Registration no:

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B Tech
PECI5403

7th Semester Back Examination 2019-20
DESIGN OF ADVANCED CONCRETE STRUCTURES
BRANCH: CIVIL ENGINEERING
Max Marks : 70
Time: 3 Hours
Q.CODE: HB197
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Part - I

Q1 **Answer the following questions:**   **(2 x 10)**

  a) State different types of earthquake.
  b) Define base shear.
  c) What is the purpose of a retaining wall?

  d) What is bearing capacity of soil?
  e) What is an elevated water tank?
  f) Define shear key.
  g) Write the different forces consider during the design of a water tank.
  h) Distinguish between pretensioned and post-tensioned members.
  i) Write the various types of loss of prestress in pre-tensioned member.
  j) State various types of loads acting on bridges.

Answer any five out of seven questions

Q2 **a)** Explain how earthquake force is computed on building frames.   **(5)**
       b) Illustrate significance of ductility in seismic design.   **(5)**
Q3 **a)** State the assumptions made for the design of water tank.   **(5)**

       b) Distinguish between active pressure and passive pressure of earth, in   **(5)**
             relation to retaining wall structures.

Q4 **a)** Determine the ductility with respect to curvature of a singly reinforced   **(5)**
             beam of width 300mm, overall depth 600 mm, reinforced with 4 bars of
             20mm diameter. Use M20 concrete and Fe 250 steel.

       b) Explain about various forces acting on retaining wall.   **(5)**
Q5 **a)** What is the necessity of using high strength concrete and high tensile   **(5)**
             steel in prestressed concrete?

       b) Explain different components of bridge with neat sketch.   **(5)**

Q6 Design a cantilever retaining wall for the following data **(10)**

Height of wall above ground = 4 m, Depth of foundation = 1.5 m,

Unit weight of earth fill= 18 kN/m^2 , Angle of internal friction = 20 ^{O},

Coefficient of friction between soil and concrete = 0.45, Safe bearing

capacity of soil = 120 kN/m^2. Use M20 concrete and Fe 415 steel.

Q7 A simply supported prestressed concrete beam of rectangular cross-section **(10)**
400 mm x 600 mm, is loaded with a total uniformly distributed load of 256 kN
over a span of 6 m. Sketch the distribution of stresses at mid-span and end
sections if the prestressing force is 1920 kN and the tendon is concentric.

Q8 **Write short answer on any Two:** **(2 x 5)**
   a) Cyclic behavior of reinforcement

   b) Counterfort retaining wall

   c) Losses of prestress