

Code No: **R42012****R10****Set No. 1****IV B.Tech II Semester Supplementary Examinations, April - 2018****ADVANCED STRUCTURAL DESIGN****(Civil Engineering)****Time: 3 hours****Max. Marks: 75****Answer any FIVE Questions**
All Questions carry equal marks

- 1 Design the stem of a cantilever retaining wall to retain an earth embankment with a horizontal top 3.75 m above ground level. Density of earth = 19 kN/m^3 . Angle of internal friction $\phi = 30^\circ$. SBC of soil = 180 kN/m^2 . Coefficient of internal friction between soil and concrete = 0.5. Adopt M20 grade concrete and Fe 415 grade steel. [15]
- 2 Design a circular water tank flexible base resting on the ground to store 50,000 litres of water. The depth of tank may be kept 4m. Use M25 concrete and Fe 415 steel. [15]
- 3 Design an overhead rectangular tank of riveted steel, for a capacity of 1 lakh litres. The height of columns is to be kept as 10.5m above the ground. The tank is to be built at Mumbai. [15]
- 4 a) Discuss in detail about the bunkers and silos. [7]
b) Derive an expression for temperature stresses in horizontal reinforcement of a R.C chimney. [8]
- 5 a) Explain in brief Pigeaud's method of determining B.M. in slabs, due to a Wheel load. [8]
b) Explain the various types of concrete bridges and also the different loads as per IRC. [7]
- 6 a) Design the web plate of a plate girder railway bridge for a live load of 80 kN/m . Assume dead load due to appurtenances and equipment on the bridge as 50 kN/m . Assume that the girder is simply supported with an effective span of 15m. Assume that the girder is laterally supported. Yield strength of steel is 250 MPa . [8]
b) Describe half through plate girder bridge with figure [7]
- 7 A truss girder through bridge for single broad gauge track has an effective span of 35m. The truss girder has 7 panels of 5m each. The cross girders are spaced 5m apart while the stringers are spaced 2m between centre line. The sleepers are spaced 45 cm from centre to centre and have size of $2.8 \text{ m} \times 250 \text{ mm} \times 200 \text{ mm}$, made of timber weighing 7.5 kN/m^3 . The weight of stock rails and check rails may be taken as 0.6 and 0.4 kN per metre run. The centre to centre spacing of main girders is 7 m. Design for the stringers and also design the joint. Take the height of girder between c.g. of chord as 6.5m. [15]
- 8 a) Explain detailing of RCC structural elements with reinforcement arrangement as per IS Code to incorporate ductile design. [8]
b) Explain concept of Strong Column and weak beams. [7]