6E3033

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B.Tech VI Semester (Main/Back) Exam., May, 2012

Civil Engineering

6CE2 Conerete Structures-II

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five questions,** selecting one question from **each unit.***
*All Question carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Units of quantities used/ calculated must be stated clerly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1.**IS456 (2000)** _ __ 2. **IS3370 (Part II & IV)** _

3.**IRC 21**_ _ 4. **IRC 6 (2000)** _____

5.**IS1343 (1980)** _____

Unit - I

1. (a) A simply supported rectangular beam of cross section 350 X 700 mm, span 10 m carries uniformly distributed load of 20 kN. The beam has to have a minimum cover distance of 150 mm from soffit any where on the beam. Suggest a suitable cable profile and pre stressing force. Density of concrete = 24 kN/m^3 . 8

(b) A prestressed concrete beam, 100 mm wide and 300 mm deep is prestressed by straight wires carrying an initial force 150 kN at an eccentricity of 50 mm. The modulus of elasticity of steel and concrete are 210 and 35 kN/mm^2 respectively. Estimate percentage loss of stress in steel due to elastic deformation of concrete if the area of steel wires is 188 mm^2. 8

Or

1. (a) A pre-stressed concrete beam having a rectangular section 150 mm wide and 350 mm deep has an effective cover of 50mm. It f_{ck} = 40 N/ mm^2 and fp = 1600 N/ mm^2 and Ap = 46/ mm^2 . Calculate the ultimate flexural strength of the section using ISI 343 code provisions. 8

(b) A pre-Stressed concrete beam (span = 10m) of rectangular section, 120 mm wide and 300 mm deep, is axially prestressed by a cable carrying an effective force of 180 kN. The beam supports udl of 5 kN/m including self weight. Calculate maximum & minimum principal stresses developed in the beam. 8

Unit - II

2. (a) A rectangular beam of size 300 mm X 400 mm effective depth is reinforced with 0.25% tension steel at a given section. It is subjected to shear force of 16 kN, and tensional moment of 2 kM.m at a section. Check for torsional rainforcement. Use M20 and mild steel. 8

(b) Carry out the redistribution of moment and find out point of contra - -flexure for a fixed beam length = 5m , udl=24 kN/m. 8

Or

2 A tee beam ABC is continuous over two span of 8m each and it car ries udl of 75 kN/m. Assuming fck =25 and fy =415, check whether we can reduce the max. moment by 30% and redistribute the spans. Width of flange = 1000mm, width of web=300mm, thickness of slab= 50 mm, D=820mm, d=770 mm. 16

Unit - III

3. (a) Derieve the formulae for meridional thrust and hoop stress for spherical dome for following load cases. Case I-udl as per unit area of the surface, case II- Concentrated load on the crown. 8

(b) A spherical dome of water tank of span 6m has a rise of 1.2m.It carries an inclusive udl of 600 N/m2 and conctrated load of 800 N at the crown. Design the dome & ring beam. Use M20 and mild steel. 8

Or

3. (a) What are the assumptions in yeild line theory? 4

(b) A slab whose length is twice its breadth is simply supported on three sides. It is free on one of its longer sides. If the moment capacities are equal in both directions, calculate the collapse load. 12

Unit - IV

4. (a) Design a vertical wall and bottom dome of over head intze type water tank for following data. Inner radius of wall = 4250 mm, Thickness of wall = 100 mm, Height of wall = 3150 mm, Thickness of top dome = 75 mm, Rise of bottom dome = 1500 mm, Top ring beam 150 mm X 250 mm, Bottom ring beam = 350mm X 350 mm,Live load on top dome= 0.75 kN/m.use Fe 415. Draw reinforcement details. 16

Or

4. (a) Design a tank wall, which has under tension 300 kN without bending. Assume allowable tension in concrete 1.30 MP_a and allowable tension in steel = 130 MP_a and allowable tension in steel = 130 mpo and M = 15. 10

(b) Design a tank wall where My = 109 kN.m/m at mid height x = a/2 and y= b/2. The shear on adjacent slab V=92 kN/m. Assume M25, Fe415 and class B environment . Give check for stress in steel only. 6

Unit - V

5. (a) Design a stab for culvert for a clear span of 4m having a clear roadway of 10m between kerbs for a single vehicle of IRC class AA track vehicle loading only. Wearing coat 75 mm, kerb width 375mm, thickness of slab 300 mm, weight of railing 65 kg/m,Use M20 and Fe415. 16

Or

5. (a) Explain various stability checks required in design of retaining wall. 6

(b) Design the vertical stem of a cantilever retaining wall for a height of 4m out of which 3m is above ground level. The top of earth retained is surchanged at an angle of 10^0 with the horizontal. The angle of re pose of earth is 29^0 and it's density is 17 kN/m^3. Thesafebearinpressure is 100 kN/m^2. Top thickness of wall is 150 mm. Thicknessof base slab is 400mm. Draw sketch of reinforcement. details. UseM20 and Fe415. Provide temperature and shrinkage re-inforcement. 10
