

Roll No

MVSE-104

M.E./M.Tech., I Semester

Examination, December 2016

Design of Concrete Structures

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions. All questions carry equal marks.
ii) Use IS code and design aids is permitted.

1. a) Explain the methods of estimation of Earthquake forces.
b) A three-storeyed school building is in seismic zone IV its foundation is on isolated footings on medium soil and the period of oscillation of the building $T = 0.2$ second. Calculate the horizontal seismic coefficient α_n by
i) Static method
ii) Dynamic method assuming a damping factor 5% and SMRF and OMRF frames (Ah).
2. A flat slab floor has panels of (6×5) m in X and Y directions between centres of columns which are (400×400) mm in size. It has an edge beam all around the periphery of (250×500) mm which carries an exterior wall of weight 6 kN/m . The slab thickness is 150 mm and the characteristic live load it has to carry is 5.25 kN/m^2 . The height of each storey is 3 m . Analyse exterior frame in 6m direction and determine the distribution of moments.
3. An R.C. water tank with an open top is required to store $80,000$ litres of water. The inside dimensions of rectangular tank may be taken as $6 \text{ m} \times 4 \text{ m}$. The tank rests on walls on all the four sides. Design the side wall of the tank. Use M20 grade of concrete and Fe415. Sketch the details.

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4. Calculate the design along long and short span of deck slab for a T-beam bridge on a National highway considering class AA. tracked vehicle only. The following data is given below :
i) Effective span of beam = 17 m
ii) Clear width of roadway = 8 m
iii) C/c spacing of cross-beams = 4.0 m
iv) C/c spacing of longitudinal beams = 2.5 m
v) Thickness of wearing coat = 80 mm
vi) Thickness of slab = 215 mm
5. A prestressed concrete beam having a rectangular section 100 mm wide and 200 mm deep span over 3.0 m . The beam is prestressed by a straight cable containing 5 wires of 5 mm diameter stressed to 1200 N/mm^2 , at an eccentricity of 36 mm . Assume the modular ratio 6.2 and modular of elasticity is 40 kN/mm^2 and modular of rupture is 4 N/mm^2 . Calculate the maximum deflection of the beam for an imposed load of 9 kN/m and cracking load 1.45 times working load.
6. Name various codes used for prestressed members. Describe the nature of anchorage zone stresses with particular reference to bursting and spalling tension.
7. Distinguish clearly between Silo and Bunker.
Design the side walls of a Bunker to store 350 kN of coal for the following data:
Unit wt. of coal = 8400 N/m^3 and Angle of repose = 30°
The stored coal is to be out charged at its angle of repose.
Take permissible stress in steel as 150 N/mm^2 . The size of Bunker is $3 \text{ m} \times 3 \text{ m}$ and hopper portion has a height of 1.25 m with a central hole of size $0.5 \times 0.5 \text{ m}$.
8. Write short notes on any four of the following:
a) Grid floors
b) Battery of Bunkers
c) Shear wall
d) Transfer length in Pretension members
e) Limit state approach of prestressed concrete design

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