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UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B.Tech. (Civil Engineering) Semester – VII
Subject (Course): Advanced Design of Structures **Max. Marks : 100**
Course Code : CE - 471 . **Duration : 3 Hrs**
No. of page/s: 02

Instruction:

(i) **Solve all question from section A&C and any four from section B**
(ii) **Assume suitable data if necessary**
(iii) **Draw neat sketches whenever required**

Section A

Q1. a Discuss the Capacity based design concept . **05**
b. Differentiate the behavior of bunker & silo. **05**
Q2.a How concrete and steel behave under cyclic loading. **05**
b. State the advantage of Redistribution concept in design**.** **05**

Section B

Q3 a. Discuss the behavior of counterfort retaining wall. **05**
b. A passage of 4 m required in the hilly area for the pedestrian and light vehicle. **15**
Design the suitable bridge connecting the town 40 m apart from each other's.

Q4 . Attempt any two **(10x2=20)**

a) Design a square tank of size 2.6 m for the capacity of 10 kL. Tank is open at top and rest on firm ground of SBC 100 kN/m^2
b) A cantilever retaining wall of height 3.6 m above NGL. Base is provided at 0.9 m below NGL. The size of stem 350 mm at bottom and 200 mm at top and width of base 3m and thick. Of 350 mm. Heel is 1.8 m. Wall is retain sloping earth fill at heel side. Check the adequacy of the section for the stability under following data.
   i) Angle of repose = 29^0
   ii) Surcharge angle = 15^0
   iii) Coeff. Of Friction = 0.5
   iv) Safe bearing capacity = 120 kN/m^2
   v) Unit weight of Earth = 18 kN/m^3

c) A continuous beam ABC , fixed at end supports. The clear distance between supports is 5m with support width 300mm. Design the beam for the live load of 30 kN/m. (No need to calculate absolute value of BM)

Section C

Q5.a What is kern distance ? State its significance in Pre- stressed concrete . **05**

b. A pre-stressed concrete beam of inverted T section has web dimensions 250x750mm and flange 500x250 mm and is simply supported over a span of 12 m. The beam is post tensioned with 3 cable, each containing 10 wires of 7 mm dia., placed at100 mm from soffit of the section at the mid span. If the initial pre-stress is 1200 N/mm^2, calculate maximum UDL taken by the section, if maximum compressive & tensile stress is limited to 14 N/mm^2 and 1N/mm^2 respectively. Assume loss of pre-stress=18% **15**

Q6. a What is Intze Tank ? Illustrate the mechanism of load transfer by its components. **05**

b. A Intze tank is provided for 16 m internal dia. and 4m total height of cylindrical part. Fixed the other dimension and calculate the capacity of tank. Also design the top dome , top ring beam and the cylindrical wall. **15**

or

Q7. a Discuss the design principle of Chimney. **08**

b. Design a RCC bunker to store 400 kN of coal, for the following data. **12**

i) Unit weight of coal = 8.5 kN/m^3

ii) Angle of repose = 30^0 ,

The stored coal is to be surcharged at its angle of repose