Registration No :

Total Number of Pages : 02

B.Tech
PCI7D002

7th Semester Regular Examination 2019-20
ADVANCED DESIGN OF REINFORCED CONCRETE STRUCTURES
BRANCH : CIVIL
Max Marks : 100
Time : 3 Hours
Q.CODE : HR340
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1   **Only Short Answer Type Questions (Answer All-10)**   **(2 x 10)**

   a)   State the methods used for computation of earthquake forces on building frame.

   b)   What is base shear?

   c)   What is Bauschinger's effect?

   d)   State bearing capacity of soil.

   e)   Define surcharge and surcharge angle.

   f)   What is scour depth?

   g)   What is economical span of bridge?

   h)   State Dicken's formula to predict maximum flood for determining waterway of bridge.

   i)   Write the main requirements of foundation system for a structure?

   j)   What are the situations in which combined footings are preferred to isolated footings?

Part-II

Q2   **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)**   **(6 x 8)**

   a)   Explain about Cyclic behavior of concrete.

   b)   Explain how storey shear is calculated in multi-storeyed building frames.

   c)   Illustrate the Significance of ductility in earthquake design.

   d)   Determine the ductility with respect to curvature of a singly reinforced beam of width 300mm, effective depth 540 mm, overall depth 600 mm, reinforced with 3 bars of 20mm diameter. Use M20 concrete and Fe 250 steel.

   e)   Briefly explain about different types of retaining wall.

   f)   What is the purpose of shear key in retaining wall? Describe its action.

   g)   Briefly explain about Counterfort retaining wall.

   h)   What are the different components of bridges? Explain with figure.

   i)   What is slab culvert and where it is provided?

   j)   Explain about impact factor calculation for RCC bridges.

   k)   State how bending moment is determined at any section of footing as per Indian Standard Code.

   l)   Under what circumstances is a trapezoidal shape preferred to a rectangular shape for a two column combined footing.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3   A rectangular beam of span 5 m and cross section 300 mm x 600 mm is subjected to a factored axial load of 30 kN, factored moment of 120kN-m and a factored shear force of 330 kN. Design the beam for ductility. Use M20 concrete and Fe 415 steel.   **(16)**

Q4   Determine suitable dimensions of a cantilever retaining wall, which is required to support a 4.0 m high bank of earth above the ground level on the toe side of the wall. Consider the backfill surface to be inclined at an angle of 15° with the horizontal. Assume good soil for foundation at a depth of 1.25 m below the ground level with a safe bearing capacity of 160 kN/m². Further assume the backfill to comprise granular soil with a unit weight of 16 kN/m³ and an angle of shearing resistance of 30°. Assume the coefficient of friction between soil and concrete to be 0.5. Use M20 concrete and Fe 415 steel.   **(16)**

Q5   What is the importance of IRC loading in bridge design? Discuss about different types of standard loadings for road bridges.   **(16)**

Q6   A reinforced concrete wall 250mm thick carries a load of 500 kN/m inclusive of its own weight. Design a reinforced concrete footing on soil having safe bearing capacity of 160 kN/m². Use M20 concrete and Fe 415 steel.   **(16)**