

**Civil Engineering Department**  
**SYLLABUS FOR PhD ENTRANCE EXAM IN CIVIL ENGINEERING**

**Water Resources Engineering**

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Fluid Mechanics, Conservation of Mass, Momentum and Energy, Pipe flow, Free surface flow, Laminar and Turbulent flow, Turbines.

Hydrology, Water Cycle, Hydro-meteorology, Measurement of surface flow, Precipitation, Evaporation, Infiltration, Runoff, Hydrograph analyses, Flood Routing, Statistical methods in hydrology, Hydrology of floods and droughts, Watershed hydrology, Sediment and Fluvial Hydraulics.

Water resources planning and management, Irrigation Engineering, Design of water resources and irrigation structures, River training works, Dams, Ground water hydrology, Contaminant transport.

Climate change, Remote sensing, GIS, GNSS.

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**Sample Questions:**

1. If a stream function is given by  $\psi = x^3 - y^3$ , then
  - a) It is an unsteady, an irrotational flow case
  - b) A potential function exists
  - c) It is a steady, an irrotational flow
  - d) It is a possible flow, rotational flow case
  
2. A 6-hr unit hydrograph is triangular in shape with a base of 75 hr and a peak discharge of  $12 \text{ m}^3/\text{s}$ . This unit hydrograph refers to a catchment of area, in  $\text{km}^2$ 
  - a) 65 b) 162 c) 320 d) 1800
  
3. A canal is to be carried over a natural drainage. Which structure will you provide at this place
  - a) A syphon b) An aqueduct c) A bridge d) A cross-drainage structure
  
4. An 8 hour storm had 8 cm of rainfall, and the resulting runoff was 4 cm. If the  $\phi$  – index remains at the same value, a rainfall of 12 cm in a 15 hour storm produces a runoff in this catchment of
  - a) 4.5 cm b) 6.0 cm c) 8.0 cm d) 10.5 cm
  
5. A straight line is fitted to a plot between return period on logarithmic scale and flood peak on an ordinary scale. The 10 year and 100 year floods are obtained as 110 cumecs and 220 cumecs respectively. What would be the magnitude of 1000 year flood
  - a) 330 cumecs b) 440 cumecs c) 550 cumecs d) 660 cumecs