Reg. No. : | | | | | | | | | | |

Question Paper Code: 37102

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Seventh Semester

Civil Engineering

01UCE702 - ADVANCED STRUCTURAL DESIGN

(Regulation 2013)

(IS 456:2000, IS 800:2007, SP 6-1:1964 and IRC 21:2000 are permitted)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Describe the philosophy of structural design.
2. List out the types of bolts used in bolted connection.
3. Define hoop stress.
4. In which circumstances the circular water tank are designed and checked.
5. Name the component parts of the slab culvert.
6. Enumerate about foot-over bridge.
7. Write the difference between cantilever and counter fort retaining wall.
8. State the purpose of providing shear key.
9. What is the use of push in an industrial structures?
10. List out the various load acting on self-supported steel chimney.

PART - B (5 x 16 = 80 Marks)

11. (a) Compare allowable stress design and limit state design with their merits and demerits. (16)

Or

(b) A 75*mm*x50*mm*x8*mm* angle is to be connected to a gusset plate by 6*mm* fillet welds at the extremities of the longer leg. Design the weld connection corresponding to the full tensile strength of the angle. Assume shop welding. (16)

12. (a) 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. (16)

Or

(b) Design a circular hemispherical bottomed steel water tank to the following requirements.

Capacity of the tank =12,500 *liters*

Diameter of the tanks=5.5*metres*

Height of the tanks=12 *metres*

Adopt suitable working stresses method. (16)

13. (a) 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. (16)

Or

(b) Describe about IRC specifications and loadings. (16)

14. (a) 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, $\phi = 30^o$, (iii) SBC of soil = 200 kN/m^2, (iv) Coefficient of friction between soil and concrete = 0.6. Adopt M20 and Fe415. (16)

Or

(b) Design a retaining wall to retain an earth embankment 4m high above ground level. The density of earth is 18kN/m^2 and its angle of repose is 30°.The embankment is horizontal at top. The safe bearing capacity of the soil may be taken as200kN/m² and the coefficient of friction between soil and concrete is0.5. adopt M-20 grade concrete and fe-415 HYSD bars. (16)

15. (a) Design an I-section purlin for the following data:

Span of trusses=5*m*

Spacing f trusses =10*m*

Spacing of purlin=1.25*m*

D.L of roof sheets = 125*kN/m²*

wind load=1800*N/m²* normal to roof

Slope of roof=30º. (16)

Or

(b) Design a self-supporting chimney of 30 m height. The diameter of the cylindrical shell is 2 m at the top. The chimney has a 100 mm thick brick lining supported on the shell. Take a uniform wind pressure intensity of 1.5 kN/m^2 throughout the height. Assume uniform values of permissible tensile and compressive stresses as 120 N/mm^2 and 90 N/mm^2. Design of base plate, lugs and anchor plates are not necessary. (16)

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