**Ph.D. COMMON ENTRANCE TEST**

**SUBJECT – CIVIL ENGINEERING**

**Roll No:**

**PART B**

**Duration: 60 minutes Maximum Marks: 50**

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| **Instructions:**1. **This entrance test question paper is not to be taken out of the examination hall**
2. **Question paper consists of Section A and Section B**
3. **Section A consists of 30 MCQs carrying 1 Mark each. Write the Alphabet of the correct answer in the space given.**
4. **Section B consists of Descriptive questions carrying 5 marks each. Restrict your answer to 500 words. Additional plain sheets have been attached to the question paper to answer Section B**
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**SECTION – A**

**Answer the following questions by writing the Alphabet of the correct answer in the Box given: 30 X 1 = 30**

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|  | What is the purpose of a shear wall in a building? 1. To resist lateral loads
2. To provide insulation
3. To support vertical loads
4. None of these.
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|  | The relationship between effective stress and total stress in soils is given by: A. Terzaghi's principleB. Rankine's theoryC. Coulomb's lawD. Newton’s law |
|  | Which traffic signal control system dynamically adjusts signal timings based on real-time traffic conditions? A. Fixed-time controlB. Actuated controlC. Adaptive controlD. All of these |
|  | What is the primary purpose of a wastewater treatment plant? A. Solid waste disposalB. Air pollution controlC. Water pollution controlD. Noise pollution treatment |
|  | The Critical Path Method (CPM) is used for: A. Resource allocationB. Project schedulingC. Quality controlD. Finance Management |
|  | The coefficient of discharge of an orifice is the ratio of: A. Actual discharge to theoretical dischargeB. Actual velocity to theoretical velocityC. Actual pressure to theoretical pressureD. None of these |
|  | The instrument used for measuring horizontal angles is: A. TheodoliteB. Total stationC. Dumpy levelD. Brunton compass |
|  | Which type of cement is suitable for marine construction? A. Ordinary Portland Cement (OPC)B. Sulphate Resistant Cement (SRC)C. Rapid Hardening Cement (RHC)D. All of these |
|  | Manning's equation is used to calculate: A. Flow velocity in an open channelB. Pressure in a pipelineC. Seepage velocity in soilsD. Total discharge |
|  | The Richter scale measures: A. Earthquake intensityB. Earthquake magnitudeC. Earthquake durationD. Earthquake location |
|  | What is the main ingredient in concrete that reacts with water to form a solid matrix? A. Sand B. CementC. AggregateD. Soil |
|  | GIS is used for: A. Data encryptionB. Spatial analysisC. Structural analysisD. Digitization |
|  | The California Bearing Ratio (CBR) is a measure of: A. Soil compactionB. Subgrade strengthC. Asphalt qualityD. Damping ratio  |
|  | In hydrology, the term "infiltration" refers to: A. Water runoff from a watershedB. Water absorption into the soilC. Evaporation of surface waterD. River discharge |
|  | The method used to analyze indeterminate structures with redundant members is: A. Slope-deflection methodB. Moment distribution methodC. Force methodD. Stress analysis |
|  | Which type of pile derives its load-carrying capacity mainly from skin friction?A. End-bearing pileB. Friction pileC. Sheet pileD. None of these |
|  | The Rational Method is used for the estimation of: A. Groundwater flowB. Peak runoff rateC. River dischargeD. Evaporation |
|  | What is the purpose of a Gantt chart in project management? A. Resource allocationB. Schedule visualizationC. Cost estimationD. Vibration measurement |
|  | EIA is conducted to: A. Assess the economic viability of a projectB. Evaluate the environmental consequences of a projectC. Determine the social impact of a projectD. Fund management |
|  | The natural frequency of a structure depends on its: A. Damping ratioB. Stiffness and massC. Mode shapeD. Economic viability |
|  | Geotextiles are used primarily for: A. WaterproofingB. ReinforcementC. InsulationD. Vibration control |
|  | The Highway Capacity Manual (HCM) provides guidelines for: A. Bridge designB. Pavement designC. Traffic flow analysisD. Structural monitoring |
|  | What is the purpose of adding superplasticizers to concrete? A. Increase strengthB. Improve workabilityC. Accelerate curingD. Reduce the strength |
|  | LiDAR is a technology used for: A. Satellite communicationB. Bridge inspectionC. Topographic mappingD. Satellite control |
|  | Dynamic compaction is a method used for: A. Soil stabilizationB. Soil compactionC. Foundation settlement controlD. Structural health monitoring |
|  | Biochemical Oxygen Demand (BOD) is a measure of: A. Oxygen concentration in waterB. Organic pollution in waterC. Inorganic pollution in waterD. Total dissolved solids |
|  | A cantilever retaining wall is stable if: A. The wall is tallB. The base width is sufficientC. Backfill is loosely compactedD. Vibration provided |
|  | Life-cycle cost analysis involves the consideration of costs over the: A. Design phaseB. Construction phaseC. Entire life of the projectD. Engineer’s salary |
|  | The concept of "Zoning" in urban planning refers to: A. Building height restrictionsB. Land use regulationsC. Road network planningD. All of these |
| 1. 30
 | A bending moment may be defined as: A. Arithmetic sum of the moments of all the forces on either side of the sectionB. Arithmetic sum of the forces on either side of the sectionC. Algebraic sum of the moments of all the forces on either side of the sectionD. None of these. |
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**Section - B**

**Answer any four questions (Each question carry 5 marks 4\*5 = 20**

1. Discuss the principles, advantages, and limitations of base isolation systems in safeguarding structures against seismic forces.

2. Explore the applications of remote sensing and GIS in monitoring and managing natural disasters.

3. Elaborate on the concept of smart cities and their implications for transportation systems.

4. Explain the concept of soil-structure interaction. Discuss how considering this interaction is crucial in the design of deep foundations.

5. Discuss the challenges and solutions associated with managing and treating industrial wastewater.

6. Explore the recent advancements in self-healing concrete technology. Discuss the mechanisms involved in self-healing and potential applications in enhancing the durability of civil engineering structures.

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