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Question Paper Code: 37102

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Seventh Semester

Civil Engineering

01UCE702 - ADVANCED STRUCTURAL DESIGN

(Regulation 2013)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

- High strength bolts are designed on the basis of
(a) Friction (b) Tension (c) Compression (d) Shear
- The maximum area of tension reinforcement in beams shall not exceed
(a) 0.15 % (b) 1.5 % (c) 4 % (d) 1 %
- The bending moment at center span of water tank slab is
(a) $pL^2/16$ (b) $pB^2/16$ (c) $pB^2/12$ (d) $pB^2/8$
- Cantilever retaining walls can safely be used for a height not more than -----
(a) 3m (b) 4m (c) 5m (d) 6m
- If W is the load on a circular slab of radius R , the maximum circumferential moment at the centre of the slab is
(a) $3WR^2/16$ (b) $2WR^2/16$ (c) $3WR^3/16$ (d) $2WR^3/16$
- Bottom bars under the columns are extended into the interior of the footing slab to a distance greater than
(a) 42 diameters from the centre of the column
(b) 42 diameters from the inner edge of the column
(c) 42 diameters from the outer edge of the column
(d) 24 diameter from the centre of the column

7. The method of design of steel framework for greatest rigidity and economy in weight, is known as
- (a) simply design (b) semi-rigid design
(c) fully rigid design (d) none of the above
8. A fillet weld may be termed as -----
- (a) mitre weld (b) concave weld (c) convex weld (d) all the above
9. The distance between, rivet line and the nearest edge of a joint not exposed to weather, is taken (where t is thickness in mm of the thinner outside plate).
- (a) 10 t (b) 8 t (c) 6 t (d) 12 t
10. Which of the following is not a compression member?
- (a) Strut (b) Tie (c) Rafter (d) Boom

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Explain the various design philosophies in detail. State their advantages and disadvantages. (8)
12. Design side wall and floor slab only for a RC circular tank resting on the ground for a capacity of 500 m³. The depth of storage is to be 4m. Free board is 200 mm. Use M20 and Fe410 grade steel. (8)
13. Design a reinforced concrete slab culvert for a slate highway to suit the following data:
- Carriage way: two lane 7.5m wide
Materials: M-25 grade concrete and Fe-415 HYSD bars kerbs: 600mm wide
clear span=6m, wearing coat=80mm,
width of bearing =400mm,
- Loading: I.R.C class A or AA, whichever gives the worst effect. Design the reinforced concrete dock slab and stated the details of reinforcement in the longitudinal and cross section of the slab. The design should conform to the specifications of the bridge code IRC: 21-2000. (8)

14. Design stem and toe for a cantilever retaining wall to retain earth embankment with a horizontal top above ground level: (i) Density of earth = 18 kN/m^3 , (ii) Angle of internal friction, $\phi = 30^\circ$, (iii) SBC of soil = 200 kN/m^2 , (iv) Coefficient of friction between soil and concrete = 0.6. Adopt M20 and Fe415. (8)
15. Write step by step procedure for the design of purlin. (8)