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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **18CE2060** | **Duration** | **3hrs** |
| **Course Title** | **GLOBAL CLIMATE CHANGE AND ITS IMPACT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define climate change. | | CO1 | R | 1 |
| 2. | List two main sectors of the green economy according to Karl Burkart. | | CO3 | R | 1 |
| 3. | Identify the factors affecting climate. | | CO2 | R | 1 |
| 4. | List two dimensions of food security. | | CO3 | U | 1 |
| 5. | Define coastal upwelling. | | CO4 | R | 1 |
| 6. | Describe the concepts of energy balance. | | CO1 | R | 1 |
| 7. | Explain ozone depletion. | | CO4 | A | 1 |
| 8. | List two impacts of greenhouse gases. | | CO6 | R | 1 |
| 9. | Illustrate water-related ecosystem services. | | CO4 | A | 1 |
| 10. | Infer the characteristics of hurricanes. | | CO6 | An | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Explain the impact of global warming on agriculture. | | CO4 | U | 3 |
| 12. | Classify lapse rates using a suitable diagram. | | CO2 | An | 3 |
| 13. | Describe the four basic types of climate models. | | CO5 | R | 3 |
| 14. | Illustrate the impact of air pollution on living organisms and non-living environments. | | CO1 | A | 3 |
| 15. | Describe the green economy. | | CO2 | R | 3 |
| 16. | Given the following temperature and elevation data, determine the stability of the atmosphere: Elevation (m) | Temperature (°C) 2.00 | 14.35 324.00 | 11.13 | | CO2 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Classify cloud types and illustrate with a clear diagram. | CO4 | E | 12 |
|  |  |  |  |  |  |
| 18. |  | Illustrate the global wind system using a neat and clear diagram. | CO6 | A | 12 |
|  |  |  |  |  |  |
| 19. |  | Explain the important international agreements and protocols on climate change. | CO6 | A | 12 |
|  |  |  |  |  |  |
| 20. |  | Assess water-related adaptation to climate change and analyze past climate variations from natural records. | CO3 | E | 12 |
|  |  |  |  |  |  |
| 21. | a. | Compare unstable, stable, and neutral atmospheric stability and their effects on weather. | CO1 | E | 06 |
|  | b. | Summarize a case study on climate change mitigation and adaptation. | CO4 | E | 06 |
|  |  |  |  |  |  |
| 22. |  | Assess the impact of climate variability and change on sanitation systems. | CO3 | E | 12 |
|  |  |  |  |  |  |
| 23. |  | Articulate evidence suggesting what the climate was like in the past. | CO6 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Evaluate the IPCC’s role, structure, and activities, and analyze its impact on global climate change policy. | CO6 | E | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| **CO1** | Understand the climate and its change |
| **CO2** | List the factors affecting global climate change |
| **CO3** | Analyze the impacts of global climate change |
| **CO4** | Explain the importance of climate change in various fields |
| **CO5** | Develop Climate Change Models |
| **CO6** | Study the impacts of climate change across the Globe |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | - | 3 | - | 6 | - | 11 |
| **CO2** | 4 | - | 3 | - | - | - | 7 |
| **CO3** | 1 | 1 |  | 3 | 24 | - | 29 |
| **CO4** | 1 | 3 | 2 | - | 18 | - | 24 |
| **CO5** | 3 | - | - | - | - | - | 3 |
| **CO6** | 1 | - | - | 27 | 12 | - | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **18CE3027** | **Duration** | **3hrs** |
| **Course Title** | **DESIGN OF MASONRY STRUCTURES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Summarize the advantages and disadvantages of using reinforced masonry in earthquake-prone areas with sketches. | CO1 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Compile the list of different materials commonly used in masonry construction and describe the role of mortar in masonry construction. | CO1 | C | 20 |
|  |  |  |  |  |  |
| 3. |  | Explain the factors that influence the load-bearing capacity of a masonry wall. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Distinguish the factors that contribute to inelastic behavior in masonry during extreme loading events. | CO6 | A | 20 |
|  |  |  |  |  |  |
| 5. |  | Explain the difference between in-plane and out-of-plane loading in the context of masonry walls. Also its flexural behaviour under bending. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Explain the factors that influence the shear strength of masonry wall and its failure. | CO4 | U | 20 |
|  |  |  |  |  |  |
| 7. |  | Analyze the various failure modes of masonry wall under axial, shear and bending with sketches. | CO5 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Assess the advantages and limitations of static pushover analysis for identifying weak points in masonry. | CO1 | A | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Develop a case study analysis framework that focuses on learning from masonry failures under static and dynamic loads. | CO6 | A | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the masonry design approaches. |
| CO2 | Analyze reinforced masonry members. |
| CO3 | Determine interactions between members. |
| CO4 | Determine shear strength and ductility of reinforced masonry members. |
| CO5 | Check the stability of walls |
| CO6 | Perform elastic and In-elastic analysis of masonry walls. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | - | 20 | - | 20 | 20 | 60 |
| CO2 | - | - | - | - | - | - | - |
| CO3 | - | 40 | - | - | - | - | 40 |
| CO4 | - | 20 | - | - | - | - | 20 |
| CO5 | - | - | - | 20 | - | - | 20 |
| CO6 | - |  | 40 | - | - | - | 40 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **18CE3034 / 20CE3018** | **Duration** | **3hrs** |
| **Course Title** | **DESIGN OF PRESTRESSED CONCRETE STRUCTURES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (5 X 16 = 80 MARKS)**  **(Answer any five from the following)** | | | | | |
| 1. |  | Estimate the maximum working stress in a rectangular concrete beam with a cross-section of 30 cm deep and 20 cm wide, prestressed using 15 wires of 5 mm diameter located 6.5 cm from the bottom of the beam and 3 wires of 5 mm diameter located 2.5 cm from the top. Assuming the prestress in the steel is 840 N/mm², calculate the stresses at the extreme fibres of the mid-span section when the beam is supporting its own weight over a span of 6 m. Assume the density of concrete is 24 kN/m³ and the uniformly distributed live load is 6 kN/m. | CO1 | An | 16 |
|  |  |  |  |  |  |
| 2. |  | Design of a post tensioned beam of span 20 m for a live load of 15 kN per meter run. Concrete grade of M40 and 5 mm diameter steel wires of characteristics strength 1600 MPa were adopted in the design. The beam was designed as type-1 structure. The strength of concrete at transfer was assumed as 35 MPa and the initial stress in the wires as 1200 MPa. | CO2 | C | 16 |
|  |  |  |  |  |  |
| 3. | a. | Estimate the magnitude of the live load for a continuous beam ABCD (AB = BC = CD = 10 m) that supports a uniformly distributed live load of q kN/m. The beam has a rectangular section with a width of 300 mm and an overall depth of 600 mm throughout. It is prestressed by a concordant cable located 100 mm from the soffit at mid-span points and from the top of the beam at supports B and C. The cross-sectional area of the cable is 600 mm². The ultimate strength of the cable and concrete is 1600 N/mm² and 40 N/mm², respectively. If the density of concrete is 24 kN/m³, evaluate the magnitude of the live load at the limit state of collapse, assuming,  (a) Elastic distribution of moments, and  (b) Full redistribution of moments. | CO3 | An | 8 |
|  | b. | Evaluate the load factor against failure for a continuous beam with two equal spans of 30 m each. The beam has a rectangular section, 500 mm wide by 1000 mm deep throughout the spans. The beam is prestressed by a concordant cable with high tensile strands of cross-sectional area 3000 mm², located 100 mm from the top of the beam at the mid-support section. If the beam supports a uniformly distributed service load of 8 kN/m throughout the span lengths, estimate the load factor against failure assuming: fpu = 1700 N/mm2, fck = 50 N/mm2 and density of concrete as 24 kN/m3, for the two cases,  (a) Elastic distribution of moments, and  (b) Complete redistribution of moments. | CO3 | An | 8 |
|  |  |  |  |  |  |
| 4. |  | Design the mid span section of the post-tensioned prestressed concrete slab of effective span 10m is to be designed to carry an equivalent live load of 15 kN/m. Adopting M45 grade of concrete and 7 mm diameter high tensile wires of ultimate strength 1520 MPa. Assume that at transfer the cube strength of concrete is 35 MPa. | CO4 | C | 16 |
|  |  |  |  |  |  |
| 5. |  | Design the circumferential and longitudinal wires for a non-cylindrical prestressed concrete pipe with an internal diameter of 1000 mm and a concrete shell thickness of 75 mm, required to convey water at a working pressure of 1.5 N/mm². The length of each pipe is 6 m. The maximum direct compressive stresses in concrete are 15 and 2 N/mm². The loss ratio is 0.8.  (a) Design the circumferential wire winding using 5 mm-diameter wires stressed to 1000 N/mm².  (b) Design the longitudinal prestressing using 7 mm wires tensioned to 10.00 N/mm². The maximum permissible tensile stress under the critical transient loading (wire wrapping at spigot end) should not exceed 0.8fci where fci is the cube strength of concrete at transfer = 40 N/mm². | CO5 | C | 16 |
|  |  |  |  |  |  |
| 6. |  | Illustrate the impact of factors such as creep, shrinkage, and relaxation of steel on the initial prestress and how these losses are influenced by environmental conditions. Identify the main causes of prestress losses in concrete structures. | CO1 | U | 16 |
|  |  |  |  |  |  |
| 7. |  | Compare the behavior of under-reinforced and over-reinforced prestressed concrete members under flexural loads. How does the reinforcement ratio affect the failure mode and ultimate failure point? | CO2 | An | 16 |
| **PART – B (1 X 20 = 20 MARKS) [Compulsory Question]** | | | | | |
| 8. |  | Determine the minimum prestress necessary for designing a composite slab for the bridge deck using a standard inverted T-section. The top flange is 250 mm wide and 100 mm thick, the bottom flange is 500 mm wide and 250 mm thick, and the web thickness is 100 mm. The overall depth of the inverted T-section is 655 mm. The bridge deck must support a characteristic imposed load of 50 kN/m² over an effective span of 12 m. Grade-40 concrete is specified for the precast pretensioned T-section with a compressive strength at transfer of 36 N/mm², while concrete of grade-30 is used for the in-situ part. Check for safety under the serviceability limit state. | CO6 | A | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** | | | | | | | | | |
| CO1 | List the prestressing techniques | | | | | | | | | |
| CO2 | Understand the concepts of prestressing techniques | | | | | | | | | |
| CO3 | Analyze prestressed concrete structures | | | | | | | | | |
| CO4 | Design prestressed concrete structural elements | | | | | | | | | |
| CO5 | Appraise on the quality parameters of PSC structures | | | | | | | | | |
| CO6 | Investigate the rationale for failure of a PSC structure | | | | | | | | | |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 16 |  | 16 |  |  | 32 |
| CO2 |  |  |  | 16 |  | 16 | 32 |
| CO3 |  |  |  | 16 |  |  | 16 |
| CO4 |  |  |  |  |  | 16 | 16 |
| CO5 |  |  |  |  |  | 16 | 16 |
| CO6 |  |  | 20 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **18CE3058** | **Duration** | **3hrs** |
| **Course Title** | **WETLAND HYDROLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Relate wetlands and riparian areas support to wildlife and in general biodiversity. | CO1 | A | 10 |
|  | b. | Describe how wetlands and riparian areas function to prevent storm damage. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Associate the importance of the following topics with wetlands:   * Nutrient budget * Erosion and sediment * Peak and low flow * Deforestation | CO2 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Summarize the Ramsar Convention's three pillars for protecting wetlands. | CO4 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe how wetlands function to control downstream flooding. | CO5 | An | 10 |
|  | b. | Explain the three components in EPA's recommended approach for state wetlands monitoring and assessment programs? | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. |  | Explain the given topics with reference to wetland development.   * Characteristics of watersheds * Soil and water conservation * Flood management | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Generalize hydrologic principles with reference to wetlands due to changes in forest and agricultural management. | CO5 | U | 10 |
|  | b. | Distinguish the possible influence of forest on hydrologic processes and inflows into wetlands. | CO6 | An | 10 |
|  |  |  |  |  |  |
| 7. |  | Develop an integrated wetland management plan. | CO6 | C | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe the relationship between wetland functions and wetland values. | CO4 | An | 10 |
|  | b. | Explain the wetlands process and sequestration of pollutant to maintain water quality. | CO5 | A | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Illustrate the possible impacts of urbanization on wetland hydrology using suitable diagram. | CO3 | An | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand different aspects of wetland management |
| CO2 | Conduct water balance studies in wetland |
| CO3 | Apply the hydrological principles in wetland management |
| CO4 | Estimate the exchange processes in coastal wetlands |
| CO5 | Model sediment dynamics in wetland conservation |
| CO6 | Develop suitable wetland management strategy in catchment and coastal hydrology |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 10 | 10 |  |  |  | 20 |
| CO2 |  | 20 |  |  |  |  | 20 |
| CO3 |  |  | 20 | 20 |  |  | 40 |
| CO4 |  | 10 | 20 | 10 |  |  | 40 |
| CO5 |  | 10 | 10 | 10 |  |  | 30 |
| CO6 |  |  |  | 10 |  | 20 | 30 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **18CE3062** | **Duration** | **3hrs** |
| **Course Title** | **SUBSURFACE INVESTIGATIONS AND FIELD TESTING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the scopes and objectives of surface exploration. | CO1 | U | 10 |
|  | b. | Examine the differences between preliminary and detailed exploration for site investigations. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Explain various stages in subsurface exploration including consideration for spacing. | CO1 | An | 20 |
|  |  |  |  |  |  |
| 3. | a. | Discuss any four different methods of borings. | CO2 | U | 10 |
|  | b. | Describe the types of pits, trenches, drifts and shafts used in open excavation. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the types of samples. How do design features affect sample disturbance. | CO3 | A | 10 |
|  | b. | Describe the following types of soil samplers split spoon sampler, scraper bucket and piston sampler. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discuss the factors that influence the quality of soil samples. | CO3 | U | 10 |
|  | b. | Explain the working mechanism of split spoon sampler and piston sampler. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Explain SPT and CPT. How do these test provide information about soil properties. | CO5 | An | 20 |
|  |  |  |  |  |  |
| 7. | a. | Discuss the methods used for preserving and handling soil samples after collection. | CO3 | U | 10 |
|  | b. | Determine the process of core drilling and its application in subsurface exploration. | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Discuss the importance and applications of field permeability tests in soil investigation. | CO5 | U | 10 |
|  | b. | Explain the groundwater table observations are integrated into in-situ testing. | CO5 | A | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze the different geophysical methods used in subsurface investigation. | CO6 | An | 10 |
|  | b. | Assess the processes of electrical sounding and seismic refraction methods in geophysical exploration. | CO6 | E | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| CO1 | Recall the different methods of soil investigation. |
| CO2 | Evaluate the properties of soil at different depths. |
| CO3 | Identify the samplers to collect the disturbed and undisturbed soil. |
| CO4 | Conduct field test for bearing capacity. |
| CO5 | Design suitable field instrumentation. |
| CO6 | Prepare subsoil investigation reports. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 10 |  | 20 |  |  | 40 |
| CO2 |  | 20 | 10 |  |  |  | 30 |
| CO3 |  | 20 | 10 |  |  |  | 30 |
| CO4 |  | 10 | 10 |  |  |  | 20 |
| CO5 |  | 10 | 10 | 20 |  |  | 40 |
| CO6 |  |  |  | 10 | 10 |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **18CE3064** | **Duration** | **3hrs** |
| **Course Title** | **STRENGTH AND DEFORMATION CHARACTERISTICS OF SOILS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the one-dimensional consolidation theory and its significance in soil mechanics. | CO1 | U | 10 |
|  | b. | Interpret the factors affecting consolidation in layered soil systems. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Determine the methods used to compute the coefficient of consolidation. | CO1 | A | 20 |
|  |  |  |  |  |  |
| 3. | a. | Illustrate the stress-strain behavior of granular soils under direct shear and triaxial testing. | CO2 | An | 10 |
|  | b. | Compare drained and undrained conditions in triaxial testing of granular soils. | CO2 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the importance of triaxial testing and stress path plotting for cohesive soils. | CO3 | A | 10 |
|  | b. | Explain the Mohr-Coulomb failure criterion and its use in geotechnical engineering. | CO4 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | Differentiate the total stress and effective stress approaches in cohesive soils. | CO3 | U | 10 |
|  | b. | Examine the Von Mises and Tresca yield criteria and their applications in soil mechanics. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Explain the elasto-plastic law and the differences between linear visco-elastic and elasto-plastic behavior in soils. | CO5 | An | 20 |
|  |  |  |  |  |  |
| 7. | a. | Explain the stress-strain behavior of partially saturated clay and factors influencing it. | CO5 | U | 10 |
|  | b. | Describe the process and significance of determining critical states in cohesionless soils. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Illustrate the Skempton’s pore pressure parameters and their significance in soil mechanics. | CO3 | A | 10 |
|  | b. | Explain the concept of liquefaction in cohesionless soils and factors influencing it. | CO4 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Summarize the Roscoe and Hvorslev boundary surface models in critical state theory. | CO6 | E | 10 |
|  | b. | Assess the concept of critical state soil mechanics and its relevance in soil modeling | CO6 | E | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Determine the compressibility of soil.. |
| CO2 | Distinguish stress strain behavior between cohesionless and cohesive soil. |
| CO3 | Illustrate stress path for different conditions. |
| CO4 | Examine the failure criteria of soils. |
| CO5 | Design Rheological models and stress paths. |
| CO6 | Justify Elasto plastic and visco- elastic laws. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | 20 |  |  |  | 40 |
| CO2 |  | 10 |  | 20 |  |  | 30 |
| CO3 |  | 10 | 20 |  |  |  | 30 |
| CO4 |  | 10 | 20 |  |  |  | 30 |
| CO5 |  | 10 |  | 20 |  |  | 30 |
| CO6 |  |  |  |  | 20 |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CE1001** | **Duration** | **3hrs** |
| **Course Title** | **BUILDING SCIENCE AND ENGINEERING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define the term equinox in sun-earth path. | | CO1 | R | 1 |
| 2. | Relate the solar time with the local time. | | CO1 | R | 1 |
| 3. | List the health issues caused by the variation of heat. | | CO2 | R | 1 |
| 4. | Define the thermal equilibrium of human body. | | CO2 | R | 1 |
| 5. | Identify the various energy sources for electricity. | | CO3 | R | 1 |
| 6. | Write about the energy audit carried out for a building. | | CO3 | R | 1 |
| 7. | Define the term velocity. | | CO4 | R | 1 |
| 8. | State the concept of reverberation. | | CO4 | R | 1 |
| 9. | State the objective of daylighting in the building design. | | CO5 | R | 1 |
| 10. | Write the equation used to measure the indoor thermal radiation. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Interpret the necessity to study climate factor to design building. | | CO1 | U | 3 |
| 12. | Differentiate core body temperature and skin temperature. | | CO2 | U | 3 |
| 13. | List the ways to maximize the natural energy gains in the building. | | CO3 | U | 3 |
| 14. | Identify the room acoustic parameters. | | CO4 | U | 3 |
| 15. | Trace the types of technology adopted for managing daylighting in the building. | | CO5 | U | 3 |
| 16. | Describe about the shading device and its uses. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No 17 to 23, Q.No 24 is Compulsory)** | | | | | |
| 17. | a. | Summarize the factors affecting the building design related to sun-earth relationship. | CO1 | U | 6 |
|  | b. | Discuss the various building design adopted to overcome the ill effects due to climate. | Co1 | U | 6 |
|  |  |  |  |  |  |
| 18. | a. | Explain the environmental, personal and contributing factors governing thermal comfort. | CO2 | U | 6 |
|  | b. | Illustrate the suitable active and passive system for better thermal comfort in the building. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 19. | a. | Compute the energy use in building by bottom up approach. | CO3 | A | 6 |
|  |  | Evaluate the economic and cultural feasibility in implementing energy efficient solution in building. | CO3 | An | 6 |
|  |  |  |  |  |  |
| 20. | a. | Explain the transmission, propagation and insulation of acoustics in the building. | CO4 | E | 6 |
|  | b. | Recommend the parameters that have to be considered for the auditorium. | CO4 | E | 6 |
|  |  |  |  |  |  |
| 21 | a. | Evaluate the daylighting measurement system. | CO5 | E | 6 |
|  | b. | Describe the glazing material and its composition in controlling daylighting. | CO5 | A | 6 |
|  |  |  |  |  |  |
| 22. | a. | Illustrate the usage of facades in building design. | CO5 | A | 6 |
|  | b. | Analyze the challenges and advantages of incorporating daylighting in building system. | CO5 | An | 6 |
|  |  |  |  |  |  |
| 23. | a. | Examine adverse effect of daylighting in the building. | CO6 | U | 6 |
|  | b. | Analyze the importance of thermal comfort inside the building with an example. | CO6 | An | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Summarize the context of LEED and its certification system. | CO6 | E | 6 |
|  | b. | Explain the ill-effect of improper acousting planning. | CO6 | A | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED\

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify the climate responsive design of buildings |
| CO2 | Illustrate the thermal comfort and energy efficiency requirements |
| CO3 | Illustrate acoustics, in the design of buildings |
| CO4 | Demonstrate the principles of noise control |
| CO5 | Design for visual quality and day lighting |
| CO6 | Appraise the design principles in real time environment |

|  |  |  |  |  |  |  |  |
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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| CO / BL | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 2 | 15 |  |  |  |  | 17 |
| CO2 | 2 | 15 |  |  |  |  | 17 |
| CO3 | 2 | 3 | 6 | 6 |  |  | 17 |
| CO4 | 2 | 3 |  |  | 12 |  | 17 |
| CO5 | 1 | 3 | 12 | 6 | 6 |  | 28 |
| CO6 | 1 | 9 | 6 | 6 | 6 |  | 28 |
|  | | | | | | | **124** |



**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE1003** | **Duration** | **3hrs** |
| **Course Title** | **GREEN DESIGN AND LIFE CYCLE ASSESSMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Infer the concept of green energy. | | CO1 | U | 1 |
| 2. | State the role of greenhouse gases in the atmosphere. | | CO1 | R | 1 |
| 3. | List any one corporate image benefit of energy with examples. | | CO2 | R | 1 |
| 4. | Define passive design of buildings. | | CO2 | R | 1 |
| 5. | List any one of the strategies applied for carbon management. | | CO3 | R | 1 |
| 6. | List any one methods to reduce carbon footprint. | | CO3 | R | 1 |
| 7. | Define Life Cycle Assessment (LCA). | | CO5 | R | 1 |
| 8. | List any one significance of EIA. | | CO4 | R | 1 |
| 9. | State any one advantages of green design technology. | | CO6 | R | 1 |
| 10. | Define green transport. | | CO4 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | List any two scopes of emissions that can be considered in the greenhouse protocol. | | CO1 | R | 3 |
| 12. | Appraise any two benefits that occur by conducting a lifecycle assessment in business. | | CO2 | An | 3 |
| 13. | Cite the rating systems applied for green analysis of buildings. | | CO6 | U | 3 |
| 14. | State the measurement procedure to assess customer satisfaction in green building design. | | CO4 | R | 3 |
| 15. | Explain the cost-benefit analysis of LCA. | | CO3 | U | 3 |
| 16. | Identify any three environmental impacts that occurs during construction. | | CO5 | R | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No. 17 to 23, Q.No. 24 is Compulsory)** | | | | | |
| 17. | a. | Summarize the effect of global warming with reference to climate change. | CO1 | E | 6 |
|  | b. | Explain the aspects of energy consumption during building construction. | CO4 | A | 6 |
|  |  |  |  |  |  |
| 18. | a. | Enumerate any 15 criteria considered during GRIHA rating of existing buildings. | CO2 | R | 6 |
|  | b. | Explain the process followed for mitigation of GHG in buildings. | CO2 | A | 6 |
|  |  |  |  |  |  |
| 19. | a. | Enumerate the principles adapted during design of energy efficient buildings. | CO3 | R | 6 |
|  | b. | Illustrate the environmental and social benefits derived due to carbon footprint analysis. | CO6 | U | 6 |
|  |  |  |  |  |  |
| 20. | a. | Describe the methods followed for the measurement of greenhouse gas emission. | CO6 | U | 6 |
|  | b. | Discuss the steps involved in lifecycle impact assessment of products. | CO3 | An | 6 |
|  |  |  |  |  |  |
| 21. | a. | Explain the stages involved in Life cycle Inventory Analysis. | CO3 | A | 6 |
|  | b. | Illustrate Environmental Impact Assessment of a building project. | CO5 | A | 6 |
|  |  |  |  |  |  |
| 22. |  | Appraise the carbon footprint analysis procedures in detail followed for buildings. | CO5 | An | 12 |
|  |  |  |  |  |  |
| 23. | a. | Analyze and state the personal and social benefits of energy conservation. | CO5 | U | 6 |
|  | b. | Explain the procedure followed for sustainability assessment of LCA. | CO4 | U | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Describe the problems faced by stakeholders during implementation of green design. | CO4 | U | 6 |
|  | b. | Explain the lighting and ventilation techniques involved in green design. | CO6 | An | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Identify the carbon emission from the buildings |
| CO2 | Illustrate the energy efficiency principles |
| CO3 | Apply the energy analysis models |
| CO4 | Analyze the sustainability of buildings |
| CO5 | Apply the social and economic aspects in green buildings |
| CO6 | Formulate techniques for green design in buildings |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 4 | 7 | - | - | 6 | - | 17 |
| **CO2** | 7 |  | 7 | 3 |  |  | 17 |
| **CO3** | 8 | 3 | 6 | 6 |  |  | 23 |
| **CO4** | 5 | 12 | 6 | - |  |  | 23 |
| **CO5** | 4 | 6 | 0 | 12 |  |  | 22 |
| **CO6** | 1 | 15 |  | 6 |  |  | 22 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2001** | **Duration** | **3hrs** |
| **Course Title** | **SURVEYING AND GEOMATICS ENGINEERING** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | List the types of leveling staff. | | CO1 | R | 1 |
| 2. | State geodetic surveying. | | CO1 | R | 1 |
| 3. | Define Tacheometer. | | CO2 | R | 1 |
| 4. | Define latitude in the context of surveying. | | CO2 | R | 1 |
| 5. | Differentiate stadia tacheometry and tangential tacheometry. | | CO3 | U | 1 |
| 6. | List the instruments used in tacheometric surveying. | | CO3 | R | 1 |
| 7. | Define transition curve. | | CO4 | R | 1 |
| 8. | Calculate the length of long chord for a circular curve of radius 100m and deflection angle 30°. | | CO4 | A | 1 |
| 9. | Explain the principle of operation of a total station. | | CO5 | U | 1 |
| 10. | Explain the significance of total station in survey. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Differentiate between a map and a plan. | | CO1 | U | 3 |
| 12. | Change the following whole circle bearing to reduced bearing: a) 151 o  b) 285 o | | CO2 | A | 3 |
| 13. | Describe the benefits of tacheometric surveying in areas with limited accessibility. | | CO3 | U | 3 |
| 14. | Compare compound and reverse curve. | | CO4 | A | 3 |
| 15. | Explain the uses of total station. | | CO5 | U | 3 |
| 16. | Illustrate the process and applications of drone surveying in modern surveying practices. | | CO6 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eighth readings. 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 m. Enter the above readings in a page of a level book and calculate the R.L. of points, if the first reading was taken with a staff held on a bench mark of 200 m. | CO1 | An | 8 |
|  | b. | Explain the process of reciprocal leveling and how it helps to eliminate errors. | CO1 | A | 4 |
|  |  |  |  |  |  |
| 18. |  | The following records are obtained in a traverse survey, where the length and bearing of the last line were not recorded:   |  |  |  | | --- | --- | --- | | **LINE** | **LENGTH (m)** | **BEARING** | | AB | 75.50 | 30o 24’ | | BC | 180.50 | 110 o 36’ | | CD | 60.25 | 210 o30’ | | DA | ? | ? |   Calculate the length and bearing of the line DA. | CO2 | An | 12 |
|  |  |  |  |  |  |
| 19. |  | The following observations were taken with a tachometer fitted with an anallatic lens, the staff being held vertically. The constant of the tachometer is 100 and 0.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Int.  Station | Height of instrument | Staff station | Vertical angle | Staff readings  (m) | Remark | | A | 1.255 | BM | -7°20’ | 2.325, 2.825,3.325 | RL of BM = 255.750m | | A | 1.255 | B | +4°30’ | 0.850, 1.600, 2.350 | | C | 1.450 | B | -5°24’ | 2.715, 3.315,3.915 |   Calculate the RL of B and the distance between A and B. | CO3 | A | 12 |
|  |  |  |  |  |  |
| 20. | a. | Two straights intersect at chainage 1615m, the deflection angle being 11o and radius 573m. Calculate all the data necessary to set out a simple right handed curve by the Rankine’s method of angles. Peg interval may be taken as 20m. Draw the table of deflection angles. | CO4 | An | 9 |
|  | b. | Explain the point of curve (PC) and point of tangency (PT) in a simple horizontal curve with the aid of a neat sketch. Describe how these points are applied during the layout of a road or railway curve. | CO4 | A | 3 |
|  |  |  |  |  |  |
| 21. | a. | Explain the key advantages and disadvantages of using a total station in surveying compared to traditional surveying tools. | CO5 | A | 6 |
|  | b. | Discuss the primary applications of a total station in construction and engineering projects. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 22. | a. | Differentiate between a temporary benchmark and a permanent benchmark. | CO1 | U | 4 |
|  | b. | Explain different types of leveling. | CO1 | U | 8 |
|  |  |  |  |  |  |
| 23. | a. | Summarize the steps involved in the reiteration method for determining horizontal angles and evaluate its accuracy. | CO2 | E | 6 |
|  | b. | Explain the trigonometric principles used to derive height and horizontal distance between two points when first instrument is higher than the second instrument. | CO2 | An | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Explain the fundamentals of drone surveying and discuss how it differs from traditional surveying methods in terms of accuracy and efficiency. | CO6 | A | 6 |
|  | b. | Examine the critical steps involved in flight planning for drone surveys. | CO6 | A | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Perform basic land surveying instruments and perform related calculations equipments |
| **CO2** | Select methods to measure angles and distances |
| **CO3** | Schedule field surveying operations. |
| **CO4** | Examine the implementation of surveying procedures for setting out curves |
| **CO5** | Appraise the usage of equipment’s and methods in triangulation survey |
| **CO6** | Formulate the surveying methods and executions |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 15 | 4 | 8 |  |  | 29 |
| **CO2** | 2 |  | 3 | 18 | 6 |  | 29 |
| **CO3** | 1 | 4 | 12 |  |  |  | 17 |
| **CO4** | 1 |  | 7 | 9 |  |  | 17 |
| **CO5** | 1 | 9 | 6 |  |  |  | 16 |
| **CO6** |  | 1 | 15 |  |  |  | 16 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2002** | **Duration** | **3hrs** |
| **Course Title** | **MECHANICS OF SOLIDS** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Determine the stress in a rod that is 150 cm long and 2 cm in diameter when subjected to an axial pull of 20 kN. | | CO1 | A | 1 |
| 2. | Define principle of superposition. | | CO1 | R | 1 |
| 3. | Explain pure bending or simple bending. | | CO2 | U | 1 |
| 4. | Write the significance of shear force in the analysis of beams. | | CO2 | U | 1 |
| 5. | List the different methods used to find the slope and deflection of a beams. | | CO3 | R | 1 |
| 6. | Describe the boundary conditions involved in the double integration method for beam deflection analysis. | | CO3 | U | 1 |
| 7. | Name the stresses set up in a thin cylinder subjected to internal fluid pressure. | | CO4 | R | 1 |
| 8. | Select the key stress that should be used for calculating the required wall thickness in the design of a cylindrical pressure vessel subjected to internal pressure. | | CO4 | U | 1 |
| 9. | Calculate the maximum torque for a solid shaft with a diameter of 50 mm and a shear stress of 80 MPa. | | CO5 | A | 1 |
| 10. | Examine the differences in design considerations for short and long columns based on their failure mechanisms. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Solve for the minimum diameter of a steel wire required to raise a 4000 N load, under the condition that the stress is limited to 95 N/mm². | | CO1 | A | 3 |
| 12. | Classify beams based on support condition. | | CO2 | U | 3 |
| 13. | Calculate the slope at the supports of a simply supported beam 10 m long, carrying a point load of 70 kN at its center. The moment of inertia of the beam is 78 x 106 mm4, and the modulus of elasticity E for the material of the beam is 2.1 x 105 N/mm2. | | CO3 | A | 3 |
| 14. | Evaluate the interaction between the changes in diameter and length when a cylindrical shell is subjected to internal pressure. | | CO4 | E | 3 |
| 15. | Determine the relation for a circular shaft when subjected to torsion. | | CO5 | A | 3 |
| 16. | Summarize the significance of understanding the assumptions in Euler’s column theory and their implications for structural engineering. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Determine the following for a steel bar tested in a tensile test:  a) Young’s modulus, b) Stress at the elastic limit, c) Percentage elongation, d) Percentage decrease in area.  Given the following data:   * Diameter of the steel bar = 30 mm * Gauge length = 200 mm * Load at elastic limit = 250 kN * Extension at load of 150 kN = 0.21 mm * Maximum load = 380 kN * Total extension = 60 mm * Diameter of the rod at failure = 22.5 mm | CO1 | A | 12 |
|  |  |  |  |  |  |
| 18. |  | Calculate the shear force and bending moment at key points along a cantilever beam of length 2 m, which carries point loads of 300 N, 500 N, and 800 N at distances of 0.5 m, 1.2 m, and 2 m, respectively, from the fixed end. Plot the shear force and bending moment diagrams for the beam. | CO2 | A | 12 |
|  |  |  |  |  |  |
| 19. |  | Establish the mathematical expressions for the slopes , at the supports, and the maximum deflection ​ at the center of a simply supported beam subjected to a point load P applied at its midpoint. | CO3 | A | 12 |
|  |  |  |  |  |  |
| 20. |  | Determine the maximum diameter of a boiler subjected to an internal steam pressure of 2 N/mm², with a boiler plate thickness of 2.6 cm and a permissible tensile stress of 120 N/mm². The efficiency of the longitudinal joint is 90% and the efficiency of the circumferential joint is 40%. | CO4 | A | 12 |
|  |  |  |  |  |  |
| 21. | a. | Discover the external and internal diameters of a hollow shaft required to transmit 300 kW of power at 80 r.p.m., assuming that the shear stress should not exceed 60 N/mm² and the internal diameter is 0.6 times the external diameter. Also, assume that the maximum torque is 1.4 times the mean torque. | CO5 | A | 6 |
|  | b. | Determine the diameter of a solid steel which will transmit 90 kW at 160 r.p.m. Also determine the length of the shaft if the twist must not exceed 10 over the entire length. The maximum shear stress is limited to 60 N/mm2. Take the value of modulus of rigidity = 8 x 104 N/mm². | CO5 | A | 6 |
|  |  |  |  |  |  |
| 22. |  | Calculate the maximum bending moment on a simply supported beam of length 9 m, carrying a uniformly distributed load of 10 kN/m over a distance of 6 m from the left end. Draw the shear force and bending moment diagrams for the beam. | CO2 | A | 12 |
|  |  |  |  |  |  |
| 23. |  | Compute the longitudinal and hoop stresses in the wall of a closed cylindrical vessel made of steel plates 4 mm thick with plane ends, subjected to a fluid pressure of 3 N/mm². The diameter of the cylinder is 25 cm and the length is 75 cm. Determine the change in diameter, length, and volume of the cylinder. Take E= 2.1 x 105 N/mm2 and µ= 0.286. | CO4 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Evaluate the following for a timber column with a section size of 15 cm x 20 cm and a length of 6 m, with both ends fixed.  a) Crippling load b) Safe load for the column, assuming a factor of safety of 3.  Take the Young's modulus of timber as 17.5 kN/mm². | CO6 | A | 6 |
|  | b. | Calculate the safe load for a 1.5 m long column with a circular cross-section of 5 cm diameter, where one end is fixed and the other end is free. Use a factor of safety of 3.Apply the following methods:  a) Rankine’s formula with yield stress, 560 N/mm2 and a = 1/1600;  b) Euler’s formula with E= 1.2 x 105 N/mm2. | CO6 | A | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Illustrate the concepts and principles |
| **CO2** | Explain the behaviour of structural elements |
| **CO3** | Analyze the structural members for various forces |
| **CO4** | Estimate the response of the elements |
| **CO5** | Develop suitable response intricacies |
| **CO6** | Adapt suitable analysis procedure |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 |  | 16 |  |  |  | 17 |
| **CO2** |  | 5 | 24 |  |  |  | 29 |
| **CO3** | 1 | 1 | 15 |  |  |  | 17 |
| **CO4** | 1 | 1 | 24 |  | 3 |  | 29 |
| **CO5** |  |  | 16 |  |  |  | 16 |
| **CO6** | 1 | 3 | 12 |  |  |  | 16 |
|  | | | | | | | **124** |



**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2003** | **Duration** | **3hrs** |
| **Course Title** | **FLUID MECHANICS AND MACHINERY** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Differentiate between kinematic and dynamic viscosity. | | CO1 | U | 1 |
| 2. | Define weight density. | | CO1 | R | 1 |
| 3. | State Pascal’s law with an example. | | CO1 | R | 1 |
| 4. | Compare Venturimeter with Orificemeter. | | CO2 | U | 1 |
| 5. | Illustrate the velocity profile for a pipe flow. | | CO3 | U | 1 |
| 6. | List the forms of energies that are considered in Bernoulli’s equation. | | CO3 | A | 1 |
| 7. | Define critical depth. | | CO4 | R | 1 |
| 8. | State the device used to measure average velocity of flow in an open channel. | | CO4 | R | 1 |
| 9. | Define total head in case of pumps. | | CO5 | R | 1 |
| 10. | Cite an example for reaction turbine. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Capillary rise in a glass tube of 2.5 mm diameter is found to be of 1.8 cm when immersed in water. Calculate the surface tension along the water surface in contact with air. | | CO1 | An | 3 |
| 12. | An oil of specific gravity 0.9 is contained in a vessel. Estimate the pressure at the bottom of the vessel when the height of oil is 40 m. | | CO1 | E | 3 |
| 13. | Compare steady and unsteady flows with examples. | | CO2 | U | 3 |
| 14. | Express the relationship between minimum specific energy and critical depth. | | CO3 | U | 3 |
| 15. | Differentiate between backwater and drawdown curves. | | CO4 | An | 3 |
| 16. | Classify flows based on Froude’s number. | | CO3 | An | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No. 17 to 23, Q.No. 24 is Compulsory)** | | | | | |
| 17. | a. | A differential manometer is connected at the two points A and B of two pipes. The pipe A contains a liquid of sp. gr = 1.5 while pipe B contains a liquid of sp.gr = 0.9. The pressures at A and B are 1 N/m2 and 1.8 N/m2 respectively. Estimate the difference in mercury level in the differential manometer. | CO1 | U | 6 |
|  | b. | A plane 0.025mm distant from a fixed plate, moves at 60 m/s and requires a force of 2 N per unit area i.e., 2N/m2 to maintain this speed. Determine the fluid viscosity between the plates in poise. | CO1 | A | 6 |
|  |  |  |  |  |  |
| 18. | a. | Estimate the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400mm. The rate of flow of water through the pipe is 250 litres/s. | CO2 | U | 6 |
|  | b. | A pipe, through which water is flowing, is having diameters, 20 cm and 10cm at cross-sections 1 and 2 respectively. The velocity of water at section 1 is given 40 m/s. Calculate the velocity head at sections 1 and 2 and also the rate of discharge. | CO2 | A | 6 |
|  |  |  |  |  |  |
| 19. | a. | A pipeline carrying oil of specific gravity 0.87 changes in diameter from 200 mm diameter at a position A to 500 mm diameter at a position B which is 4 m at a higher level. If the pressures at A and B are 9.81 N/cm2 and 5.886 N/cm2 respectively and the discharge is 200 l/s determine the loss of head and direction of flow. | CO3 | A | 6 |
|  | b. | A flow of water of 150 l/s flows down in a rectangular flume of width 70 cm having an adjustable bottom slope. If Chezy’s constant C is 60, determine the bottom slope necessary for uniform flow with a depth of flow of 40 cm. Also find the conveyance of the flume. | CO4 | An | 6 |
|  |  |  |  |  |  |
| 20. |  | In a rectangular channel of 0.5 m width, a hydraulic jump occurs at a point where depth of water flow is 0.15 m and Froude number is 2.5. Determine: 1.Specific Energy 2.Critical and subsequent depths 3.Head loss 4. Energy dissipated | CO4 | An | 12 |
|  |  |  |  |  |  |
| 21. | a. | Explain the components of a hydro-electric power plant with their functions and hydraulic considerations. | CO5 | U | 6 |
|  | b. | A double-acting reciprocating pump, running at 40 rpm, is discharging 1.0 m3 of water per minute. The pump has a stroke length of 400 mm. The diameter of the piston is 200 mm. The suction and delivery heads are 5m and 20 m respectively. Determine the slip of the pump and power required to drive the pump. | CO5 | An | 6 |
|  |  |  |  |  |  |
| 22. |  | A sluice gate discharges water into a horizontal rectangular channel with a velocity of 6 m/s and the depth of flow is 0.4 m. The width of the channel is 8 m. Determine whether a hydraulic jump will occur, and if so, determine the height of the jump and loss of energy per unit weight of water. Also determine the power lost in the hydraulic jump. | CO5 | An | 12 |
|  |  |  |  |  |  |
| 23. |  | Design a Pelton wheel is for the following specifications:  Shaft power = 11,772 kW, Head = 380 m, Speed = 750 rpm, Overall efficiency = 86%, Jet diameter is not the exceed one-sixth of the wheel diameter. Determine: i) the wheel diameter, ii) the number of jets required and iii) Diameter of the jet. Take Kv = 0.985 and Ku = 0.45. | CO6 | C | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | The diameter and stroke length of a single-acting reciprocating pump are 12cm and 20cm respectively. The lengths of the suction and delivery pipes are 8 and 25m respectively and their diameters are 7.5 cm. If the pump is running at 40 rpm and suction and delivery heads are 4m and 14 m respectively. Estimate the pressure head in the cylinder i) At the beginning of the suction and delivery strokes ii) At the middle of the suction and delivery strokes. Take atmospheric pressure head = 10.3m of water and f = 0.009 for both pipes. | CO6 | An | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recall the behaviour of fluids under static condition, measure pressure changes and estimate total pressure on plane surfaces |
| CO2 | Demonstrate flow measurement methods |
| CO3 | Identify the flow pattern and estimate total energy |
| CO4 | Measure flow in open channels |
| CO5 | Demonstrate various types of flows in open channels |
| CO6 | Investigate the selection and operation turbines and pumps |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 7 | 6 | 3 | 3 |  | 21 |
| **CO2** |  | 10 | 6 |  |  |  | 16 |
| **CO3** |  | 4 | 7 | 3 |  |  | 14 |
| **CO4** | 2 |  |  | 21 |  |  | 23 |
| **CO5** | 1 | 6 |  | 18 |  |  | 25 |
| **CO6** |  | 1 | 3 | 12 |  | 12 | 25 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2004** | **Duration** | **3hrs** |
| **Course Title** | **SOIL MECHANICS AND FOUNDATION ENGINEERING** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)**  **(Answer all the questions)** | | | | | |
| 1. | Name the types of soil. | | CO1 | R | 1 |
| 2. | Enumerate the term hydraulic gradient. | | CO1 | R | 1 |
| 3. | Define the term plastic limit. | | CO2 | R | 1 |
| 4. | Infer the term permeability. | | CO2 | R | 1 |
| 5. | Define the term consolidation. | | CO3 | R | 1 |
| 6. | Identify the factors studied in the method of exploration | | CO3 | R | 1 |
| 7. | Define the term geostatic stress. | | CO4 | R | 1 |
| 8. | Infer the term contact pressure. | | CO4 | R | 1 |
| 9. | Define the process of subsoil exploration. | | CO5 | R | 1 |
| 10. | Identify the types of bearing capacity failures. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)**  **(Answer all the questions)** | | | | | |
| 11. | Infer the factors affecting permeability. | | CO1 | U | 3 |
| 12. | Infer the relationship between liquid limit and plastic limit (equation). | | CO2 | U | 3 |
| 13. | Identify the types of stresses induced in the soil. | | CO3 | U | 3 |
| 14. | Illustrate the stress acting on the principal plane with neat sketch. | | CO4 | U | 3 |
| 15. | Cite the advantage of precision drilling. | | CO5 | U | 3 |
| 16. | Describe the term SBC. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No. 17 to 23, Q.No. 24 is Compulsory)** | | | | | |
| 17. | a. | Compute porosity and specific gravity for the soil having voids ratio of 0.4 and the degree of saturation is 80% of the soil. Mass of the soil sample is 190g and after oven drying the soil mass reduced to 160g. | CO1 | U | 6 |
|  | b. | Discuss the formation of soil and its types. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 18. | a. | In falling head permeameter test, the initial head (t=0) is 40cm. The head drops by 5 cm in 10 minutes. Calculate the time required to run the test for the final head to be at 20 cm. If the sample is 6 cm is height and 50 cm2 in cross-sectional area. Calculate the coefficient of permeability, taking area of stand pipe = 0.5cm2. | CO2 | U | 6 |
|  | b. | Interpret the seepage pressure and specific seepage force. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 19. | a. | Write the Terzahi’s theory of one-dimensional consolidation. | CO3 | U | 6 |
|  | b. | Differentiate the compaction and the consolidation of soil. | CO3 | U | 6 |
|  |  |  |  |  |  |
| 20. | a. | Determine the pressure acting on the soil using westergard equation. | CO4 | A | 6 |
|  | b. | Illustrate the procedure followed for Newton’s influence chart. | CO4 | A | 6 |
|  |  |  |  |  |  |
| 21. | a. | Write the various methods of exploration. | CO5 | U | 6 |
|  | b. | Discuss the depth of bore hole and spacing. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 22. | a. | Summarize the bore log report and its informations. | CO5 | A | 6 |
|  | b. | Illustrate the procedure for the standard penetration test. | CO5 | A | 6 |
|  |  |  |  |  |  |
| 23. | a. | Record the different types of shallow foundations. | CO6 | A | 6 |
|  | b. | Summarize the load carrying capacity of pile by the dynamic formula. | CO6 | A | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Assess the various types of bearing capacity failures. | CO6 | E | 6 |
|  | b. | Summarize the minimum depth of foundation by Rankine’s Analysis. | CO6 | E | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | List the basic equations of elasticity |
| CO2 | Distinguish between the applications of different types of finite elements |
| CO3 | Develop the finite element discrimination for seepage, consolidation soil structure interaction problems |
| CO4 | Identify the suitable foundation for construction |
| CO5 | Design the foundation system for shallow depth |
| CO6 | Analyse the earth retaining structures for different soil medium |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 15 |  |  |  |  | 17 |
| CO2 | 2 | 15 |  |  |  |  | 17 |
| CO3 | 2 | 15 |  |  |  |  | 17 |
| CO4 | 2 | 3 | 12 |  |  |  | 17 |
| CO5 | 1 | 15 | 12 |  |  |  | 28 |
| CO6 | 1 | 3 | 12 |  | 12 |  | 28 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2005** | **Duration** | **3hrs** |
| **Course Title** | **WATER SUPPLY AND SANITARY ENGINEERING** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | List the sources of drinking water. | | CO1 | R | 1 |
| 2. | State the significance of turbidity in fresh water. | | CO1 | R | 1 |
| 3. | State the objective of water treatment. | | CO3 | R | 1 |
| 4. | Name the water treatment sequence process that removes colloidal matter and microorganisms. | | CO4 | R | 1 |
| 5. | Define a sewer system. | | CO4 | R | 1 |
| 6. | Describe the importance of a water carriage system in maintaining public health and hygiene in urban areas. | | CO2 | U | 1 |
| 7. | Give two examples of where galvanized steel pipes are commonly used. | | CO6 | U | 1 |
| 8. | State the percentage of sewage treated in India, as reported by the Central Pollution Control Board (CPCB). | | CO2 | R | 1 |
| 9. | Describe the single stack plumbing system. | | CO6 | U | 1 |
| 10. | Name any two types of pipe joints used in conveyance systems. | | CO2 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Classify the sources of water. | | CO1 | U | 3 |
| 12. | Describe the primary treatment process for wastewater. | | CO2 | U | 3 |
| 13. | List the types of water meters. | | CO4 | R | 3 |
| 14. | Differentiate between separate and combined sewer systems, with neat diagrams. | | CO5 | An | 3 |
| 15. | Explain any two safety standards and measures followed by sewer workers. | | CO6 | A | 3 |
| 16. | Describe the challenges involved in sludge management. | | CO4 | An | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No 17 to 23, Q.No 24 is Compulsory)** | | | | | |
| 17. | a. | Distinguish between the various properties of water in detail. | CO1 | An | 6 |
|  | b. | Summarize the factors that affect the losses and wastes in the water supply system. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 18. | a. | Classify the types of sewerage and list the components of sewerage systems. | CO3 | U | 6 |
|  | | | | | |
|  | b. | Explain sedimentation (primary clarification) and the screening process in wastewater treatment. | CO3 | A | 6 |
|  |  |  |  |  |  |
| 19. | a. | Describe the methods used for repairing leaks in pipes. | CO2 | U | 6 |
|  | b. | Write the methods for laying pipes, including the processes and standards involved. | CO2 | A | 6 |
|  |  |  |  |  |  |
| 20. | a. | Distinguish between types of pipe joints and values. | CO2 | U | 6 |
|  | b. | Classify traps based on their shapes in house drainage systems. | CO4 | An | 6 |
|  |  |  |  |  |  |
| 21. | a. | Explain sanitary fittings and mention their types and standards. | CO5 | A | 6 |
|  | b. | List the four plumbing systems for house drainage. | CO6 | R | 6 |
|  |  |  |  |  |  |
| 22. |  | Illustrate a typical house drainage plan and outline the key considerations when preparing a house drainage plan. | CO5 | An | 12 |
|  |  |  |  |  |  |
| 23. | a. | Describe the process of laying a manhole, including the standards and dimensions. | CO3 | U | 4 |
|  | b. | Explain the procedures for testing and cleaning manholes and outline the emergency protocols for sewer workers. | CO5 | A | 8 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Choose one of the following topics and elaborate on it in detail:   1. Explain Advanced Oxidation Processes (AOPs). 2. Differentiate between membrane bioreactors and reverse osmosis in wastewater recycling. | CO2 | A | 8 |
|  | b. | Explain the current state of sludge management practices in India. | CO1 | An | 4 |

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Select appropriate treatment to raw water |
| CO2 | Design the pipe-network for water supply and sewage disposal effectively. |
| CO3 | Calculate and Estimate the quantity and quality of water used for domestic as well as construction. |
| CO4 | Design the water distribution and sewer networks. |
| CO5 | Make use of available standards. |
| CO6 | Prepare the plan and implement house plumbing work effectively. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 2 | 9 |  | 10 |  |  | 21 |
| CO2 | 2 | 16 | 14 |  |  |  | 32 |
| CO3 | 1 | 10 | 6 |  |  |  | 17 |
| CO4 | 5 |  |  | 9 |  |  | 14 |
| CO5 |  |  | 14 | 15 |  |  | 29 |
| CO6 | 6 | 2 | 3 |  |  |  | 11 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2007** | **Duration** | **3hrs** |
| **Course Title** | **TRANSPORTATION ENGINEERING** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | State the width of National Highways (NH) roads. | | CO1 | R | 1 |
| 2. | Define route survey. | | CO3 | R | 1 |
| 3. | Describe the diamond interchange intersection. | | CO4 | U | 1 |
| 4. | Give two examples of speed radar guns used to measure the speed of vehicles. | | CO1 | U | 1 |
| 5. | Name the component in the flexible pavement that aids in providing waterproofing and skid resistance. | | CO6 | R | 1 |
| 6. | Define carriageway. | | CO2 | R | 1 |
| 7. | State the recommended range of design life for roads. | | CO2 | R | 1 |
| 8. | Define flat-footed rails. | | CO5 | R | 1 |
| 9. | Explain the concept of track stress in railways. | | CO4 | U | 1 |
| 10. | Describe the formation in earthwork. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Interpret the significance of the National Rail Plan (NRP). | | CO1 | U | 3 |
| 12. | Explain the components of the four-stage model. | | CO2 | U | 3 |
| 13. | Illustrate the nature of responses under flexible and rigid plates. | | CO6 | A | 3 |
| 14. | Distinguish between stopping sight distance (SSD) and overtaking sight distance (OSD). | | CO4 | U | 3 |
| 15. | List the factors influencing the selection of gauges in railway track design. | | CO5 | R | 3 |
| 16. | Describe the factors responsible for the development of creeps. | | CO5 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Explain the Jayakar Committee (1927) and its key recommendations. | CO1 | U | 8 |
|  | b. | List the factors affecting transportation concerning the human element. | CO2 | R | 4 |
|  |  |  |  |  |  |
| 18. | a. | Interpret travel demand modeling and its relation to transport demand and supply. | CO2 | A | 4 |
|  | b. | Relate the real-time example carrying out a sampling study that can be adopted during evening rush hours in Mumbai. | CO1 | A | 8 |
|  |  |  |  |  |  |
| 19. | a. | Distinguish the purpose of contraction joints and the recommended length of the slab for rigid pavement. | CO5 | A | 8 |
|  | b. | Describe vehicle distribution in terms of lanes. | CO3 | U | 4 |
|  |  |  |  |  |  |
| 20. | a. | Analyze an overtaking zone with a neat diagram. | CO4 | AN | 4 |
|  | b. | Describe the design considerations and criteria for horizontal curves on highways | CO4 | U | 8 |
|  |  |  |  |  |  |
| 21. | a. | Describe the principles and components of points and crossing systems in railway stations. | CO5 | U | 8 |
|  | b. | Explain the functions of rails. | CO2 | U | 4 |
|  |  |  |  |  |  |
| 22. | a. | Calculate the safe overtaking sight distance for a design speed of 96 kmph. Assume all the required data as per IRC | CO4 | A | 8 |
|  | b. | Explain the requirements of a goods yard. | CO6 | A | 4 |
|  |  |  |  |  |  |
| 23. |  | Determine the super elevation and specify the maximum and minimum super elevation for roads. | CO4 | An | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Explain the methods for laying tracks. | CO1 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the concepts of development of highway and railway engineering. |
| **CO2** | Explain the components of highway and railway engineering. |
| **CO3** | Carry out the engineering surveys involved in planning of highway and railway engineering. |
| **CO4** | Design the geometric elements of highway and railway engineering. |
| **CO5** | Recognize the functions of structural elements of highway and railway engineering. |
| **CO6** | Identify the materials used for the construction of highway and railway engineering. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 24 | 8 |  |  |  | 33 |
| **CO2** | 6 | 15 |  |  |  |  | 21 |
| **CO3** | 1 | 4 |  |  |  |  | 5 |
| **CO4** |  | 13 | 8 | 12 |  |  | 33 |
| **CO5** | 4 | 11 | 8 |  |  |  | 23 |
| **CO6** | 1 | 1 | 7 |  |  |  | 9 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2008** | **Duration** | **3hrs** |
| **Course Title** | **TRAFFIC ENGINEERING AND MANAGEMENT** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Identify the factors affecting traffic. | | CO1 | R | 1 |
| 2. | List the functions of traffic engineers. | | CO1 | R | 1 |
| 3. | Name the types of automatic volume counting method. | | CO2 | R | 1 |
| 4. | Define the manual volume counting method. | | CO2 | R | 1 |
| 5. | Describe the parameters of lane capacity. | | CO3 | U | 1 |
| 6. | State the concept of Level of Service in traffic engineering. | | CO3 | R | 1 |
| 7. | Indicate the importance of road intersection. | | CO4 | U | 1 |
| 8. | State the term conflict area in intersection. | | CO4 | R | 1 |
| 9. | Identify the causes of road accidents. | | CO5 | U | 1 |
| 10. | List the findings in road safety audit. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Differentiate macroscopic and microscopic study. | | CO1 | U | 3 |
| 12. | Summarize the spot speed measuring types used in the field. | | CO2 | U | 3 |
| 13. | Classify the types of traffic flow. | | CO3 | U | 3 |
| 14. | Compare the channelized and unchannelized intersection. | | CO4 | U | 3 |
| 15. | Compute the skills required by the road safety auditing engineer. | | CO5 | A | 3 |
| 16. | Interpret the sensors used to recognize the accidents in the road. | | CO6 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Explain the traffic density, its derived parameter and its significances. | CO1 | U | 6 |
|  | b. | Summarize the traffic flow parameter and its types. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 18. | a. | Explain the ill effects caused due to vehicle parking on roadside. | CO2 | U | 6 |
|  | b. | Summarize the passenger car unit (PCU) and mention the factors affecting it. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 19. | a. | Analyze the various level of A-F level of services for the pedestrian facilities. | CO3 | An | 6 |
|  | b. | Categorize the types of cycle tracks and the parameters considered in the cycle track design. | CO3 | An | 6 |
|  |  |  |  |  |  |
| 20. | a. | Select the suitable signal that can able to manage real the time traffic and explain its reasons. | CO4 | An | 6 |
|  | b. | Classify the types of signals used in traffic engineering. | CO4 | An | 6 |
|  |  |  |  |  |  |
| 21. | a. | Write the road safety audit objectives and mention the working methods. | CO5 | U | 6 |
|  | b. | Explain the trends in pedestrian accident pattern and highlight the measures to reduce accidents. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 22. | a. | Articulate the types of accidents in cyclists and the measures to reduce it. | CO5 | A | 6 |
|  | b. | Classify the different ways to reduce the environmental hazards and air pollution caused due to traffic. | CO5 | A | 6 |
|  |  |  |  |  |  |
| 23. | a. | Explain the various traffic demand management techniques. | CO6 | A | 6 |
|  | b. | Summarize the various traffic segregation techniques. | CO6 | A | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Summarize the travel demand management need and its methodology. | CO6 | E | 6 |
|  | b. | Recommend area traffic management system using intelligent transport system. | CO6 | E | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Understand the fundamentals of traffic engineering |
| **CO2** | Carry out different traffic studies |
| **CO3** | Design channels, intersections, signals, roundabouts and parking arrangements |
| **CO4** | Express the application of traffic flow theory |
| **CO5** | Enhance safety and environment in all design aspects |
| **CO6** | Develop Traffic management Systems |

|  |  |  |  |  |  |  |  |
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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 15 |  |  |  |  | 17 |
| **CO2** | 2 | 15 |  |  |  |  | 17 |
| **CO3** | 1 | 4 |  | 12 |  |  | 17 |
| **CO4** | 1 | 4 |  | 12 |  |  | 17 |
| **CO5** | 1 | 12 | 15 |  |  |  | 28 |
| **CO6** | - | 1 | 15 |  | 12 |  | 28 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2009** | **Duration** | **3hrs** |
| **Course Title** | **SMART CITY PLANNING AND MANAGEMENT** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define smart water management. | | CO5 | R | 1 |
| 2. | Identify two components of a smart city. | | CO2 | R | 1 |
| 3. | Describe the concept of urban mobility in smart cities. | | CO3 | U | 1 |
| 4. | Define the concept of a smart city. | | CO1 | R | 1 |
| 5. | List two components of urban mobility. | | CO3 | R | 1 |
| 6. | Identify two challenges in smart water management. | | CO5 | R | 1 |
| 7. | Define vertical transportation in the context of smart buildings. | | CO4 | R | 1 |
| 8. | State the relationship between urban form and land use. | | CO3 | U | 1 |
| 9. | List the uses of electric vehicles. | | CO3 | R | 1 |
| 10. | Infer the role of mobile phones in advancing smart technology. | | CO4 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Summarize the importance of smart energy in urban areas. | | CO6 | U | 3 |
| 12. | Apply the concept of electric vehicles in enhancing a smart city's energy efficiency. | | CO4 | A | 3 |
| 13. | Distinguish the urban mobility strategies of Vienna and Philadelphia as international smart city case studies. | | CO4 | An | 3 |
| 14. | Explain the main objectives of the AMRUT Mission in relation to smart city development. | | CO4 | U | 3 |
| 15. | Describe the relationship between land use patterns and urban mobility in smart city planning. | | CO3 | R | 3 |
| 16. | Interpret the benefits and limitations of Transit-Oriented Development (TOD). | | CO3 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Determine a smart energy solution for a mid-sized city with high energy demands. | CO3 | A | 12 |
|  |  |  |  |  |  |
| 18. |  | Differentiate the categories of smart water management technologies and assess their potential applications in urban environments. | CO5 | An | 12 |
|  |  |  |  |  |  |
| 19. | a. | Explain the importance of mobile phones and big data for smart technology. | CO4 | U | 6 |
|  | b. | Articulate energy monitoring and management in smart buildings, using examples. | CO4 | A | 6 |
|  |  |  |  |  |  |
| 20. | a. | Apply concepts of vertical transportation in smart buildings by citing appropriate examples. | CO4 | A | 6 |
|  | b. | Analyze the core components of the smart energy concept and how they contribute to sustainable urban development. | CO4 | An | 6 |
|  |  |  |  |  |  |
| 21. |  | Analyze the strategies for transforming a city into an energy-smart city, highlighting key challenges and benefits. | CO4 | An | 12 |
|  |  |  |  |  |  |
| 22. |  | Illustrate the role of a smart grid in enhancing energy efficiency and sustainability within a smart city framework. | CO4 | A | 12 |
|  |  |  |  |  |  |
| 23. |  | Evaluate the barriers to smart water management policies and propose strategies to overcome them. | CO2 | E | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Interpret the global evolution of smart cities, using Singapore or Vienna as a case study to analyze key developments and challenges. | CO6 | A | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Identify the concepts of smart city |
| **CO2** | Understand the components of Smart City |
| **CO3** | Apply the concepts of urban mobility |
| **CO4** | Apply the smart energy and smart building concepts |
| **CO5** | Apply the smart water management concepts. |
| **CO6** | Analyse the smart cities across the countries |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | - | - | - | - | - | 1 |
| **CO2** | 1 | - | - | - | 12 |  | 13 |
| **CO3** | 5 | 2 | 15 | - | - | - | 22 |
| **CO4** | 1 | 10 | 27 | 21 | - | - | 59 |
| **CO5** | 2 | - | - | 12 | - | - | 14 |
| **CO6** | - | 3 | 12 | - | - | - | 15 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2010** | **Duration** | **3hrs** |
| **Course Title** | **ENGINEERING SUSTAINABILITY: ANALYSIS AND DESIGN** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)**  **(Answer all the questions)** | | | | | |
| 1. | Define the term sustainability. | | CO1 | R | 1 |
| 2. | What is bridging type of social capital? | | CO1 | R | 1 |
| 3. | Enumerate the term sustainability quotient. | | CO2 | R | 1 |
| 4. | State the importance of social capital. | | CO2 | R | 1 |
| 5. | Define the term ‘rate of return’. | | CO3 | R | 1 |
| 6. | State the term Environmental Product Declaration (EPD). | | CO3 | R | 1 |
| 7. | List the uses of ecological footprint. | | CO4 | R | 1 |
| 8. | Name the classes of environmental sustainability. | | CO4 | R | 1 |
| 9. | Describe low impact development. | | CO5 | R | 1 |
| 10. | Identify some alternative cement replacement materials. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)**  **(Answer all the questions)** | | | | | |
| 11. | Explain the various types of social capital. | | CO1 | U | 3 |
| 12. | Identify the types of environmental labels used. | | CO2 | U | 3 |
| 13. | Infer the steps followed in life cycle assessment. | | CO3 | U | 3 |
| 14. | List the categories list of Life cycle assessment (LCIA). | | CO4 | U | 3 |
| 15. | Review the uses of Geothermal energy foundations, | | CO5 | U | 3 |
| 16. | Interpret the objectives of DFAD. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No. 17 to 23, Q.No. 24 is Compulsory)** | | | | | |
| 17. | a. | Describe the traditional and sustainable economics. | CO1 | U | 6 |
|  | b. | Summarize the steps of life cycle cost analysis. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 18. | a. | Interpret the life cycle analysis and its importance. | CO2 | U | 6 |
|  | b. | Illustrate a case study on sustainability analysis and management. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 19. | a. | Explain how life cycle impact assessment is used in civil engineering. | CO3 | U | 6 |
|  | b. | Define the Product category rule PCR and how it helps in implementing Environmental Product Declaration (EPD). | CO3 | U | 6 |
|  |  |  |  |  |  |
| 20. | a. | Explain the impacts of social media in civil engineering. | CO4 | A | 6 |
|  | b. | Define the Human Development Index (HDI) and its merits, demerits. | CO4 | A | 6 |
|  |  |  |  |  |  |
| 21. | a. | Summarize some alternate fill materials and its impact on sustainability. | CO5 | U | 6 |
|  | b. | Explain costal resilience and factors affecting it. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 22. | a. | Write a case study on methods used to improve outdoor air quality. | CO5 | A | 6 |
|  | b. | Articulate the sustainable earth wall and its advantages. | CO5 | A | 6 |
|  |  |  |  |  |  |
| 23. | a. | Examine the various methods adopted to improve worker safety. | CO6 | A | 6 |
|  | b. | Predict the parameters that are used for the crash modification. | CO6 | A | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Summarize the concept of Intelligent transportation systems and how they help maintain sustainability. | CO6 | E | 6 |
|  | b. | Assess the various types of waste material used in construction. | CO6 | E | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify the concepts of sustainability |
| CO2 | Understand the Concepts of Economic Sustainability |
| CO3 | Analyse the Concepts of Environmental Sustainability |
| CO4 | Analyse the Social aspects of sustainability |
| CO5 | Apply the concepts of sustainability to environmental and geotechnical engineering |
| CO6 | Apply the concepts of sustainability to construction and transportation engineering |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 15 |  |  |  |  | 17 |
| CO2 | 2 | 15 |  |  |  |  | 17 |
| CO3 | 2 | 15 |  |  |  |  | 17 |
| CO4 | 2 | 3 | 12 |  |  |  | 17 |
| CO5 | 1 | 15 | 12 |  |  |  | 28 |
| CO6 | 1 | 3 | 12 |  | 12 |  | 28 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2011** | **Duration** | **3hrs** |
| **Course Title** | **ANALYSIS OF STRUCTURES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define deflection. | | CO1 | R | 1 |
| 2. | List the different energy methods. | | CO1 | R | 1 |
| 3. | Recall the fundamental equation of slope deflection method. | | CO2 | R | 1 |
| 4. | Define Distribution factor. | | CO2 | R | 1 |
| 5. | State importance of ILD. | | CO3 | R | 1 |
| 6. | Sketch the influence line diagram for the propped reaction of a propped cantilever beam. | | CO3 | An | 1 |
| 7. | Discuss the degree of static indeterminacy of a three hinged parabolic arch. | | CO4 | U | 1 |
| 8. | Define Horizontal Thrust. | | CO4 | R | 1 |
| 9. | List the different types of cable structures. | | CO5 | R | 1 |
| 10. | Describe the nature of force in the cables. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Differentiate statically determinate and statically indeterminate structures. | | CO1 | An | 3 |
| 12. | Compare slope deflection and moment distribution methods. | | CO2 | U | 3 |
| 13. | Explain the necessity of Influence lines. | | CO3 | A | 3 |
| 14. | State Eddy’s theorem for an arch. | | CO4 | R | 3 |
| 15. | Draw the components of suspension bridge with a stiffening girder. | | CO5 | An | 3 |
| 16. | Develop the element stiffness matrix for a given beam shown in fig. EI is constant. | | CO6 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Using strain energy method, determine the vertical displacement at the free end of the cantilever beam shown in Fig.1.1 below. Take E = 200 kN / mm2; I = 20 x 106 mm4. | CO1 | A | 12 |
|  |  |  |  |  |  |
| 18. |  | Analyze the continuous beam loaded as shown in Fig. by slope deflection method. Take E = 2 x 105 N/mm2 and I = 16 x 107 mm4. Sketch the bending moment diagram. | CO2 | An | 12 |
|  |  |  |  |  |  |
| 19. |  | A continuous beam ABC is supported on an elastic column BD and is loaded as shown in Fig. treating joint B as rigid. Analyze the frame and draw the bending moment diagram using moment distribution method. | CO3 | An | 12 |
|  |  |  |  |  |  |
| 20. |  | Two point loads of 100 kN and 50 kN at a fixed distance apart of 2m, cross a beam of 24 m span, Draw the influence line for bending moment and shear force for a point 8m from the left support, and also determine the maximum bending moment and shear force at that point. | CO4 | An | 12 |
|  |  |  |  |  |  |
| 21. |  | A circular three hinged arch of span 25m with a central rise of 5m is hinged at the crown and the end supports. It carries a point load of 100kN at 6m from the left support. Calculate the reaction at the supports and Moment at 5m from the left support. | CO5 | A | 12 |
|  |  |  |  |  |  |
| 22. |  | A suspension cable of 130m horizontal span is supported at the same level. It is subjected to a udl of 28.5kN per horizontal meter. If the maximum tension in the cable is limited to 5000kN, calculate the minimum central dip needed. | CO5 | A | 12 |
|  |  |  |  |  |  |
| 23. |  | Analyze the continuous beam loaded as shown in figure below by slope deflection method. Take E = 2 x 105 N/mm2 and I = 16 x 107 mm4. Sketch the bending moment diagram. Take EI is constant. | CO2 | An | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Analyze the continuous beam shown in fig. and draw the bending moment diagram using Stiffness matrix method. Assume EI is constant. | CO6 | An | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Illustrate the concepts and principles. |
| **CO2** | Explain the behavior of structural elements. |
| **CO3** | Analyze the structural members for various forces. |
| **CO4** | Analyze the response of the Structural elements. |
| **CO5** | Develop suitable response intricacies. |
| **CO6** | Adapt suitable analysis procedure. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 |  |  | 15 |  |  | 17 |
| **CO2** | 2 | 3 |  | 24 |  |  | 29 |
| **CO3** | 1 |  | 3 | 13 |  |  | 17 |
| **CO4** | 4 | 1 |  | 12 |  |  | 17 |
| **CO5** | 1 |  | 24 | 3 |  |  | 28 |
| **CO6** | 1 |  | 3 | 12 |  |  | 16 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2012** | **Duration** | **3hrs** |
| **Course Title** | **MECHANICS AND DESIGN OF CONCRETE STRUCTURES** | **Max. Marks** | **100** |

IS 456, SP 16 codes are permitted, Assume the missing design data suitably

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define the term “Fe 415”. | | CO1 | R | 1 |
| 2. | Identify the example failure modes for limit state of collapse. | | CO2 | U | 1 |
| 3. | Describe the load factor used for limit state of collapse and limit state of serviceability. | | CO1 | R | 1 |
| 4. | List the types of covers used in design and drawing. | | CO1 | R | 1 |
| 5. | Select the type of beam used for higher moment of resistance. | | CO2 | U | 1 |
| 6. | Identify the appropriate slab type used for long span. | | CO1 | U | 1 |
| 7. | Classify different types of solid slabs used in construction. | | CO2 | U | 1 |
| 8. | Illustrate the shear diagram of fixed beam under UDL. | | CO2 | U | 1 |
| 9. | Write the maximum reinforcement to be used for columns. | | CO1 | A | 1 |
| 10. | Define the term curtailment in rebar. | | CO3 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Write the influencing factors that control the deflection, and recommended span to depth ratio. | | CO2 | A | 3 |
| 12. | Illustrate the reinforcement pattern of beam section. | | CO3 | A | 3 |
| 13. | Sketch the slab panel with the edge condition showing the following.   * Corner column * Interior column * Edge column | | CO2 | A | 3 |
| 14. | Define the term punching shear in footing | | CO1 | R | 3 |
| 15. | Classify the types of deep footing with examples and explain the need for choosing deep footings. | | CO6 | U | 3 |
| 16. | Explain the gross pressure variation in footing for different cases. | | CO1 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Analyze the moment of resistance of the doubly reinforced beam for the following data.  Beam of size 230x450mm  Span of the beam is 6.5m  M30 concrete and Fe 415 grade  Moment – 350kNm | CO4 | An | 12 |
|  |  |  |  |  |  |
| 18. |  | Calculate the thickness and reinforcement details of the one way simply supported slab for the following data.  Size of slab – 3x12m  Grade of concrete – M25  Grade of steel - Fe500  Live load - 3.5kN/m2  Floor finish – 0.5 kN/m2 | CO4 | A | 12 |
|  |  |  |  |  |  |
| 19. |  | Design the RCC beam of size 230x500mm supported on column of 300mm thick. Span of the beam is 7m. The load from the slab to the beam is 25kN/m. M35 concrete and Fe 500 grade. Evaluate the depth and reinforcement details of section. | CO5 | E | 12 |
|  |  |  |  |  |  |
| 20. |  | Analyze and Design the column for the following data.  Axial load – 2600kN  Grade of concrete – M35  Grade of steel - Fe500  Bending in X direction – 250kNm (Uni axial bending)  Size of column – 230x600mm | CO4 | An | 12 |
|  |  |  |  |  |  |
| 21. |  | Determine the reinforcement to be provided for the biaxial bending column for the following data.  Axial load – 4500kN  Grade of concrete – M30  Grade of steel - Fe500  Size of column – 230x450mm  Bending in X direction – 90kNm  Bending in Y direction – 150kNm | CO5 | A | 12 |
|  |  |  |  |  |  |
| 22. |  | Estimate the size required and the area of reinforcement for the Isolated footing with the following data.  Grade of concrete – M40  Grade of steel - Fe550  Size of column –230x450mm  Axial load – 3500kN  Safe bearing capacity of soil – 250kN/m2 | CO5 | E | 12 |
|  |  |  |  |  |  |
| 23. |  | Explain the stress block details and design concept of Rectangular, T and L beams. | CO6 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Write short notes on the following   1. Limit state design 2. Loading and load combinations | CO5 | A | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Identify the design philosophies of RCC elements |
| CO2 | Analyse the behaviour of structural elements |
| CO3 | Illustrate the stress resultants of LSM and WSM |
| CO4 | Recommend the design section of the structural elements |
| CO5 | Develop suitable detailing diagrams of RC elements |
| CO6 | Prepare the design basis report for RC buildings |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | 4 | 1 | - | - | - | 11 |
| CO2 | - | 4 | 6 | - | - | - | 10 |
| CO3 | 1 | - | 3 | - | - | - | 4 |
| CO4 | - | - | 12 | 24 | - | - | 36 |
| CO5 | - | - | 24 | - | 24 | - | 48 |
| CO6 | - | 15 | - | - | - | - | 15 |
|  | | | | | | | **124** |



**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2013** | **Duration** | **3hrs** |
| **Course Title** | **DESIGN OF STEEL STRUCTURES** | **Max. Marks** | **100** |

**IS 800-2007, IS 875 Part 1, 2 and 3, SP 6 & Steel Tables are permitted for the Exam**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)**  **(Answer all the questions)** | | | | | |
| 1 | Identify the type of beam section available in India for steel structures. | | CO1 | R | 1 |
| 2 | Specify the maximum pitch of bolts for a Joint in a compression member. | | CO2 | A | 1 |
| 3 | Justify with one major advantage for preferring steel structures. | | CO1 | U | 1 |
| 4 | Define shear lag of an angle. | | CO1 | R | 1 |
| 5 | Identify the value of Imperfection factor for hot rolled sections and Rolled I section bending about the major axis. | | CO2 | An | 1 |
| 6 | Estimate the effective length of a fixed column, if its unsupported length is 5m. | | CO2 | R | 1 |
| 7 | How would you decide on the allowable deflection of a simply supported beam with uniformly distributed load with elastic cladding? | | CO2 | A | 1 |
| 8 | Recognize the type of girder in which reduction of thickness of flanges is being adopted for economy. | | CO4 | A | 1 |
| 9 | Recommend a suitable roof covering that prevents transfer of heat inside a steel building. | | CO1 | A | 1 |
| 10 | Categorize the terrain which includes air fields, open park lands and underdeveloped sparsely built-up outskirts of towns and suburbs | | CO3 | An | 1 |
| **PART – B (6 X 3 = 18 MARKS)**  **(Answer all the questions)** | | | | | |
| 11 | How would you decide on the minimum and maximum edge/end distance in connections? | | CO2 | An | 3 |
| 12 | Determine the slenderness ratio of a tension member ISA 50 x 50 x 6 with an effective length of 4m in which a reversal of direct stress occurs due to loads other than wind or seismic forces is expected to occur and check the safety with respect to the codal value. | | CO3 | An | 3 |
| 13 | Estimate the buckling class of ISMB 400 about both the axes. | | CO2 | An | 3 |
| 14 | Justify with appropriate reasons for using Plate Girders in long span bridges. | | CO4 | An | 3 |
| 15 | Classify Cranes according the intensity of their use. | | CO1 | U | 3 |
| 16 | Determine the imposed load on a roof truss with a roof angle of 20˚. | | CO3 | An | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No. 17 to 23, Q.No. 24 is Compulsory)** | | | | | |
| 17. |  | Determine the joint capacity of a lap joint made of 12 mm thick plates with 6 numbers of 12mm fully threaded black bolts (G 4.6) as  represented in Fig.1. | CO3 | An | 12 |
|  |  |  |  |  |  |
| 18. |  | Determine the maximum load on a steel flat 200 x 8mm having 3 bolts of M20 bolts in 20mm holes in two rows, connected to a gusset plate of 8mm thick shown in the Figure?  Strength of bolts need not be checked. For Steel fu= 410 MPa, fy= 250 MPa | CO3 | An | 12 |
|  |  |  |  |  |  |
| 19. |  | Design a bridge compression member of 2 channels placed back to back. The length of two members is 6m. It carries a load of 1000kN. The width over the backs of channels is to be decided by the designer considering practical point of view. | CO4 | A | 12 |
|  |  |  |  |  |  |
| 20. |  | Design a lacing system for a bridge compression member made of 2 Nos of ISMC 300 @ 35.8 kg/m channels placed toe to toe. The member carries a load of 800kN and the length of the member is 6m. The unfavourable slenderness ratio of the section as a whole is 55.05. The width over the backs of channels may be decided by the designer. | CO4 | A | 12 |
|  |  |  |  |  |  |
| 21. |  | Design a simply supported beam to carry an udl of 45kN/m. The effective span of the beam is 8m. The compression flange of the beam is prevented from lateral deflection | CO4 | A | 12 |
|  |  |  |  |  |  |
| 22. |  | A hall of clear dimensions 15m x 6m is to be covered with RCC slab flooring 120mm thick resting over RS beams spaced at an interval of 3m c/c. Roof finishing of 20mm thickness is to be provided over the RCC slab. The live load on the slab is 4kN/m2. The joints are resting over 300mm thick columns. Design the floor beams by taking the unit weight of RCC and finishing as 25kN/m3. | CO4 | An | 12 |
|  |  |  |  |  |  |
| 23. |  | Classify the types of Gantry Girders with their components and application. | CO1 | An | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Design a suitable purlin for the Pratt truss shown in Fig.1 Self-weight of Asbestos Roof sheets may be taken as 120 N/m2. Live Load to be calculated in accordance with IS 875-1987 Part 2. Wind Load to be determined as per IS 875-2015 Part 3.    **Fig. 1** | CO4 | A | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Apply appropriate steel sections and connections in the steel structures |
| CO2 | Interpret the stipulations of IS Code in the design of steel structural elements |
| CO3 | Estimate the forces in structural members due to different loads. |
| CO4 | Design structural members adopting codal provisions. |
| CO5 | Evaluate the adequacy of designed structural components. |
| CO6 | Develop new configurations of structural elements resulting in economical design |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 4 | 1 | 12 | - | - | 19 |
| CO2 | 1 | - | 2 | 7 | - | - | 10 |
| CO3 | - | - | - | 31 | - | - | 31 |
| CO4 | - | - | 49 | 15 | - | - | 64 |
| CO5 | - | - | - | - | - | - | - |
| CO6 | - | - | - | - | - | - | - |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2014** | **Duration** | **3hrs** |
| **Course Title** | **WATER RESOURCES SYSTEMS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)**  **(Answer all the questions)** | | | | | |
| 1. | Elaborate Hydrologic cycle. | | CO1 | U | 1 |
| 2. | Paraphrase convective precipitation. | | CO1 | R | 1 |
| 3. | Mention the components of hydrograph. | | CO2 | R | 1 |
| 4. | Elucidate the importance of base flow separation. | | CO2 | An | 1 |
| 5. | Define flood routing. | | CO3 | R | 1 |
| 6. | Mention any two control structures used in irrigation systems. | | CO4 | R | 1 |
| 7. | List the purposes of aqueducts. | | CO4 | R | 1 |
| 8. | Elucidate consumptive irrigation requirement. | | CO5 | U | 1 |
| 9. | State the disadvantages of flooding method of irrigation. | | CO5 | U | 1 |
| 10. | Classify aquifers. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)**  **(Answer all the questions)** | | | | | |
| 11. | Appraise the factors affecting runoff. | | CO1 | U | 3 |
| 12. | Differentiate single ring and double ring infiltrometer with diagrams. | | CO3 | U | 3 |
| 13. | List the monsoons faced by Indian country and the corresponding regions benefitted by the monsoons | | CO2 | U | 3 |
| 14. | Compare Canal falls and Canal regulators | | CO4 | An | 3 |
| 15. | If wheat requires about 9.5cm of water every 28days, and the base period for wheat is140days, estimate delta for wheat. | | CO5 | A | 3 |
| 16. | State the assumptions of Dupuit-Theim’s theory for radial flow of groundwater. | | CO6 | R | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Elaborate about different forms of precipitation with diagrams. | CO1 | U | 4 |
|  | b. | Enumerate the about the various devices available for automatic measurement of rain gauges | CO1 | A | 8 |
|  |  |  |  |  |  |
| 18. | a. | Enumerate about the factors that affect the evapo-transpiration process. | CO2 | U | 4 |
|  | b. | Infiltration capacity data obtained in a flooding-type infiltration test is given below:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Time since start | 5 | 10 | 15 | 25 | 45 | 60 | 75 | 90 | 110 | 130 | | Cumulative infiltration depth (cm) | 1.75 | 3.0 | 3.95 | 5.5 | 7.25 | 8.3 | 9.3 | 10.2 | 11.28 | 12.36 |   For this data determine the infiltration rate at 25 and 90 minutes and ultimate infiltration capacity. | CO2 | A | 8 |
|  |  |  |  |  |  |
| 19. | a. | Characterize the physiographic and climatic factors affecting the Hydrographs. | CO3 | U | 6 |
|  | b. | Elaborate the base flow separation techniques followed for hydrographs. | CO3 | A | 6 |
|  |  |  |  |  |  |
| 20. | a. | Explain various irrigation efficiencies. | CO4 | U | 6 |
|  | b. | Discuss the merits and demerits of any 3 irrigation methods. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 21. |  | Discuss the stages of reservoir planning and the criteria for selection of site for dam construction | CO4 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Enumerate the various methods applied for improving duty. | CO5 | U | 12 |
|  |  |  |  |  |  |
| 23. |  | Elaborate about artificial recharging techniques and its effect on groundwater table level. | CO6 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Elucidate about the control structures used in an irrigation system and their purposes. | CO4 | An | 6 |
|  | b. | During the recuperation test of a 4.0 m open well a recuperation of the depression head from 2.5 m to 1.25 m was found to take place in 90 minutes. Determine the (i) specific capacity per unit well area, and (ii) yield of the well for a safe drawdown of 2.5 m (iii) What would be the yield from a well of 5.0 m diameter for a drawdown of 2.25 m. | CO6 | Ap | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recognise the concepts to manage water resources and apply for hydrological modelling |
| CO2 | Decide and plan basic water resources projects |
| CO3 | Analyse the flow in streams |
| CO4 | Appreciate the importance of reservoirs and hydraulic structures |
| CO5 | Identify the irrigation methods |
| CO6 | Plan structures for recharging groundwater |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 8 | 8 |  |  |  | 17 |
| **CO2** | 1 | 7 | 8 | 1 |  |  | 17 |
| **CO3** | 1 | 9 | 6 |  |  |  | 16 |
| **CO4** | 2 | 18 |  | 9 |  |  | 29 |
| **CO5** |  | 20 | 3 |  |  |  | 23 |
| **CO6** | 4 | 12 | 6 |  |  |  | 22 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2015** | **Duration** | **3hrs** |
| **Course Title** | **QUANTITY SURVEYING AND ESTIMATION** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define quantity surveying. | | CO1 | U | 1 |
| 2. | Recall the purpose of estimates. | | CO1 | R | 1 |
| 3. | Define BOQ. | | CO1 | R | 1 |
| 4. | What is sanitary units in building? | | CO1 | R | 1 |
| 5. | Define MEP in building. | | CO1 | U | 1 |
| 6. | Write a short note on valuation. | | CO1 | R | 1 |
| 7. | Define net income from a building. | | CO2 | U | 1 |
| 8. | What is sinking fund method of depreciation? | | CO5 | U | 1 |
| 9. | Define slab culvert. | | CO5 | U | 1 |
| 10. | Write short note on water supply scheme in building. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Explain estimation and its types. | | CO1 | U | 3 |
| 12. | Recall data analysis of rates for various items of works. | | CO2 | R | 3 |
| 13. | Discuss the procedure for estimation of masonry platform. | | CO1 | U | 3 |
| 14. | State the factors to be considered in estimating bituminous road. | | CO1 | R | 3 |
| 15. | Differentiate valuation and depreciation. | | CO4 | U | 3 |
| 16. | Explain the principles for the preparation of water supply scheme. | | CO5 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Recall the principles in selecting units of measurement for items | CO1 | R | 4 |
|  | b. | Explain purpose and basic principles of general and detailed specifications | CO1 | U | 8 |
|  |  |  |  |  |  |
| 18. | a. | Explains the factors to be considered in abstract estimate for building project | CO1 | U | 6 |
|  | b. | Discuss the reason for fluctuating rate analysis in building estimation | CO2 | U | 6 |
|  |  |  |  |  |  |
| 19. | a. | Prepare BOQ for concrete slab of size 10 m (Length) x 7 m (breadth) x 0.125 m (depth), consider the grade of concrete as M20. Assume if any data is required. | CO3 | A | 8 |
|  | b. | Recall the factors to be considered in preparing BOQ for a building in detail | CO3 | R | 4 |
|  |  |  |  |  |  |
| 20. | a. | Prepare a detailed estimate for the given building. Consider the door size as 8 feet (height) x 2.5 feet (width), window size 2.14 feet x 2.14 feet, exterior wall has a thickness as one brick, ventilator size 1 feet x 1 feet. The cost of cement: sand: aggregate: steel = 9Rs/kg: 2.5 Rs/kg: 3 Rs/kg: 80 Rs/kg. Assume if any data is required. Note: dimensions inside the sketch in feet and inches. | CO5 | A | 12 |
|  |  |  |  |  |  |
| 21. |  | Prepare a detailed estimate, consider door size as 6 feet (height) x 2.5 feet (width), window size 2.14 feet x 2.14 feet, ventilator size 1 feet x 1 feet, exterior wall has a thickness of 230 mm, toilet partition wall has a thickness of half-brick. The cost of cement: sand: aggregate: steel = 9Rs/kg: 2 Rs/kg: 2.5 Rs/kg: 72 Rs/kg. Assume if any data is required. Note: dimensions inside the sketch in feet and inches. | CO5 | A | 12 |
|  |  |  |  |  |  |
| 22. | a. | Explain the factors to be considered in estimating the cost for RCC slab, beam, column with foundation. | CO2 | U | 6 |
|  | b. | Explain RCC slab culvert in detail with neat sketch. | CO3 | U | 6 |
|  |  |  |  |  |  |
| 23. | a. | Explain methods of depreciation of a building with suitable examples. | CO5 | U | 4 |
|  | b. | Discuss valuation and factors governs it in detail. | CO5 | U | 8 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Discuss in detail the report on estimates for the construction of residential building for Assistant professor in Karunya Nagar. | CO6 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | List the detailed specification for different types of structures |
| **CO2** | Plan the rate analysis of civil engineering works |
| **CO3** | Determine the rates of various items of civil works |
| **CO4** | Justify estimated cost of civil construction projects |
| **CO5** | Evaluate the actual value of any property |
| **CO6** | Explain specifications and tendering process for contracts |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 11 | 22 |  |  |  |  | 33 |
| **CO2** | 3 | 13 |  |  |  |  | 16 |
| **CO3** | 4 | 6 | 8 |  |  |  | 18 |
| **CO4** |  | 3 |  |  |  |  | 3 |
| **CO5** |  | 17 | 24 |  |  |  | 41 |
| **CO6** |  | 13 |  |  |  |  | 13 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2016** | **Duration** | **3hrs** |
| **Course Title** | **CONSTRUCTION TECHNOLOGY AND AUTOMATION** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | State the risk assessment factors in building. | | CO1 | R | 1 |
| 2. | List the factors to be considered in sustainable construction practices. | | CO5 | R | 1 |
| 3. | Define earthquake load acting in a building. | | CO5 | U | 1 |
| 4. | Define gable roof. | | CO1 | R | 1 |
| 5. | Infer expansion and contraction joint. | | CO1 | U | 1 |
| 6. | What is backhoe excavator? | | CO2 | U | 1 |
| 7. | List the drilling machines used to excavate the soil. | | CO2 | R | 1 |
| 8. | Explain depreciation in construction equipment. | | CO4 | U | 1 |
| 9. | Define forklift and its types. | | CO2 | U | 1 |
| 10. | Enumerate construction automation. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Describe site development consideration in detail. | | CO5 | U | 3 |
| 12. | Compare any three brick masonry types used in construction. | | CO2 | U | 3 |
| 13. | Explain underpinning and its methods. | | CO3 | U | 3 |
| 14. | Describe damp proof course and its types in building. | | CO1 | U | 3 |
| 15. | Illustrate the factors affecting the selection of equipment. | | CO4 | A | 3 |
| 16. | Enumerate the opportunities for 3D printing in civil infrastructure. | | CO6 | R | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Enumerate the functional requirement of buildings in detail. | CO1 | R | 6 |
|  | b. | Classify the types of loads acting on a building during its service period. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 18. | a. | Differentiate between load bearing and non-load bearing structures. | CO2 | U | 6 |
|  | b. | Explain precast construction and its types in detail. | CO6 | U | 6 |
|  |  |  |  |  |  |
| 19. | a. | Illustrate foundation and its types in detail with suitable sketches. | CO2 | A | 6 |
|  | b. | Compare plastering and pointing in detail. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 20. | a. | Summarize roofing and its types with suitable examples. | CO1 | U | 6 |
|  | b. | Illustrate fire protection system and its requirements in detail. | CO3 | A | 6 |
|  |  |  |  |  |  |
| 21. | a. | Appraise HVAC system and its components in detail. | CO3 | A | 6 |
|  | b. | Explain Anti-termite treatment in building in detail. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 22. | a. | Classify the equipments used for excavation in detail. | CO4 | U | 6 |
|  | b. | Describe construction equipment management and its governing factors in detail. | CO5 | U | 6 |
|  |  |  |  |  |  |
| 23. | a. | Illustrate cranes and its types used in construction. | CO4 | A | 6 |
|  | b. | Compare various types of erection in construction and its process in detail. | CO6 | U | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Explain 3D printing and its benefits in construction industry. | CO6 | U | 6 |
|  | b. | Summarize digital construction technology and its benefits in detail. | CO6 | U | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Adopt the construction practices adopted in the field |
| **CO2** | Demonstrate basic knowledge about construction equipment |
| **CO3** | Identify the equipment types for different construction projects |
| **CO4** | Evaluate the material handling equipment and the equipment productivity |
| **CO5** | Demonstrate construction project management skills |
| **CO6** | Adapt automation in construction site |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 8 | 16 |  |  |  |  | 24 |
| **CO2** | 1 | 17 | 6 |  |  |  | 24 |
| **CO3** |  | 3 | 6 | 6 |  |  | 15 |
| **CO4** |  | 7 | 9 |  |  |  | 16 |
| **CO5** | 1 | 16 |  |  |  |  | 17 |
| **CO6** | 4 | 24 |  |  |  |  | 28 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2017** | **Duration** | **3hrs** |
| **Course Title** | **DISASTER PREPAREDNESS AND PLANNING** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define the term "hazard" in the context of disaster management. | | CO1 | U | 1 |
| 2. | What are the phases of the Disaster Management Cycle? | | CO1 | R | 1 |
| 3. | Name two natural disasters and two man-made disasters. | | CO2 | R | 1 |
| 4. | What is the primary cause of a tsunami? | | CO2 | R | 1 |
| 5. | List two socio-economic impacts of disasters. | | CO3 | U | 1 |
| 6. | What is the significance of climate change in urban disasters? | | CO3 | R | 1 |
| 7. | What does Environmental Risk Assessment (ERA) focus on? | | CO4 | U | 1 |
| 8. | Name any two mountain areas in India vulnerable to disasters. | | CO4 | R | 1 |
| 9. | Who is responsible for disaster response at the district level in India? | | CO5 | U | 1 |
| 10. | Define "reconstruction" in the context of post-disaster management. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Examine the perception of vulnerability in disaster management. | | CO1 | An | 3 |
| 12. | Discuss the typical characteristics of earthquakes as a natural disaster. | | CO2 | U | 3 |
| 13. | Analyze the health impacts of disasters on affected populations. | | CO3 | An | 3 |
| 14. | How does environmental vulnerability mapping assist in disaster management? | | CO4 | U | 3 |
| 15. | Elucidate the role of the Central Government in disaster response. | | CO5 | An | 3 |
| 16. | Outline the steps involved in the rehabilitation process post-disaster. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No. 17 to 23, Q.No. 24 is Compulsory)** | | | | | |
| 17. |  | Discuss the Disaster Management Cycle in detail, explaining each phase. | CO1 | R | 12 |
|  |  |  |  |  |  |
| 18. | a. | Compare and contrast the characteristics of natural and man-made disasters with examples. | CO2 | U | 8 |
|  | b. | Demonstrate the causal phenomena and preparedness measures for floods and forest fires. | CO2 | A | 4 |
|  |  |  |  |  |  |
| 19. | a. | Analyze the environmental and social impacts of disasters, with examples. | CO3 | A | 8 |
|  | b. | Brief the role of climate change in contributing to disaster vulnerability in urban areas. | CO3 | U | 4 |
|  |  |  |  |  |  |
| 20. |  | Discuss various pre-disaster tools such as ERA, EMS, SEA, and hazard mapping in detail. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 21. | a. | Outline the roles and responsibilities of the Armed Forces and police during disaster response operations. | CO5 | U | 8 |
|  | b. | Examine the institutional framework for disaster management in India, focusing on the role of Nodal Ministries. | CO5 | A | 4 |
|  |  |  |  |  |  |
| 22. |  | Explain the importance of prevention, mitigation, and preparedness in disaster management. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 23. | a. | Investigate the hazard and vulnerability profile of India’s coastal areas and the ecological fragility involved. | CO4 | A | 8 |
|  | b. | Discuss long-term counter-disaster planning, emphasizing reconstruction and rehabilitation strategies. | CO6 | U | 4 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Scrutinize the post-disaster environmental response measures in water, sanitation and waste management. | CO6 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL**M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Recall the types of disasters and its causes. |
| **CO2** | Understand disaster cycle and assess the risks. |
| **CO3** | Apply disaster concepts to disaster management |
| **CO4** | Analyse relationship between development and disasters. |
| **CO5** | Decide the roles and responsibilities of organizations and institutions to society and its organizational structure. |
| **CO6** | Design the disaster management and mitigation plan. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 13 | 13 |  | 3 |  |  | 29 |
| **CO2** | 2 | 11 | 4 |  |  |  | 17 |
| **CO3** | 1 | 5 | 8 | 3 |  |  | 17 |
| **CO4** | 1 | 16 | 8 |  |  |  | 25 |
| **CO5** |  | 9 | 4 | 3 |  |  | 16 |
| **CO6** |  | 8 | 12 |  |  |  | 20 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2018** | **Duration** | **3hrs** |
| **Course Title** | **CONSTRUCTION ENGINEERING AND MANAGEMENT** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)**  **(Answer all the questions)** | | | | | |
| 1. | What are the temporary facilities needed for a project work site? | | CO1 | U | 1 |
| 2. | Name any three-finishing work in construction. | | CO1 | R | 1 |
| 3. | Classify masonry based on type of units. | | CO2 | A | 1 |
| 4. | List the types of anti – termite treatment. | | CO2 | A | 1 |
| 5. | Expand CPM. | | CO5 | R | 1 |
| 6. | Define cost estimate. | | CO4 | U | 1 |
| 7. | Identify PCM. | | CO4 | R | 1 |
| 8. | State the disadvantages of PERT. | | CO5 | A | 1 |
| 9. | Mention the importance of labor safety. | | CO6 | A | 1 |
| 10. | List the objectives of material management. | | CO6 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)**  **(Answer all the questions)** | | | | | |
| 11. | Describe about dead shoring. | | CO1 | U | 3 |
| 12. | Explain estimate cost inputs. | | CO2 | U | 3 |
| 13. | Summarize risk register. | | CO3 | R | 3 |
| 14. | Explain work breakdown structure. | | CO4 | U | 3 |
| 15. | Explain ABC analysis. | | CO5 | A | 3 |
| 16. | Describe the functions of materials management. | | CO6 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | List the stages of production of concrete. | CO1 | R | 6 |
|  | b. | Explain the needs for contraction joints in concrete. | CO1 | U | 6 |
|  |  |  |  |  |  |
| 18. | a. | Write the functions of scaffolding. | CO3 | U | 6 |
|  | b. | Explain about the sloped roof types and its components. | CO4 | R | 6 |
|  |  |  |  |  |  |
| 19. |  | Explain in detail on tunneling through soft ground. | CO5 | A | 12 |
|  |  |  |  |  |  |
| 20. | a. | Write about estimate cost in PCM. | CO5 | A | 6 |
|  | b. | Explain construction project planning in detail. | CO4 | U | 6 |
|  |  |  |  |  |  |
| 21. |  | List and explain various stakeholders of construction industry. | CO4 | A | 12 |
|  |  |  |  |  |  |
| 22. | a. | List the factors affecting striking of formwork. | CO5 | U | 6 |
|  | b. | Explain the functional requirements of doors. | CO3 | R | 6 |
|  |  |  |  |  |  |
| 23. | a. | Explain the process of material management. | CO5 | A | 6 |
|  | b. | Describe a short note on resource allocation and resource leveling and their benefits. | CO5 | A | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Explain a detailed note on the role and function of construction manager. | CO6 | A | 6 |
|  | b. | Write a short note on construction safety management. | CO6 | A | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recall the basics if building components. |
| CO2 | Understand the items / facets of construction engineering. |
| CO3 | Apply the construction engineering techniques for various components. |
| CO4 | Demonstrate construction project management skills and apply tools of project management. |
| CO5 | Explain the importance of project management. |
| CO6 | Propose an engineering and management plan. |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 7 | 12 |  |  |  |  | 19 |
| CO2 |  | 6 | 2 |  |  |  | 8 |
| CO3 | 9 | 6 |  |  |  |  | 15 |
| CO4 | 7 | 4 | 12 |  |  |  | 23 |
| CO5 | 1 | 6 | 34 |  |  |  | 41 |
| CO6 |  | 2 | 16 |  |  |  | 18 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2019** | **Duration** | **3hrs** |
| **Course Title** | **DESIGN OF PRECAST CONCRETE STRUCTURES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)**  **(Answer all the questions) IS 15916 and IS 1343 codes are permitted** | | | | | |
| 1. | Select the suitable minimum standard thickness for slab element. | | CO1 | R | 1 |
| 2. | Identify the type of cranes used for handling and erection. | | CO2 | U | 1 |
| 3. | Identify the suitable prestressed concrete system for bridges. | | CO2 | U | 1 |
| 4. | Quote the tensile strength of steel used for prestressed concrete. | | CO2 | R | 1 |
| 5. | Define the term loss in prestress. | | CO1 | R | 1 |
| 6. | Recall the allowable limit of tensile stresses in prestressed concrete Type II members. | | CO1 | R | 1 |
| 7. | List any four Prestressed precast concrete elements. | | CO5 | R | 1 |
| 8. | Classify different types of precast joints. | | CO2 | U | 1 |
| 9. | Sketch the stress strain diagram of prestressed concrete section. | | CO2 | A | 1 |
| 10. | Calculate the area of member under compression, with a load of 500kN. Grade of concrete M40. | | CO3 | A | 1 |
| **PART – B (6 X 3 = 18 MARKS)**  **(Answer all the questions)** | | | | | |
| 11. | Differentiate homogeneous and non-homogeneous wall. | | CO2 | U | 3 |
| 12. | Differentiate pretension and post tension in prestressed concrete. | | CO2 | U | 3 |
| 13. | List the type of precast floors and walls. | | CO1 | R | 3 |
| 14. | Write the abnormal loads that causes progressive collapse. | | CO4 | U | 3 |
| 15. | List some of the devices used for prestressing. | | CO2 | R | 3 |
| 16. | Draw the bending stress diagram of prestressed concrete beam section. | | CO5 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Identify various elements that are used in precast construction, also discuss the standardization and tolerances in precast products. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 18. |  | Explain different stages in lifting, erection and transportation of precast elements with neat sketches. | CO2 | A | 12 |
|  |  |  |  |  |  |
| 19. |  | Discuss the requirements of structural joints and jointing materials in Precast elements and explain the requirements of ductility. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 20. |  | Calculate the deflection of prestressed concrete beam for the following data.  Size of beam 300x400mm  Grade of concrete  Live load 4kN/m  Span of beam 6m  8 no of 7mm dia strands are used  Prestress in tendon – 1200MPa  Eccentricity 50mm | CO4 | An | 12 |
|  |  |  |  |  |  |
| 21. |  | Explain the design concepts of precast elements, and selection of materials for the construction. | CO2 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Explain the design steps involved to avoid the progressive collapse in precast buildings. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 23. |  | Explain the methods and devices of Prestressing in detail. | CO5 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Evaluate the moment of resistance of PSC precast beam section for the following data  Area of prestressing steel 325mm2  Ultimate tensile strength of PSC bar 1600MPa  Effective depth 350mm  Size of section 230x400mm  Grade of Concrete M50 | CO6 | E | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify the suitable prefabrication building system |
| CO2 | Explain the behavior of precast elements |
| CO3 | Classify different types of joints for prefabricated structures |
| CO4 | Analyse the building system and joints |
| CO5 | Design the components of precast building system |
| CO6 | Appraise the possibilities of progressive collapse |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 6 | 12 | - | - | - | - | 18 |
| CO2 | 4 | 21 | 13 | - | - | - | 38 |
| CO3 | - | - | 1 | - | - | - | 1 |
| CO4 | - | 27 | - | 12 | - | - | 39 |
| CO5 | 1 | 12 | 3 | - | - | - | 16 |
| CO6 | - | - | - | - | 12 | - | 12 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2020** | **Duration** | **3hrs** |
| **Course Title** | **ARTIFICIAL INTELLIGENCE IN PROJECT MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Describe the process of predicting cost overruns using AI. | | CO4 | R | 1 |
| 2. | Explain the application of fuzzy logic in sequencing project activities. | | CO2 | U | 1 |
| 3. | List any two challenges in knowledge representation. | | CO1 | R | 1 |
| 4. | Classify the significance of monte carlo simulation in risk assessment. | | CO5 | U | 1 |
| 5. | Identify one AI application in civil engineering. | | CO1 | R | 1 |
| 6. | Describe the role of ANN in project planning. | | CO3 | U | 1 |
| 7. | List any two AI techniques for predicting project performance. | | CO5 | R | 1 |
| 8. | Identify the components of an intelligent system. | | CO3 | R | 1 |
| 9. | Define "predicate logic". | | CO1 | R | 1 |
| 10. | List any two benefits of forward reasoning. | | CO2 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Illustrate the concept of knowledge-based expert systems (KBES). | | CO6 | U | 3 |
| 12. | List three benefits of genetic algorithms in engineering design. | | CO4 | R | 3 |
| 13. | Identify the challenges in smart water management. | | CO3 | U | 3 |
| 14. | Determine the steps involved in K-means clustering. | | CO6 | A | 3 |
| 15. | Interpret the strengths and weaknesses of Bayesian networks. | | CO1 | U | 3 |
| 16. | Differentiate the natural language processing and machine learning in predicting project performance. | | CO5 | An | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Predict project performance using ANN and evaluate its effectiveness. | CO5 | E | 12 |
|  |  |  |  |  |  |
| 18. |  | Explain the effectiveness of monte carlo simulation in project risk management. | CO5 | U | 12 |
|  |  |  |  |  |  |
| 19. | a. | Interpret the ANN's limitations in predicting construction delays and suggest improvements. | CO4 | A | 6 |
|  | b. | Evaluate AI's future role in advancing sustainable civil engineering. | CO1 | E | 6 |
|  |  |  |  |  |  |
| 20. | a. | Explain probability distributions in risk management. | CO5 | U | 6 |
|  | b. | Distinguish expert decisions in AI including benefits and challenges. | CO4 | U | 6 |
|  |  |  |  |  |  |
| 21. |  | Describe decision tree in details using suitable examples. | CO6 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Analyze the sequencing of project activities using ANN. | CO2 | An | 12 |
|  |  |  |  |  |  |
| 23. |  | Identify opportunities and challenges in the use of AI in civil engineering projects. | CO2 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Analyze a case where AI performance prediction influence project success or failure. | CO6 | An | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Identify the problems in Civil Engineering and solve using AI |
| **CO2** | Formulate problems and make decisions |
| **CO3** | Explain various search algorithms for problem solving |
| **CO4** | Apply Artificial Intelligence in real time problems |
| **CO5** | Participate in the design of systems that act intelligently and learn from experience |
| **CO6** | Assess the applicability, strengths and weaknesses of the basic knowledge representation |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 3 | 3 | - | - | 6 | - | 12 |
| **CO2** | 1 | 13 | - | 12 | - | - | 26 |
| **CO3** | 1 | 4 | - | - | - | - | 5 |
| **CO4** | 4 | 6 | 6 | - | - | - | 16 |
| **CO5** | 1 | 19 | - | 3 | 12 | - | 35 |
| **CO6** | - | 15 | 3 | 12 | - | - | 30 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2031** | **Duration** | **3hrs** |
| **Course Title** | **CONCRETE TECHNOLGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | State the initial and final setting time of concrete. | | CO1 | R | 1 |
| 2. | List Bouge’s compounds. | | CO1 | R | 1 |
| 3. | Infer soundness test on cement. | | CO2 | U | 1 |
| 4. | Classify the aggregates types based on density. | | CO2 | U | 1 |
| 5. | Define modulus of elasticity of concrete. | | CO4 | R | 1 |
| 6. | Define concrete bleeding. | | CO4 | R | 1 |
| 7. | Enumerate split tensile strength of concrete. | | CO4 | R | 1 |
| 8. | What is fiber reinforced concrete? | | CO5 | U | 1 |
| 9. | Enumerate foam concrete. | | CO5 | R | 1 |
| 10. | State the significance of rapid chloride permeability test. | | CO5 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Differentiate standard consistency and setting time test on cement. | | CO1 | U | 3 |
| 12. | Illustrate slump cone test with suitable sketch. | | CO2 | U | 3 |
| 13. | Classify the factors influencing the strength of concrete. | | CO4 | U | 3 |
| 14. | Explain the mix design guidelines as per IS 10262:2019. | | CO3 | U | 3 |
| 15. | Differentiate high strength concrete and high-performance concrete. | | CO5 | U | 3 |
| 16. | Identify the merits and demerits of non-destructive testing. | | CO6 | R | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Describe wet cement production process in detail with suitable sketch. | CO1 | U | 6 |
|  | b. | Articulate laboratory and field tests on cement. | CO1 | A | 6 |
|  |  |  |  |  |  |
| 18. | a. | Differentiate aggregate crushing value and aggregate impact value in detail. | CO2 | U | 6 |
|  | b. | Classify the field and laboratory tests on fine and coarse aggregates. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 19. | a. | Illustrate the types of concrete mixers used in construction sector. | CO2 | A | 6 |
|  | b. | Infer corrosion and its protection techniques in detail. | CO4 | An | 6 |
|  |  |  |  |  |  |
| 20. | a. | Explain the types of chemical attack in concrete in detail. | CO4 | U | 8 |
|  | b. | Compare manual and mechanical concrete compaction. | CO4 | U | 4 |
|  |  |  |  |  |  |
| 21. |  | Estimate the quantity of the concrete mix ingredients required for M20 grade mix with the following data’s: Cement - OPC, specific gravity of cement – 3.01, specific gravity and size of fine aggregate – 2.5 & 4.75 mm (maximum size), specific gravity and size of coarse aggregate – 2.9 & 20 mm (maximum size), slump of concrete – 90 mm. Assume if any data is required. | CO3 | An | 12 |
|  |  |  |  |  |  |
| 22. |  | Estimate the quantity of the concrete mix ingredients required for M35, using the following conditions: OPC cement with a specific gravity of 3.15, M-sand with a specific gravity of 2.66, and maximum particle size of 4.75 mm, coarse aggregate with a specific gravity of 2.96 and maximum particle size of 12.5 mm, concrete slump was found to be 56 mm. Assume if any data is required. | CO3 | An | 12 |
|  |  |  |  |  |  |
| 23. | a. | Explain ready-mix concrete and its classification. | CO5 | U | 6 |
|  | b. | Distinguish the advantages and disadvantages of ready-mix concrete in detail. | CO5 | U | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Infer rebound hammer test and ultrasonic pulse velocity test in detail. | CO6 | An | 6 |
|  | b. | Describe rebar locator and corrosion analyzer test in detail. | CO6 | U | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Categorize the construction materials, their components and manufacturing process. |
| **CO2** | Identify the quality control properties of concrete making materials. |
| **CO3** | Design the mix design of concrete based on various parameters. |
| **CO4** | Predict the properties of concrete in fresh and hardened concrete. |
| **CO5** | Adopt the different types of concrete in details. |
| **CO6** | Demonstrate non- destructive techniques on concrete structures. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 2 | 9 | 6 |  |  |  | 17 |
| **CO2** |  | 17 | 6 |  |  |  | 23 |
| **CO3** |  | 3 |  | 24 |  |  | 27 |
| **CO4** | 1 | 15 |  | 6 |  |  | 24 |
| **CO5** | 2 | 16 |  |  |  |  | 18 |
| **CO6** | 3 | 6 |  | 6 |  |  | 15 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2034** | **Duration** | **3hrs** |
| **Course Title** | **REPAIR AND REHABILITATION OF STRUCTURES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | List the three types of materials commonly found in structures prone to distress. | | CO1 | R | 1 |
| 2. | Classify the structures based on their vulnerability to distress. | | CO1 | U | 1 |
| 3. | List the external factors that can impact the strength of a structure. | | CO2 | R | 1 |
| 4. | Compare repair with regular maintenance in construction. | | CO2 | U | 1 |
| 5. | List the different types of equipment commonly used in non-explosive demolition methods. | | CO6 | R | 1 |
| 6. | Explain the surface preparation process. | | CO3 | U | 1 |
| 7. | Define shoring. | | CO4 | R | 1 |
| 8. | State the purpose of underpinning in structural work. | | CO4 | R | 1 |
| 9. | List four materials selected for the seismic strengthening of the structure. | | CO5 | R | 1 |
| 10. | Identify any two semi-destructive testing methods. | | CO3 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Describe the various types of information that help in crack diagnosis. | | CO1 | U | 3 |
| 12. | Evaluate the impact of corrosion on lifespan and structural integrity of steel components in structures. | | CO2 | An | 3 |
| 13. | Summarize the importance of cleaning reinforcing steel. | | CO3 | U | 3 |
| 14. | Relate carbonation strength and compressive strength of concrete. | | CO4 | A | 3 |
| 15. | State the salient feature of retrofitting and its significance. Additionally, outline the disadvantages associated with retrofitting. | | CO5 | R | 3 |
| 16. | Write key steps involved in developing a comprehensive demolition strategy for a building. | | CO6 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Explain the three types of materials and their vulnerabilities. | CO1 | U | 4 |
|  | b. | Write the step-by-step procedure to be followed for the conditional assessment of existing masonry buildings to identify the distress. | CO1 | A | 8 |
|  |  |  |  |  |  |
| 18. | a. | Apply your understanding of corrosion prevention to outline specific strategies and materials suitable for designing a structure in a coastal area prone to high humidity. Also support your choice to mitigate the impact of corrosive environment. | CO2 | A | 8 |
|  | b. | Explain the significance of preventive measures in controlling defects in masonry structures. | CO2 | U | 4 |
|  |  |  |  |  |  |
| 19. |  | Analyze the procedure for core sampling and testing techniques in concrete structures, identifying key factors that affect the accuracy and reliability of results. | CO3 | An | 12 |
|  |  |  |  |  |  |
| 20. |  | Assess the sustainability and economic impact of using coatings versus sacrificial anodes in large infrastructure projects. Which approach offers better long-term value, considering maintenance and replacement costs? | CO4 | E | 12 |
|  |  |  |  |  |  |
| 21. |  | Evaluate the impact of different crack repair techniques, such as epoxy injection, grouting, and routing and sealing, on the structural integrity and load-bearing capacity of concrete elements. How does each method address specific crack types and structural conditions? | CO5 | E | 12 |
|  |  |  |  |  |  |
| 22. |  | Examine the effect of surface conditions, such as carbonation and moisture, on the reliability of rebound hammer test results. How can engineers adjust their interpretation to account for these factors? | CO3 | A | 12 |
|  |  |  |  |  |  |
| 23. | a. | Enumerate the different types of underpinning, including sketches for each type. | CO4 | R | 6 |
|  | b. | Explain in detail two corrosion protection techniques. | CO4 | U | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Analyze the advantages and disadvantages of using implosion as a demolition technique compared to traditional methods, with reference to a specific case study. | CO6 | An | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Understand distress and damages to concrete steel and masonry structures |
| **CO2** | Inspect the structures for its maintenance |
| **CO3** | Interpret damage of structures using various tests |
| **CO4** | Apply of repair techniques to damage structures |
| **CO5** | Evaluate the strength of structural elements |
| **CO6** | Retrofit and strengthen RCC and Steel structures |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 1 | 8 | 8 |  |  |  | 17 |
| **CO2** | 1 | 5 | 8 | 3 |  |  | 17 |
| **CO3** |  | 5 | 12 | 12 |  |  | 29 |
| **CO4** | 8 | 6 | 3 |  | 12 |  | 29 |
| **CO5** | 4 |  |  |  | 12 |  | 16 |
| **CO6** | 1 |  | 3 | 12 |  |  | 16 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2036** | **Duration** | **3hrs** |
| **Course Title** | **MUNICIPAL WASTE MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define solid waste. | | CO1 | R | 1 |
| 2. | Describe the health effects caused by exposure to e-waste. | | CO1 | U | 1 |
| 3. | List the classification of municipal solid waste. | | CO1 | R | 1 |
| 4. | Describe the main benefits of recycling. | | CO3 | U | 1 |
| 5. | Illustrate labelling. | | CO2 | A | 1 |
| 6. | Explain waste processing. | | CO2 | U | 1 |
| 7. | Explain the importance of waste seperation. | | CO2 | U | 1 |
| 8. | Define Bangalore method in composting. | | CO1 | R | 1 |
| 9. | Define active composting. | | CO1 | R | 1 |
| 10. | The Maximum C\N Ration In A Municipal Solid Waste Compost Is. | | CO1 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Describe the key provisions and regulations outlined in the solid waste management rules 2016. | | CO5 | U | 3 |
| 12. | List the factors influencing composition of solid waste. | | CO2 | R | 3 |
| 13. | Explain the various methods used for handling hazardous waste. | | CO3 | U | 3 |
| 14. | Write the benefits of effective bio-medical waste management. | | CO3 | U | 3 |
| 15. | Explain landfill bio-reactor functions and its role in waste management. | | CO4 | U | 3 |
| 16. | Describe E-Waste. | | CO1 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | List the major sources of solid wastes and explain their contributions to overall waste generation. | CO2 | R | 6 |
|  | b. | Explain the different classification of solid wastes with examples for each. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 18. |  | Describe the properties and benefits of municipal solid wastes. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 19. | a. | Explain the step by step process of storage and collection of municipal solid waste. | CO1 | U | 6 |
|  | b. | Explain the need for transfer and transport of municipal solid wastes. | CO4 | U | 6 |
|  |  |  |  |  |  |
| 20. | a. | Explain the different methods of disposal of bio-medical waste and their segregation. | CO2 | U | 6 |
|  | b. | Describe the procedures for the treatment and disposal of bio-medical waste. | CO3 | U | 6 |
|  |  |  |  |  |  |
| 21. | a. | Explain sanitary landfill and its types. | CO4 | U | 6 |
|  | b. | Explain the formation and management of landfill gas and leachate. | CO4 | U | 6 |
|  |  |  |  |  |  |
| 22. | a. | Define incineration and discuss its advantages and disadvantages in waste management. | CO3 | R | 6 |
|  | b. | Explain the process of biogas generation, including the types of waste used and its benefits. | CO3 | U | 6 |
|  |  |  |  |  |  |
| 23. | a. | Analyze a case study that highlights best practices in waste management. | CO2 | An | 6 |
|  | b. | Explain the key features of the swachh bharat mission and evaluate its impact on waste management in India. | CO5 | U | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Explain composting, its need in promoting sustainability, and elaborate on the various types of composting methods, highlighting their advantages and disadvantages. | CO3 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Analyze the nature and characteristics of municipal solid wastes |
| **CO2** | Sort out the functional elements for solid waste management |
| **CO3** | Apply the techniques and methods used in transformation, conservation and recovery of materials from solid waste |
| **CO4** | Identify and design waste containment systems |
| **CO5** | Gain knowledge in regulatory requirements regarding municipal solid waste management |
| **CO6** | Apply the basic scientific principles for solving practical waste management challenges |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 5 | 22 | - | - | - | - | 27 |
| **CO2** | 9 | 14 | 1 | 6 | - | - | 30 |
| **CO3** | 6 | 31 | - | - | - | - | 37 |
| **CO4** | - | 21 | - | - | - | - | 21 |
| **CO5** | - | 9 | - | - | - | - | 9 |
| **CO6** | - | - | - | - | - | - | - |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **20CE2037** | **Duration** | **3hrs** |
| **Course Title** | **NOISE POLLUTION AND ITS CONTROL** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Describe the basic principles of noise pollution. | | CO1 | R | 1 |
| 2. | State the difference between noise and sound pollution. | | CO1 | R | 1 |
| 3. | List two challenges associated with outdoor sound propagation. | | CO1 | R | 1 |
| 4. | Identify the primary sources of transportation noise. | | CO2 | R | 1 |
| 5. | Explain the impact of noise pollution on human health. | | CO3 | R | 1 |
| 6. | List some key noise mitigation approaches. | | CO4 | R | 1 |
| 7. | Define noise pollution. | | CO4 | R | 1 |
| 8. | Explain how strategic noise mapping helps in noise management. | | CO1 | U | 1 |
| 9. | Enumerate industrial noise sources. | | CO4 | R | 1 |
| 10. | List two current limitations and future research priorities in noise mitigation. | | CO4 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Analyze the relationship between noise pollution and health issues. | | CO3 | An | 3 |
| 12. | Explain the principles of noise pollution measurement. | | CO2 | U | 3 |
| 13. | Recall the special case of low-frequency noise. | | CO2 | R | 3 |
| 14. | List three sound-absorbent materials. | | CO5 | R | 3 |
| 15. | Illustrate the decibel scale using a neat and clean diagram. | | CO2 | U | 3 |
| 16. | Discuss the impact of transportation and industrial noise on public health. | | CO1 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Describe the functionality of a Sound Level Meter, and provide a clear block diagram illustrating the components of a typical sound level meter. | CO1 | R | 12 |
|  |  |  |  |  |  |
| 18. |  | Illustrate noise pollution remedies with a neat diagram. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 19. |  | Define the following:   * Auditory effects * Non-auditory effects | CO3 | R | 12 |
|  |  |  |  |  |  |
| 20. |  | Explain the functioning of a noise barrier and provide illustrations of several examples using clear diagrams. | CO5 | U | 12 |
|  |  |  |  |  |  |
| 21. |  | Explain the importance of public awareness on noise pollution and outline the strategies and significance of public education initiatives addressing this issue. | CO6 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Define any two of the following:   * Legislation and administrative functions. * Environmental Protection Act of 1986. * The Rajasthan Noise Control Act of 1963. | CO6 | R | 12 |
|  |  |  |  |  |  |
| 23. |  | Define  1. Noise assessment  2. Noise rating  3. Ldn  2. Noise management program | CO1 | R | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Explain the Indian standards and guidelines for noise pollution. | CO6 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Identify the nature and characteristics of noise pollution |
| **CO2** | Analyze the noise pollution problems |
| **CO3** | Detect the various effects of noise pollution |
| **CO4** | Apply suitable preventive measures and identify the technologies and methods to control of noise |
| **CO5** | Choose suitable noise adsorbent materials |
| **CO6** | Gain knowledge about the various noise pollution regulations |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 27 | 4 | - | - | - | - | 31 |
| **CO2** | 4 | 6 | - | - | - | - | 10 |
| **CO3** | 13 | - | - | 12 | - | - | 25 |
| **CO4** | 4 | 12 | - | - | - | - | 16 |
| **CO5** | 3 | 12 | - | - | - | - | 15 |
| **CO6** | 12 | 24 | - | - | - | - | 36 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2038** | **Duration** | **3hrs** |
| **Course Title** | **ENVIRONMENTAL LAWS AND POLICY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Identify the drawbacks of ozone depletion. | | CO1 | R | 1 |
| 2. | Differentiate between noise pollution and sound pollution. | | CO1 | U | 1 |
| 3. | Define "Hazardous Wastes (Management and Handling) Rules." | | CO1 | R | 1 |
| 4. | Identify the specific requirements outlined for the labeling of hazardous wastes. | | CO1 | R | 1 |
| 5. | Explain noise pollution. | | CO6 | U | 1 |
| 6. | List two objectives of the Kyoto Protocol. | | CO6 | R | 1 |
| 7. | Understand the importance of the Air Act. | | CO1 | U | 1 |
| 8. | Define the Environmental Protection Act. | | CO1 | R | 1 |
| 9. | List two penalties imposed for offenses under the Water Act. | | CO3 | R | 1 |
| 10. | Define the Water Act. | | CO1 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Discuss the key aspects of emission standards, compliance requirements, and enforcement measures outlined in the Environmental Protection Act. | | CO2 | U | 3 |
| 12. | Enumerate the strategies and measures for mitigating major accidents as prescribed by the Hazardous Wastes Rules. | | CO5 | R | 3 |
| 13. | Explain the significant features and provisions of the Water Act. | | CO4 | U | 3 |
| 14. | Define the Umbrella Act. | | CO3 | R | 3 |
| 15. | Examine the principles and implications of International Law. | | CO5 | U | 3 |
| 16. | List the advantages provided by the Environmental Protection Act. | | CO6 | R | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Explain the provisions of the Environmental Protection Act of 1981 related to industry location restrictions, focusing on their environmental implications. | CO3 | U | 12 |
|  |  |  |  |  |  |
| 18. |  | Analyze the objectives and limitations of the Environmental Protection Act of 1981. | CO1 | An | 12 |
|  |  |  |  |  |  |
| 19. |  | Write the evolution of International Environmental Law. | CO1 | A | 12 |
|  |  |  |  |  |  |
| 20. |  | Describe the effectiveness of the Hazardous Wastes (Management and Handling) Rules in ensuring environmental safety, particularly in accident reporting, appeals, storage, manufacturing, major accident mitigation, safety reports, and emergency plans. | CO3 | U | 12 |
|  |  |  |  |  |  |
| 21. |  | Discuss the impact of the Kyoto Protocol and its implementation challenges in addressing global climate change. | CO6 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Summarize the chapters and sections of the Environmental Protection Act of 1981. | CO5 | U | 12 |
|  |  |  |  |  |  |
| 23. |  | Describe the Indian standards and guidelines for noise pollution. | CO6 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Discuss the significance of the Vienna Convention on the Law of Treaties (1969) in shaping the modern framework of international treaty law. | CO6 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| **CO1** | Recall different policies and rules framed for the environmental protection |
| **CO2** | Recognize the formation of boards at different levels |
| **CO3** | Discuss the functions of central pollution board and the state pollution boards. |
| **CO4** | Know about different duties of pollution control boards |
| **CO5** | Assess about the actions taken by government for the violation of rules |
| **CO6** | Enumerate about the prevention of advanced pollution |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 5 | 2 | 12 | 12 | - | - | 31 |
| **CO2** | - | 3 | - | - | - | - | 3 |
| **CO3** | 4 | 24 | - | - | - | - | 28 |
| **CO4** | - | 3 | - | - | - | - | 3 |
| **CO5** | 3 | 15 | - | - | - | - | 18 |
| **CO6** | 4 | 37 | - | - | - | - | 41 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2039** | **Duration** | **3hrs** |
| **Course Title** | **IRRIGATION ENGINEERING AND HYDRAULIC STRUCTURES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Interpret high and low duty. | | CO1 | U | 1 |
| 2. | Infer the crop seasons followed in India. | | CO1 | U | 1 |
| 3. | Define cropwater requirement. | | CO2 | R | 1 |
| 4. | List any one disadvantages of irrigation. | | CO2 | R | 1 |
| 5. | Write the formula for calculating conveyance efficiency. | | CO3 | A | 1 |
| 6. | Identify the most suitable irrigation methods for cultivation in sloping grounds. | | CO3 | R | 1 |
| 7. | State the significance of permanent wilting point. | | CO3 | R | 1 |
| 8. | Cite the purpose of distribution box in farms. | | CO4 | U | 1 |
| 9. | Prioritize any two control hydraulic structures used in irrigation systems. | | CO5 | A | 1 |
| 10. | List the criteria that are considered while fixing water pricing. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Compare sprinkler and drip irrigation methods. | | CO1 | An | 3 |
| 12. | List any two factors that affect duty of irrigation. | | CO2 | R | 3 |
| 13. | Estimate delta for wheat, if wheat requires about 9.5cm of water every 28days, and the base period as140days, | | CO3 | An | 3 |
| 14. | Explain the hydraulic profile of a dam and mark its various zones indicating their purposes. | | CO3 | A | 3 |
| 15. | State the various methods of surface irrigation. | | CO4 | R | 3 |
| 16. | Differentiate between aqueduct and superpassage. | | CO6 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Describe in detail the necessity of irrigation with reference to spatial and temporal distribution of rainfall. | CO1 | U | 6 |
|  | b. | State the advantages and disadvantages of irrigation. | CO1 | R | 6 |
|  |  |  |  |  |  |
| 18. | a. | Explain the factors that are considered for the estimation of cropwater requirement in order to plan irrigation scheduling. | CO2 | A | 6 |
|  | b. | A channel is to be designed for irrigating 5000 ha in kharif crop and 4000 ha in rabi crop. The water requirement for kharif and rabi are 60 cm and 25 cm respectively. The crop period for kharif crop is 21 days and for rabi crops 28 days. Determine the discharge of the channel for which it is to be designed. | CO2 | A | 6 |
|  |  |  |  |  |  |
| 19. |  | Explain any 3 conventional irrigation methods with their merits and demerits. | CO3 | A | 12 |
|  |  |  |  |  |  |
| 20. |  | Describe the components of drip irrigation and installation procedures. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 21. | a. | Articulate various methodologies followed for improving duty. | CO4 | A | 6 |
|  | b. | Describe the stages of reservoir planning and the criteria followed for selection of site for dam construction. | CO4 | U | 6 |
|  |  |  |  |  |  |
| 22. |  | Explain water pricing methods followed for canal irrigation in different states of India. | CO6 | A | 12 |
|  |  |  |  |  |  |
| 23. |  | Explain onfarm development works with their functions. | CO5 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Describe the control structures, installed to regulate flows in an irrigation system and their purposes. | CO5 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | state the concepts of duty, crop and crop seasons |
| CO2 | classify the irrigation methods |
| CO3 | demonstrate the irrigation methods |
| CO4 | examine irrigation structures |
| CO5 | appraise and design of impounding structures and cross drainage works |
| CO6 | construct and operate the irrigation projects |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| **CO1** | 6 | 8 | 0 | 3 | - | - | 17 |
| **CO2** | 5 | - | 12 | - | - | - | 17 |
| **CO3** | 2 | - | 16 | 3 | 0 | - | 21 |
| **CO4** | 3 | 19 | 6 | - | - | - | 28 |
| **CO5** | - | 12 | 13 | - | - | - | 25 |
| **CO6** | 1 | - | 15 | - | - | - | 16 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2041** | **Duration** | **3hrs** |
| **Course Name** | **BASICS OF REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)**  **(Answer all the questions)** | | | | | |
| 1. | Define Remote sensing. | | CO1 | R | 1 |
| 2. | Define spectral signature. | | CO1 | R | 1 |
| 3. | Tabulate the types of platforms. | | CO2 | R | 1 |
| 4. | List the types of sensors. | | CO2 | R | 1 |
| 5. | Summarize the types of image interpretation. | | CO3 | R | 1 |
| 6. | Define digital image processing. | | CO3 | R | 1 |
| 7. | What is Map Projection? | | CO4 | R | 1 |
| 8. | List the components of GIS. | | CO4 | R | 1 |
| 9. | Compare vector and raster data. | | CO5 | R | 1 |
| 10. | Infer on deformation studies of deflection. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)**  **(Answer all the questions)** | | | | | |
| 11. | Examine the significance of wavelength regions on remote sensing technique. | | CO1 | U | 3 |
| 12. | Compare the orbit types.  Sun-synchronous and geo-stationary; low altitute, medium and high; polar, near polar | | CO2 | U | 3 |
| 13. | Explain the types of data products and their applications. | | CO3 | U | 3 |
| 14. | Summarize the basic components of GIS. | | CO4 | U | 3 |
| 15. | Articulate the data input by digitization and scanning. | | CO5 | U | 3 |
| 16. | Comment on the landslide risk analysis. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No. 17 to 23, Q.No. 24 is Compulsory)** | | | | | |
| 17. |  | Categorize the various spectral regions of electromagnetic spectrum and their significance in remote sensing techniques with neat sketch. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 18. | a. | Discuss the various types of resolution of sensors and their salient features. | CO2 | U | 6 |
|  | b. | Discuss the airborne and space-borne remote sensing system. | CO2 | U | 6 |
|  |  |  |  |  |  |
| 19. |  | Integrate the principle of digital image processing and their logical sequence of image processing with neat sketch. | CO3 | U | 12 |
|  |  |  |  |  |  |
| 20. |  | Compare the data type of spatial and non-spatial data and their significance in data analysis with a typical example.. | CO4 | A | 12 |
|  |  |  |  |  |  |
| 21. |  | Apply the modelling using RS and GIS in Highway studies. | CO5 | U | 12 |
|  |  |  |  |  |  |
| 22. |  | Summarize the basic elemets of image interpretation with neat sketches. | CO5 | A | 12 |
|  |  |  |  |  |  |
| 23. |  | Prepare the land information system using GIS with a typical case study in Land parcel/ information studies. | CO6 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Examine the site suitability analysis for the transport infrastructure using RS and GIS. Explain with anyone case study. | CO6 | E | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Identify the concepts of sustainability |
| CO2 | Understand the Concepts of Economic Sustainability |
| CO3 | Analyse the Concepts of Environmental Sustainability |
| CO4 | Analyse the Social aspects of sustainability |
| CO5 | Apply the concepts of sustainability to environmental and geotechnical engineering |
| CO6 | Apply the concepts of sustainability to construction and transportation engineering |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 15 |  |  |  |  | 17 |
| CO2 | 2 | 15 |  |  |  |  | 17 |
| CO3 | 2 | 15 |  |  |  |  | 17 |
| CO4 | 2 | 3 | 12 |  |  |  | 17 |
| CO5 | 1 | 15 | 12 |  |  |  | 28 |
| CO6 | 1 | 3 | 12 |  | 12 |  | 28 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2044** | **Duration** | **3hrs** |
| **Course Title** | **SUSTAINABLE DESIGN OF CAMPUS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define green engineering. | | CO1 | R | 1 |
| 2. | List two composting methods commonly used in organic waste treatment. | | CO1 | R | 1 |
| 3. | Define energy in terms of its role in sustainability. | | CO2 | R | 1 |
| 4. | Describe grey energy. | | CO2 | U | 1 |
| 5. | Give an example of a food preservation method that uses salting (curing) techniques. | | CO3 | U | 1 |
| 6. | Define sustainable agriculture. | | CO3 | R | 1 |
| 7. | Summarize the role of efficient water fixtures in contributing to sustainable water conservation. | | CO4 | U | 1 |
| 8. | Describe Johads, a traditional water conservation method in India. | | CO4 | U | 1 |
| 9. | State urban heat island mitigation recommended by GRIHA. | | CO6 | R | 1 |
| 10. | Identify the air temperature range for comfortable human occupancy as recommended by ASHRAE Standard 55. | | CO5 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Differentiate between anaerobic digestion and bokashi fermentation in the context of organic waste treatment. | | CO1 | An | 3 |
| 12. | Explain the purpose and expected outcomes of conducting energy audits. | | CO2 | A | 3 |
| 13. | Identify the four pillars of food security and their significance | | CO3 | U | 3 |
| 14. | Distinguish between the roles of xeriscaping and permeable hardscaping in sustainable landscaping. | | CO4 | An | 3 |
| 15. | Determine the factors that influence thermal comfort in classrooms. | | CO5 | A | 3 |
| 16. | List the water sources used on your campus for managing water consumption. | | CO4 | R | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.No 17 to 23, Q.No 24 is Compulsory)** | | | | | |
| 17. | a. | Classify three inorganic waste treatment methods a campus can adopt to promote sustainability. | CO1 | An | 6 |
|  | b. | Consider wastewater management system adopted by Gadjah Mada University that could be implemented on your campus. | CO1 | E | 6 |
|  |  |  |  |  |  |
| 18. | a. | Identify the factors influencing heating energy demand. | CO2 | U | 6 |
|  | b. | Illustrate two waste-to-energy technologies that can be adopted for energy conversion on a campus. | CO2 | An | 6 |
|  |  |  |  |  |  |
| 19. | a. | Interpret land degradation as a form of environmental degradation and mention its impact on the green revolution. | CO3 | A | 6 |
|  | b. | Explain effective water and soil management practices for enhancing agricultural production. | CO3 | A | 6 |
|  |  |  |  |  |  |
| 20. | a. | Differentiate between reuse and recycling regarding process, water quality, and applications. | CO4 | An | 6 |
|  | b. | Describe sustainable water conservation methods that can be adopted by any campus. | CO4 | U | 6 |
|  |  |  |  |  |  |
| 21. |  | Explain the origin, contributing factors, health effects, and management and prevention strategies for Sick Building Syndrome (SBS). | CO5 | An | 12 |
|  |  |  |  |  |  |
| 22. | a. | Determine the challenges faced on campus when conserving energy. | CO6 | A | 6 |
|  | b. | Evaluate the natural and human-made factors considered in designing features based on a case study of NTU Singapore’s approach to sustainability and energy management. | CO6 | An | 6 |
|  |  |  |  |  |  |
| 23. |  | Write in detail any four food preservation techniques, incorporating both traditional and modern methods. | CO3 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. | a. | Evaluate the green initiatives implemented on your campus, focusing on energy efficiency measures, green building concepts, and biodiversity conservation. | CO6 | An | 8 |
|  | b. | Explain water conservation practices and greywater treatment systems implemented on your campus. | CO6 | A | 4 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify the Waste management concepts in the institute |
| CO2 | Apply sustainability principles for Energy |
| CO3 | Analyze the importance of food and sustainability |
| CO4 | Apply Water related sustainability concepts |
| CO5 | Analyze the concepts related to health and sustainability |
| CO6 | Evaluate a strategy for developing sustainable institute |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| CO / BL | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 2 | 0 |  | 9 | 6 |  | 17 |
| CO2 | 1 | 7 | 3 | 6 |  |  | 17 |
| CO3 | 1 | 4 | 24 |  |  |  | 29 |
| CO4 | 1 |  | 10 | 9 |  |  | 20 |
| CO5 |  | 1 | 3 | 12 |  |  | 16 |
| CO6 | 1 |  | 10 | 14 |  |  | 25 |
|  | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE2047** | **Duration** | **3hrs** |
| **Course Title** | **INTELLIGENT TRANSPORTATION SYSTEMS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)**  **(Answer all the questions)** | | | | | |
| 1. | Define the term ITS. | | CO1 | R | 1 |
| 2. | Recall the national ITS programme. | | CO1 | R | 1 |
| 3. | List out the studies carried out effectively by integration telecommunication and ITS. | | CO2 | R | 1 |
| 4. | State the factors that are studied by telecommunication in ITS. | | CO2 | R | 1 |
| 5. | Identify the ITS use in commercial vehicle operations. | | CO3 | R | 1 |
| 6. | State the use of ITS in disaster planning. | | CO3 | R | 1 |
| 7. | State the main advantage of ITS in electronic payment. | | CO4 | R | 1 |
| 8. | Define the term vehicles in platoons. | | CO4 | R | 1 |
| 9. | Tabulate the advantages of ITS. | | CO5 | R | 1 |
| 10. | Recognize any one ITS technology adopted in well developed countries. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)**  **(Answer all the questions)** | | | | | |
| 11. | Associate the dynamic message sign in ITS. | | CO1 | U | 3 |
| 12. | Differentiate between emergence and incident management. | | CO2 | U | 3 |
| 13. | Interpret the use of traveler information in urban planning. | | CO3 | U | 3 |
| 14. | Illustrate the mechanism of speed detection techniques. | | CO4 | U | 3 |
| 15. | Indicate the elements of automated highway systems. | | CO5 | U | 3 |
| 16. | Name the country that has best transport system in the world. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Explain the automatic vehicle identification process and its advantages. | CO1 | U | 12 |
|  |  |  |  |  |  |
| 18. |  | Illustrate the emergency management study using telecommunications. | CO2 | U | 12 |
|  |  |  |  |  |  |
| 19. |  | Employ GIS and ITS in sustainable urban transportation planning. | CO3 | U | 12 |
|  |  |  |  |  |  |
| 20. |  | Elaborate the usage of ITS in public transportation management and its detailed framework with flowchart. | CO4 | U | 12 |
|  |  |  |  |  |  |
| 21. |  | Construct the ITS framework used for parking guidance and information system. | CO4 | A | 12 |
|  |  |  |  |  |  |
| 22. |  | Interpret the ITS technology in preventing the accidents in real time. | CO5 | A | 12 |
|  |  |  |  |  |  |
| 23. |  | Write the ITS development in the Singapore city and the users’ satisfactions. | CO6 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Illustrate the accident management using ITS along with a case study of Delhi. | CO6 | A | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand the concept of its, with particular emphasis on advanced traffic management and traveler |
| CO2 | Information issues explain the human factor issues for its generalize the sensor and communication technologies |
| CO3 | Apply the various its methodologies |
| CO4 | Define the significance of its under Indian conditions |
| CO5 | Describe the elements of Vehicle Location, Route Navigation and Guidance concepts |
| CO6 | Demonstrate the application of ITS in urban planning |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 2 | 15 | - | - | - | - | 17 |
| CO2 | 2 | 15 | - | - | - | - | 17 |
| CO3 | 2 | 15 | - | - | - | - | 17 |
| CO4 | 2 | 15 | 12 | - | - | - | 29 |
| CO5 | 1 | 3 | 12 | - | - | - | 16 |
| CO6 | 1 | 15 | 12 | - | - | - | 28 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CE2053** | **Duration** | **3hrs** |
| **Course Title** | **SMART BUILDINGS** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define a smart building. | | CO1 | R | 1 |
| 2. | Explain the purpose of integrating BAS for efficient building functionality. | | CO1 | U | 1 |
| 3. | Illustrate the Intelligent Management System (IMS) in modern buildings. | | CO2 | U | 1 |
| 4. | Define Sick Building Syndrome (SBS). | | CO2 | R | 1 |
| 5. | Give examples of initiating devices for detecting and activating alarm systems. | | CO5 | U | 1 |
| 6. | Explain the purpose of fire alarm systems. | | CO5 | U | 1 |
| 7. | Identify the primary goal of the security system. | | CO5 | R | 1 |
| 8. | Describe professional monitoring services. | | CO4 | U | 1 |
| 9. | State the primary function of a microprocessor in building electronics. | | CO2 | R | 1 |
| 10. | Name one application of cloud computing in building infrastructure. | | CO4 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | List the benefits of IoT in building automation. | | CO1 | R | 3 |
| 12. | Summarize the essential features of BMS software. | | CO3 | U | 3 |
| 13. | Explain four common components of HVAC. | | CO4 | U | 3 |
| 14. | Classify types of fire detectors. | | CO5 | U | 3 |
| 15. | State the importance of structural health monitoring for infrastructure maintenance. | | CO6 | R | 3 |
| 16. | Infer the role of the fiber optic backbone in modern building infrastructure. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Explain the evolution of Building Management systems (BMS) technology over time. | CO1 | A | 8 |
|  | b. | Illustrate the components of building automation systems. | CO1 | A | 4 |
|  |  |  |  |  |  |
| 18. | a. | Describe the IBMS architecture and mention the functions for normal operation and emergency operation. | CO2 | U | 8 |
|  | b. | Explain the integration of EPBX systems into BMS to enhance communication and operation (any three methods). | CO2 | U | 4 |
|  |  |  |  |  |  |
| 19. | a. | Write about Demand-Controlled Ventilation (DCV) and Natural Ventilation (NV). | CO3 | A | 4 |
|  | b. | Infer the components of HVAC controls, their functionality, and the benefits they provide for a smart building. | CO4 | U | 8 |
|  |  |  |  |  |  |
| 20. | a. | Summarize fire prevention and evacuation procedures. | CO5 | R | 6 |
|  | b. | Explain the major components of sprinkler systems | CO5 | U | 6 |
|  |  |  |  |  |  |
| 21. | a. | Explain RFID technology in detail, mentioning its components, benefits, and functionality. | CO4 | U | 8 |
|  | b. | Interpret considerations for choosing a security system and explain how security systems work. | CO5 | A | 4 |
|  |  |  |  |  |  |
| 22. | a. | Summarize the physiological aspects of thermal comfort, acoustic comfort, and visual comfort affecting humans. | CO3 | U | 8 |
|  | b. | Illustrate a pie chart for the primary causes of sick building syndrome. | CO4 | U | 4 |
|  |  |  |  |  |  |
| 23. |  | Explain the importance of access control systems and mention the major components of access control systems. | CO5 | A | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Analyze with a case study how a building that has implemented smart technologies tackled challenges faced during the implementation and achieved benefits in terms of energy efficiency, cost savings, and user satisfaction | CO6 | AN | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Understand the system of Smart Technology |
| **CO2** | Implement the design principles and strategy in Smart buildings |
| **CO3** | Illustrate philosophy of building automation systems |
| **CO4** | Analyze the intelligent building design concepts |
| **CO5** | Design fire safety and security systems for intelligent buildings |
| **CO6** | Integrate the building management systems and adopt them in intelligent buildings |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | | **An** | **E** | **C** | **Total** |
| **CO1** | 4 | 1 | 12 |  | |  |  | 17 |
| **CO2** | 2 | 13 |  |  | |  |  | 15 |
| **CO3** |  | 11 | 4 |  | |  |  | 15 |
| **CO4** | 1 | 24 |  |  | |  |  | 25 |
| **CO5** | 7 | 11 | 16 |  | |  |  | 34 |
| **CO6** | 3 | 3 |  | 12 | |  |  | 18 |
|  | | | | | | | | **124** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE3001** | **Duration** | **3hrs** |
| **Course Title** | **ADVANCED STRUCTURAL ANALYSIS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (5 X 16 = 80 MARKS)**  **(Answer any five from the following)** | | | | | |
| 1. |  | Analyze the continuous beams using Matrix flexibility method. Take EI is constant.  UNIT – IV FLEXIBILTY AND STIFFNESS METHOD | CO1 | An | 16 |
|  |  |  |  |  |  |
| 2. |  | Explain in detail the step by step procedure of the Matrix flexibility for a statically determinate and in-determinate structure using semi-automatic method. | CO1 | U | 16 |
|  |  |  |  |  |  |
| 3. |  | Analyze the portal frame ABCD shown in figure by Stiffness matrix method and sketch the bending moment diagram.  Solved] Analyze the portal frame ABCD shown in figure by slope  deflection... | Course Hero | CO2 | An | 16 |
|  |  |  |  |  |  |
| 4. |  | Analyze the continuous beams using Matrix Stiffness method.  UNIT – IV FLEXIBILTY AND STIFFNESS METHOD | CO3 | An | 16 |
|  |  |  |  |  |  |
| 5. |  | Explain in detail the steps involved in the analysis of continuous beam using Direct Stiffness method. | CO4 | U | 16 |
|  |  |  |  |  |  |
| 6. |  | Explain the significance of boundary conditions in structural frame analysis. Discuss how different types of supports (fixed, hinged, roller) influence the behavior of the frame and the stability analysis. | CO5 | U | 16 |
|  |  |  |  |  |  |
| 7. |  | Analyze a grid structure using matrix methods, detailing the formulation of stiffness matrices and the assembly process. | CO4 | An | 16 |
| **PART – B (1 X 20 = 20 MARKS)**  **(Compulsory Question)** | | | | | |
| 8. |  | Analyze the truss shown in figure by direct stiffness method.  See the source image | CO5 | An | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Identify the degrees of freedom and formulate flexibility and stiffness matrix |
| CO2 | Analyze the truss using stiffness methods |
| CO3 | Analyze the beams elements using appropriate methods |
| CO4 | Analyze the elements using advanced methods |
| CO5 | Evaluate the structural stability of frames |
| CO6 | Analyze the elements using software tools |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 16 | - | 16 | - | - | 32 |
| CO2 | - | - | - | 16 | - | - | 16 |
| CO3 | - | - | - | 16 | - | - | 16 |
| CO4 | - | 16 | - | 16 | - | - | 32 |
| CO5 | - | 16 | - | 20 | - | - | 36 |
| CO6 | - | - | - | - | - | - | - |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE3003** | **Duration** | **3hrs** |
| **Course Title** | **STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING** | **Max. Marks** | **100** |

\*1S1893 Part 1 and IS13920: 2016 is Permitted

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (5 X 16 = 80 MARKS)**  **(Answer any five from the following)** | | | | | |
| 1. | a. | Determine the natural frequency of the system shown in figure. E = 2.1 x 106 kg/cm2 | CO1 | A | 8 |
|  | b. | Calculate the magnification factor of a forced vibration produced by an oscillator fixed at the middle of the beam of speed 600 rpm. The weight concentrated at the middle of the beam is 5000 N, static deflection is 0.025 cm. The force acting at the middle of the beam is equal to 500 N at velocity of 2.5 cm/sec. | CO1 | A | 8 |
|  |  |  |  |  |  |
| 2. |  | Determine the natural frequencies and mode shapes for a framed structure with two floors. The mass in each floor m1= 5000kg and m2=4000 kg is considered to be absolutely rigid. EI= 4.5 x 106 N-m2 | CO2 | A | 16 |
|  |  |  |  |  |  |
| 3. |  | Evaluate the response of a two degree of freedom system whose mass and Stiffness Matrices are given by the following.  and  The forcing function . The system starts at rest.  Find its response by newmark’s method. Use time step as 0.1 sec, α =0.25 and δ=0.5. | CO2 | An | 16 |
|  |  |  |  |  |  |
| 4. |  | Consider a four-storey reinforced concrete office building shown in Fig (elevation in mm). The building is located in Shillong (seismic zone V). The soil conditions are medium stiff and the entire building is supported on a raft foundation. The R. C. frames are infilled with brick-masonry. The lumped weight due to dead loads is 12 kN/m2 on floors and 10 kN/m2 on the roof. The floors are to cater for a live load of 4 kN/m2 on floors and 1.5 kN/m2 on the roof. The plan has 5 columns at 5m c/c in ‘X’ direction and 4 columns at 5 m c/c in ‘y’ direction. Determine design seismic load on the structure. | CO3 | A | 16 |
|  |  |  |  |  |  |
| 5. | a. | Illustrate the key guidelines for earthquake-resistant design and assess their effectiveness in improving the safety of structures in seismic zones. | CO5 | U | 8 |
|  | b. | Assess the use of rigid frames and shear walls in earthquake-resistant design, and compare their effectiveness in providing lateral stability to structures. | CO5 | E | 8 |
|  |  |  |  |  |  |
| 6. | a. | Compare earthquake magnitude and intensity, and analyze how each measure contributes to understanding an earthquake's impact on structures and populations. | CO5 | An | 8 |
|  | b. | Examine the influence of past major earthquakes in India on the development of seismic zoning policies, and evaluate their effectiveness in reducing building vulnerability. | CO5 | A | 8 |
|  |  |  |  |  |  |
| 7. | a. | Distinguish the different types of seismic waves (P-waves, S-waves, and surface waves) in terms of their speed, movement, and impact on structures during an earthquake. | CO4 | An | 8 |
|  | b. | Explain static and dynamic methods of seismic analysis. | CO4 | U | 8 |
| **PART – B (1 X 20 = 20 MARKS) [Compulsory Question]** | | | | | |
| 8. |  | Compare passive, active, and semi-active vibration control systems, and analyze their effectiveness in managing building vibrations during seismic events. | CO6 | An | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Identify the elements of vibratory system and develop mathematical models |
| CO2 | Determine the fundamental frequency and mode of vibration of structural elements |
| CO3 | Estimate the response of structures subjected to dynamic forces |
| CO4 | Apply theory of dynamics to structures subjected to seismic forces |
| CO5 | Illustrate the codal provisions for seismic resistant design |
| CO6 | Recommend suitable alternate techniques and retrofitting methods |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  | 16 | 8 |  |  | 24 |
| CO2 |  |  | 16 | 16 |  |  | 32 |
| CO3 |  |  | 16 |  |  |  | 16 |
| CO4 |  | 8 |  | 10 |  |  | 18 |
| CO5 |  | 8 | 8 | 8 | 8 |  | 32 |
| CO6 |  |  |  | 20 |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **20CE3019** | **Duration** | **3hrs** |
| **Course Title** | **EXPERIMENTAL TECHNIQUES AND INSTRUMENTATION** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Summarize the different type of measurement systems used in experiments with a detailed description. | CO3 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Discuss the functions of load cell, LVDT, strain gauge and its application in structural element testing. | CO4 | U | 20 |
|  |  |  |  |  |  |
| 3. |  | Enumerate ground penetrating radar. Explain its principle and applications. | CO4 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Write the key factors to be considered while conducting experiment with suitable examples. | CO3 | A | 20 |
|  |  |  |  |  |  |
| 5. |  | Write short notes on shake table test with neat sketches. | CO4 | R | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Describe the causes and types of experimental errors, how to reduce the error while conducting experiments. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 7. |  | Explain different types of crack measuring devices and its working procedure, also explain the evaluation of physical damages in structural elements. | CO5 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Describe different measurement systems and its application in Structural health monitoring. | CO6 | R | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Prepare a case study report for conducting the experiment to evaluate load axial deformation behavior of masonry structures. | CO1 | A | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Implement the principles of measurements for static and dynamic response of structures |
| CO2 | Plan various experiments and the instruments |
| CO3 | Adopt the various measuring devices for various parameters |
| CO4 | Choose the appropriate data recorders and improve data interpretation |
| CO5 | Evaluate the distress in structures |
| CO6 | Analyze the structure by non-destructive testing methods and model analysis |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | - | 20 | - | - | - | 40 |
| CO2 | - | - |  | - | - | - | - |
| CO3 | 20 | - | 20 | - | - | - | 40 |
| CO4 | 40 | 20 | - | - | - | - | 60 |
| CO5 | - | - | - | - | 20 | - | 20 |
| CO6 | 20 | - | - | - | - | - | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CE3022** | **Duration** | **3hrs** |
| **Course Title** | **CEMENT AND CONCRETE CHEMISTRY** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the step-by-step procedure involved in cement manufacturing process. | CO3 | U | 10 |
|  | b. | Illustrate the role of blended cement’s used by construction industry. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the role of fly ash, GGBS, silica fume and metakaolin in cement. | CO2 | U | 10 |
|  | b. | Compare primary and secondary gel formation in cement paste. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Infer the role of Bouge’s compound in cement hydration. | CO2 | An | 10 |
|  | b. | Differentiate permeability and porosity in concrete and its effect. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the exothermic reaction in cement hydration process with suitable equations. | CO1 | U | 10 |
|  | b. | Enumerate the rheological and harden properties of cement paste. | CO3 | R | 10 |
|  |  |  |  |  |  |
| 5. | a. | Determine the role of CSH in cement paste with suitable sketch. | CO1 | A | 10 |
|  | b. | Illustrate the heat of hydration reaction process with respect to time. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe any four durability factors affects the service life of concrete. | CO5 | U | 10 |
|  | b. | Compare the mechanical and durability properties of concrete. | CO5 | An | 10 |
|  |  |  |  |  |  |
| 7. | a. | Write any four commonly employed chemical admixture to enhance the properties of concrete. | CO4 | A | 10 |
|  | b. | Infer the role of mineral admixture in mechanical and durability properties of concrete. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Summarize the advantages and disadvantages of using chemical admixtures in concrete production. | CO4 | U | 10 |
|  | b. | Explain the need for special concretes in construction sector. | CO5 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Describe any four equipment’s used to analyze the microstructure of concrete. | CO6 | U | 10 |
|  | b. | Compare the microstructural and thermal analysis of concrete. | CO6 | An | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Classify the phase system of cement |
| CO2 | Explain the cement hydration process |
| CO3 | Analyse the properties of cement paste and concrete |
| CO4 | Illustrate the hydration of cement with mineral admixtures |
| CO5 | Examine the properties of hardened paste |
| CO6 | Adopt modern micro structure analysis technique |

|  |  |  |  |  |  |  |  |
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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | 10 |  |  |  | 30 |
| CO2 |  | 10 |  | 10 |  |  | 20 |
| CO3 | 10 | 20 | 10 |  |  |  | 40 |
| CO4 |  | 10 | 30 |  |  |  | 40 |
| CO5 |  | 20 |  | 10 |  |  | 30 |
| CO6 |  | 10 |  | 10 |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **20CE3024** | **Duration** | **3hrs** |
| **Course Title** | **SUSTAINABLE CONSTRUCTION** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (5 X 16 = 80 MARKS)**  **(Answer any five from the following)** | | | | | |
| 1. | a. | Explain sustainability and its features towards greener environment in context of construction industry. | CO1 | A | 8 |
|  | b. | Identify the advantages and disadvantages of implementing sustainability in today’s world. | CO1 | U | 8 |
|  |  |  |  |  |  |
| 2. | a. | Illustrate the major outcome for the development of sustainable buildings. | CO2 | A | 8 |
|  | b. | Infer the role of sustainable development in building towards external environment. | CO5 | An | 8 |
|  |  |  |  |  |  |
| 3. | a. | Explain building’s contribution to environmental devastation. | CO2 | U | 8 |
|  | b. | List the benefits of using modern technologies in sustainable built environment. | CO3 | R | 8 |
|  |  |  |  |  |  |
| 4. | a. | Articulate the strategies adopted by the current civil industry to promote sustainability in construction. | CO3 | A | 8 |
|  | b. | Infer the principles and strategies to promote sustainability in buildings. | CO1 | A | 8 |
|  |  |  |  |  |  |
| 5. | a. | List the types of recycled material used in the buildings to promote sustainability. | CO2 | R | 8 |
|  | b. | Explain the role of green building practice in environmental conservation. | CO6 | U | 8 |
|  |  |  |  |  |  |
| 6. | a. | Summarize the environmental factors affects the traditional work practices. | CO5 | U | 8 |
|  | b. | Illustrate the advantages of using green building concepts in existing building. | CO6 | U | 8 |
|  |  |  |  |  |  |
| 7. | a. | Describe the need for energy efficient buildings. | CO4 | U | 8 |
|  | b. | Explain the advantages and disadvantages of using modern technologies in energy efficiency. | CO4 | U | 8 |
| **PART – B (1 X 20 = 20 MARKS) [Compulsory Question]** | | | | | |
| 8. | a. | Explain green building with concrete and its merits and demerits in detail. | CO6 | U | 10 |
|  | b. | Infer sustainable construction and green building design and delivery. | CO6 | An | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify sustainable design aspects |
| CO2 | Evaluate the life cycle assessment |
| CO3 | Design building based on environmental aspects |
| CO4 | Incorporate energy efficiency in design of buildings |
| CO5 | Design environmental friendly buildings |
| CO6 | Apply green building ratings |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 8 | 16 |  |  |  | 24 |
| CO2 | 8 | 8 | 8 |  |  |  | 24 |
| CO3 | 8 |  | 8 |  |  |  | 16 |
| CO4 |  | 16 |  |  |  |  | 16 |
| CO5 |  | 8 |  | 8 |  |  | 16 |
| CO6 |  | 26 |  | 10 |  |  | 36 |
|  | | | | | | | **132** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **21CE3003** | **Duration** | **3hrs** |
| **Course Title** | **ADVANCED DESIGN OF CONCRETE STRUCTURAL SYSTEMS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (5 X 16 = 80 MARKS)**  **(Answer any five from the following)** | | | | | |
| 1. |  | Estimate the area of steel reinforcement required in the column and middle strip of a flat slab of size 4m x 5m without column head and drop panel. It has to carry a live load of 2 kN/m2 and floor finish load of 1 kN/m2. The flat slab has to be designed using M20 concrete and HYSD Fe415 steel. The column has a size of 400mm x 400mm with a floor height of 3m. Assume if any data is required. | CO2 | An | 16 |
|  |  |  |  |  |  |
| 2. |  | Calculate the design moments and shear force acting on a reinforced concrete grid floor system for an area of 16m x 20m. The floor system rests on the wall with a ribs spaced 1.2m in mutually perpendicular directions. The floor has to carry a live load and floor load of 5 kN/m2 and 1 kN/m2. Take M20 grade of concrete and Fe415 steel. Assume if any data is required. | CO3 | A | 16 |
|  |  |  |  |  |  |
| 3. |  | Estimate the moment and area of steel reinforcement for a deep beam of size 300 mm width and 3000mm depth simply supported over a clear span of 3m, the beam carries a load of 120 kN/m. The beam is supported on the wall of 500mm wide on each end. Consider the grade of concrete and steel as M20 and Fe415 steel. Take the permissible stress of steel as 230 N/mm2. Assume if any data is required. | CO3 | An | 16 |
|  |  |  |  |  |  |
| 4. | a. | Explain the merits and demerits in redistribution of moments in detail. | CO6 | U | 8 |
|  | b. | Explain moment curvature relation of reinforced concrete sections and its governing factors in detail. | CO6 | U | 8 |
|  |  |  |  |  |  |
| 5. | a. | Explain shear wall and its types with suitable sketches in detail. | CO5 | U | 8 |
|  | b. | Differentiate the principles of design followed in Indian Standards with suitable sketches. | CO5 | U | 8 |
|  |  |  |  |  |  |
| 6. |  | Calculate the load and area of steel reinforcement for a shear wall of length 6m, having a wall thickness of 0.3m, subjected to following loads:   |  |  |  |  | | --- | --- | --- | --- | | Loading | Axial force (kN) | Moment (kN.m) | Shear (kN) | | D.L + L.L | 2000 | 720 | 40 | | Seismic load | 90 | 6000 | 500 |   Consider M20 grade concrete and Fe-415 HYSD bar. Assume if any data is required. | CO1 | A | 16 |
|  |  |  |  |  |  |
| 7. |  | Estimate the area of steel reinforcement for a corbel carrying an ultimate load of 720 kN at a distance pf 300mm from the column face. The cross-section of the column was 500mm x 500mm, and Fe-415 steel are to be used. Consider the bearing stress of concrete as 0.9fy. Assume if any data is required. | CO1 | An | 16 |
| **PART – B (1 X 20 = 20 MARKS) [Compulsory Question]** | | | | | |
| 8. |  | Calculate the area of steel reinforcement in the circular water tank has the water holding capacity of 30,000 liters of water. The depth of the tank was 5m, use the nominal concrete of grade M20 and Fe-415 steel. Assume if any data is required. | CO4 | A | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Identify the behavior of structural elements. |
| CO2 | Analyse the structure for different loading system. |
| CO3 | Design the RC structures for its behavior. |
| CO4 | Design and detail the structural elements |
| CO5 | Adopt suitable structural systems to ensure the stability. |
| CO6 | Understand the reasons for the failure of structural system. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  | 16 | 16 |  |  | 32 |
| CO2 |  |  |  | 16 |  |  | 16 |
| CO3 |  |  | 16 | 16 |  |  | 32 |
| CO4 |  |  | 20 |  |  |  | 20 |
| CO5 |  | 16 |  |  |  |  | 16 |
| CO6 |  | 16 |  |  |  |  | 16 |
|  | | | | | | | **132** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CE3001** | **Duration** | **3hrs** |
| **Course Title** | **CONTROL OF CORROSION IN CONCRETE STRUCTURES** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain corrosion and its forms in detail. | CO3 | U | 10 |
|  | b. | Illustrate the corrosion mechanism with suitable sketch. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Classify the environmental condition accelerates corrosion. | CO2 | An | 10 |
|  | b. | Write the guidelines illustrated by Indian Standards to control corrosion in buildings. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe any four corrosion inhibiting techniques in detail. | CO2 | U | 10 |
|  | b. | Infer the factors affecting rate of corrosion in RC structures. | CO3 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the causes and effects of corrosion in structures. | CO1 | U | 10 |
|  | b. | Differentiate between salt attack and carbonation in a building. | CO3 | An | 10 |
|  |  |  |  |  |  |
| 5. | a. | Enumerate the steps involved in testing corrosion. | CO1 | R | 10 |
|  | b. | Classify the laboratory and field test to access corrosion in RC building. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe corrosion protection techniques in detail. | CO5 | U | 10 |
|  | b. | Illustrate the cause for spalling in off-shore building. | CO5 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Enumerate chloride and sulfate attack with suitable equation and sketches. | CO4 | R | 10 |
|  | b. | Determine the role of mineral admixture in corrosion resistance. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Summarize the advantages and disadvantages of corrosion protection techniques. | CO4 | U | 10 |
|  | b. | Explain the distress in concrete structures induced by corrosion. | CO5 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Classify admixtures to resist corrosion in buildings. | CO6 | U | 10 |
|  | b. | Determine the root cause of corrosion in RC structures. | CO6 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify the causes of corrosion in structures |
| CO2 | Classify the types of corrosion |
| CO3 | Select the appropriate methodology for testing the corrosion |
| CO4 | Recommend suitable materials for corrosion protection |
| CO5 | Evaluate the corrosion potential of structural elements |
| CO6 | Analyse the extent of corrosion in concrete element |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 10 | 10 |  |  |  | 30 |
| CO2 |  | 10 |  | 10 |  |  | 20 |
| CO3 |  | 10 | 10 | 20 |  |  | 40 |
| CO4 | 10 | 10 | 10 | 10 |  |  | 40 |
| CO5 |  | 20 | 10 |  |  |  | 30 |
| CO6 |  | 10 | 10 |  |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **23CE3002** | **Duration** | **3hrs** |
| **Course Title** | **ADVANCED CONCRETE TECHNOLOGY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (5 X 16 = 80 MARKS)**  **(Answer any five from the following)** | | | | | |
| 1. | a. | Compare the different types of cement used in construction, highlighting their compositions, properties, applications and suitability for various environmental conditions . | CO1 | U | 8 |
|  | b. | Describe the dry processes of cement manufacturing, outlining the key steps involved in each method. | CO1 | R | 8 |
|  |  |  |  |  |  |
| 2. | a. | Explain the principles of rheology as they apply to concrete, focusing on how the flow behavior of fresh concrete affects workability and performance. | CO2 | U | 8 |
|  | b. | Analyse the various types of admixtures used in concrete, categorizing them into chemical and mineral admixtures. | CO2 | An | 8 |
|  |  |  |  |  |  |
| 3. | a. | Write a short note on the effects of creep in concrete. | CO3 | A | 8 |
|  | b. | Describe the fundamental modes of test to find the strength of concrete specimen and discuss the properties. | CO3 | R | 8 |
|  |  |  |  |  |  |
| 4. | a. | Explain the working principle of the rebound hammer and discuss its advantages and disadvantages. | CO4 | A | 8 |
|  | b. | Illustrate the characteristics of Rebar locator and sketch the diagram. | CO4 | U | 8 |
|  |  |  |  |  |  |
| 5. | a. | Explain the nature of creep and mention its types. | CO3 | A | 8 |
|  | b. | Enumerate the theory of Freezing and thawing briefly. | CO3 | R | 8 |
|  |  |  |  |  |  |
| 6. | a. | Design the concrete mix of grade M25 using Indian Standard Method.  Specific gravity of cement – 3.12  Specific gravity of fine aggregate – 2.6  Specific gravity of coarse aggregate – 2.9  Slump – 69mm  Use 10 mm aggregate. Assume if any data is required. | CO5 | E | 8 |
|  | b. | Describe the procedure for designing a concrete mix according to IS 10262: 2019. | CO5 | R | 8 |
|  |  |  |  |  |  |
| 7. | a. | Explain the concept of lightweight concrete and explain its advantages and disadvantages in comparison to normal weight concrete. | CO6 | U | 8 |
|  | b. | Identify the key properties of roller compacted concrete, and how do these properties contribute large scale infrastructure projects such as dams, roads and pavements? | CO6 | U | 8 |
| **PART – B (1 X 20 = 20 MARKS) [Compulsory Question]** | | | | | |
| 8. | a. | Explain the properties, benefits, and types of fibers used in fiber – reinforced concrete, and describe its advantages over conventional concrete in various construction applications . | CO6 | U | 10 |
|  | b. | Describe the concept of ready – mix concrete and briefly explain its types. | CO6 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recall the properties and testing procedure of concrete materials |
| CO2 | Identify suitable admixtures for concreting |
| CO3 | Determine the properties of fresh and hardened concrete |
| CO4 | Explain the field application of non- destructive testing of concrete |
| CO5 | Design concrete mix as per IS standards |
| CO6 | Describe the proportion for high performance concrete |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 8 | 8 |  |  | - | - | 16 |
| CO2 |  | 8 |  | 8 |  |  | 16 |
| CO3 | 8 |  | 8 |  |  |  | 16 |
| CO4 | 8 | 8 | 16 |  |  |  | 32 |
| CO5 |  |  |  | 8 | 8 |  | 16 |
| CO6 |  | 26 | 10 |  |  |  | 36 |
|  | | | | | | | **132** |

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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| **Course Code** | **24CE3001** | **Duration** | **3hrs** |
| **Course Title** | **INTEGRATED COASTAL MANAGEMENT** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Distinguish between the principles of early coastal management approaches and modern ICM strategies in terms of sustainability outcomes. | CO1 | An | 10 |
|  | b. | Examine the role of stakeholder collaboration in achieving the goals of ICM. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Interpret the environmental and social benefits that emerge from integrating multiple coastal zone uses under an ICM framework. | CO1 | A | 20 |
|  |  |  |  |  |  |
| 3. | a. | Explain the use of GIS in mapping and monitoring coastal erosion in a region with high tourism activity. | CO2 | An | 10 |
|  | b. | Analyze the effectiveness of remote sensing in providing accurate data for coastal monitoring and management. | CO2 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Assess the role of problem tree analysis in identifying root causes of coastal ecosystem degradation and supporting the development of targeted management solutions. | CO2 | E | 10 |
|  | b. | Illustrate the process of conducting a stakeholder analysis for an ICM project focused on reducing coastal pollution. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 5. |  | Evaluate the effectiveness of coastal regulation zones (CRZ) in protecting fragile coastal ecosystems, especially around small islands. | CO3 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Analyze the influence of governance mechanisms on the implementation and enforcement of environmental policies in coastal areas. | CO3 | An | 20 |
|  |  |  |  |  |  |
| 7. | a. | Examine the role of social science insights in enhancing the effectiveness of coastal management strategies. | CO4 | A | 10 |
|  | b. | Differentiate between horizontal and vertical integration in ICM and assess how each contributes to cohesive management practices. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Analyze the principles of Ecosystem-Based Management (EBM) and their relevance to sustainable coastal management. | CO5 | An | 10 |
|  | b. | Evaluate the steps in the coastal management framework and their effectiveness in guiding managers from problem identification to solution implementation. | CO5 | E | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Analyze the common causes behind failures in coastal management projects and suggest strategies to avoid these issues in future projects. | CO6 | An | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Identify natural, engineering and human interventions in the coast. |
| CO2 | Illustrate the identified coastal issues. |
| CO3 | Determine appropriate approaches in coastal management. |
| CO4 | Discover strategies for sustainable coastal management. |
| CO5 | Develop skills related to coastal management planning and decision-making. |
| CO6 | Examine policies and regulations related to coastal management at local, national, and international levels. |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  | 30 | 10 |  |  | 40 |
| CO2 |  |  | 10 | 20 | 10 |  | 40 |
| CO3 |  |  |  | 20 | 20 |  | 40 |
| CO4 |  |  | 20 |  |  |  | 20 |
| CO5 |  |  |  | 10 | 10 |  | 20 |
| CO6 |  |  |  | 20 |  |  | 20 |
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**END SEMESTER EXAMINATION – NOV / DEC 2024**

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| --- | --- | --- | --- |
| **Course Code** | **24CE3002** | **Duration** | **3hrs** |
| **Course Title** | **PROJECT FORMULATION AND APPRAISAL** | **Max. Marks** | **100** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. |  | Examine the key components of a preliminary analysis in project formulation, and assess how each component contributes to project feasibility. | CO1 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Evaluate the different types of project clearances required for a coastal development project and discuss their significance in project approval and implementation. | CO1 | E | 20 |
|  |  |  |  |  |  |
| 3. |  | Compare different methods for calculating project cash flows and discuss their relevance to specific types of projects or industries. | CO2 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. |  | Assess the importance of accurate cash flow forecasting in project costing, particularly for projects with extended timelines. | CO2 | E | 20 |
|  |  |  |  |  |  |
| 5. |  | Compare the Net Present Value (NPV), Benefit-Cost Ratio (BCR), and Internal Rate of Return (IRR) methods in project appraisal, and analyze the strengths and limitations of each. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Illustrate how risk analysis is incorporated into project selection and explain the impact of various risk assessment methods on final project decisions. | CO3 | U | 20 |
|  |  |  |  |  |  |
| 7. | a. | Analyze the different means of finance available for projects and assess how the choice of financing affects project risk and cost. | CO4 | An | 10 |
|  | b. | Interpret the significance of key financial ratios, such as Debt-to-Equity Ratio and Interest Coverage Ratio, in assessing a project's financial health. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Evaluate the advantages and disadvantages of Build-Operate-Transfer (BOT) and Build-Own-Operate-Transfer (BOOT) models in infrastructure development projects. | CO5 | E | 10 |
|  | b. | Interpret the scope of technology transfer in infrastructure projects and explain how it supports the project’s long-term technical and operational sustainability. | CO5 | A | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. |  | Compare traditional project management methodologies with emerging trends, such as Agile and Lean project management, and assess their suitability for different types of projects. | CO6 | A | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Describe the fundamental concepts of project formulation and appraisal. |
| CO2 | Develop skills in designing comprehensive project plans. |
| CO3 | Explain various techniques for appraising project viability and sustainability. |
| CO4 | Analyze the risks associated with projects and devise mitigation strategies. |
| CO5 | Discover the economic, social, and environmental impacts of projects. |
| CO6 | Develop decision-making skills in project management |

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| **Assessment Pattern as per Bloom’s Level** | | | | | | | |
| **CO / BL** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  | 20 |  | 20 |  | 40 |
| CO2 |  |  | 20 |  | 20 |  | 40 |
| CO3 |  | 20 | 20 |  |  |  | 40 |
| CO4 |  |  | 10 | 10 |  |  | 20 |
| CO5 |  |  | 10 |  | 10 |  | 20 |
| CO6 |  |  | 20 |  |  |  | 20 |
|  | | | | | | | **180** |