Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

CE-7001 (CBGS)

B.E. VII Semester

Examination, November 2019

Choice Based Grading System (CBGS)

Advance Structural Design -I (RCC)

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks
iii) Assume suitable data

1. a) A portal frame with ends hinged is to be analysed for the following data: Spacing of portal frames = 4.8m, Height of columns = 5m, distance between column centers = 10m, live load on roof = 2 kN/m^2. Find design moments. 7
   b) Write down the different type of bracing used in multistorey building. Explain it's importance. 7

2. Design the stem and check the stability of a cantilever retaining wall of following particulars: 14
   i) Earth embankment 4.5m high above ground level.
   ii) Angle of repose of the soil - 28° and unit weight of soil 16 kN/m^3.
   iii) The embankment is horizontal at the top with traffic load of intensity = 22 kN/m^2.
   iv) S.B.C. of soil - 100 kN/m^2.
   v) Coefficient of friction between the wall and ground = 0.40.

3. Design the top Dome, top ring beam and cylindrical wall of an intze tank. The dia. of tank is 8m and height of cylindrical wall is 4.5m. Use M-25 concrete and Fe-415 steel. 14

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4. a) Derive the height up to which a bin behaves as a shallow one is given

$$h = b\left[\mu + \frac{\sqrt{\mu(1+\mu^2)}}{\mu+\mu'}\right]$$

. Use Airy's theory. 7
   b) Differentiate between bunker and silo. 7

5. a) Explain the pressure line method for prestressing. 7
   b) Explain the method of finding reaction factor of B.M. in longitudinal girder. http://www.rgpvonline.com 7

6. Explain substitute frames and loading conditions for maximum moment values of different critical points of a building frame. 14

7. Design the slab of culvert having 6.0 m span, width of bearing 400 mm, clear width of roadway 7.0 m, width of footpath one each side is 1.00 m, average, thickness of wearing coat is 80 mm. Design for IRC class A-A tracked vehicle. Use M-25 concrete and Fe-415 steel. Use IRC:21-1987. 14

8. In prestress concrete beam 200 mm wide and 300 mm deep with 6 m span, an initial prestressing force 400 kN is applied at an eccentricity of 70 mm by tendons of area 400 mm^2. Assuming $E_s = 2\times10^5$ MPa and $E_c = 0.333\times10^5$ MPa, anchor slip 1.5 mm, creep coefficient in concrete $\phi = 1$, concrete shrinkage 0.0002 and creep loss in steel 3%. Find (i) Loss of stress due to elastic shortening of concrete (ii) Loss of stress due to anchorage slip (iii) Loss of stress due to creep of concrete (iv) Loss of stress due to concrete shrinkage (v) Loss of stress due to creep in steel (vi) Total % loss of stress in tendons. 14

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