**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** |

**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. | |
|  | The relationship between effective stress and total stress in soils is given by:  A. Terzaghi's principle  B. Rankine's theory  C. Coulomb's law  D. Newton’s law | |
|  | Which traffic signal control system dynamically adjusts signal timings based on real-time traffic conditions?  A. Fixed-time control  B. Actuated control  C. Adaptive control  D. All of these | |
|  | What is the primary purpose of a wastewater treatment plant?  A. Solid waste disposal  B. Air pollution control  C. Water pollution control  D. Noise pollution treatment | |
|  | The Critical Path Method (CPM) is used for:  A. Resource allocation  B. Project scheduling  C. Quality control  D. Finance Management | |
|  | The coefficient of discharge of an orifice is the ratio of:  A. Actual discharge to theoretical discharge  B. Actual velocity to theoretical velocity  C. Actual pressure to theoretical pressure  D. None of these | |
|  | The instrument used for measuring horizontal angles is:  A. Theodolite  B. Total station  C. Dumpy level  D. 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 channel  B. Pressure in a pipeline  C. Seepage velocity in soils  D. Total discharge | |
|  | The Richter scale measures:  A. Earthquake intensity  B. Earthquake magnitude  C. Earthquake duration  D. Earthquake location | |
|  | What is the main ingredient in concrete that reacts with water to form a solid matrix?  A. Sand  B. Cement  C. Aggregate  D. Soil | |
|  | GIS is used for:  A. Data encryption  B. Spatial analysis  C. Structural analysis  D. Digitization | |
|  | The California Bearing Ratio (CBR) is a measure of:  A. Soil compaction  B. Subgrade strength  C. Asphalt quality  D. Damping ratio | |
|  | In hydrology, the term "infiltration" refers to:  A. Water runoff from a watershed  B. Water absorption into the soil  C. Evaporation of surface water  D. River discharge | |
|  | The method used to analyze indeterminate structures with redundant members is:  A. Slope-deflection method  B. Moment distribution method  C. Force method  D. Stress analysis | |
|  | Which type of pile derives its load-carrying capacity mainly from skin friction?  A. End-bearing pile  B. Friction pile  C. Sheet pile  D. None of these | |
|  | The Rational Method is used for the estimation of:  A. Groundwater flow  B. Peak runoff rate  C. River discharge  D. Evaporation | |
|  | What is the purpose of a Gantt chart in project management?  A. Resource allocation  B. Schedule visualization  C. Cost estimation  D. Vibration measurement | |
|  | EIA is conducted to:  A. Assess the economic viability of a project  B. Evaluate the environmental consequences of a project  C. Determine the social impact of a project  D. Fund management | |
|  | The natural frequency of a structure depends on its:  A. Damping ratio  B. Stiffness and mass  C. Mode shape  D. Economic viability | |
|  | Geotextiles are used primarily for:  A. Waterproofing  B. Reinforcement  C. Insulation  D. Vibration control | |
|  | The Highway Capacity Manual (HCM) provides guidelines for:  A. Bridge design  B. Pavement design  C. Traffic flow analysis  D. Structural monitoring | |
|  | What is the purpose of adding superplasticizers to concrete?  A. Increase strength  B. Improve workability  C. Accelerate curing  D. Reduce the strength | |
|  | LiDAR is a technology used for:  A. Satellite communication  B. Bridge inspection  C. Topographic mapping  D. Satellite control | |
|  | Dynamic compaction is a method used for:  A. Soil stabilization  B. Soil compaction  C. Foundation settlement control  D. Structural health monitoring | |
|  | Biochemical Oxygen Demand (BOD) is a measure of:  A. Oxygen concentration in water  B. Organic pollution in water  C. Inorganic pollution in water  D. Total dissolved solids | |
|  | A cantilever retaining wall is stable if:  A. The wall is tall  B. The base width is sufficient  C. Backfill is loosely compacted  D. Vibration provided | |
|  | Life-cycle cost analysis involves the consideration of costs over the:  A. Design phase  B. Construction phase  C. Entire life of the project  D. Engineer’s salary | |
|  | The concept of "Zoning" in urban planning refers to:  A. Building height restrictions  B. Land use regulations  C. Road network planning  D. 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 section  B. Arithmetic sum of the forces on either side of the section  C. Algebraic sum of the moments of all the forces on either side of the section  D. 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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