Ex/CE/5/T/407/2017(old)

Bachelor of Engineering Civil Engineering (Part time)
Fourth year , Second Semester examination , 2017 (old)
Design of Concrete Structures II

Time: 3 hours **Full marks : 100**

The figures in the margin indicate full marks

Assume reasonable value of any data if required
IS 456, IS 875 – Part III , IS 1893 , SP 16 , IRC codes , Pigued Chart etc. are allowed in the examination hall
Answer any three questions

1(a) Estimate the base shear of a 10 storied office building to be constructed in Agartala on pile foundation in medium soil. Calculate also the inertia forces induced along the height at floor levels. Seismic weight on each floor may be considered 1500 KN. Floor to floor height =3m. First floor to top of pile cap = 5.5m. It is a specially moment resisting frame. Building size on plan – 10m x 15m.

(b) Calculate the maximum load transferred on a inner longitudinal girder from deck slab due to one set of Class AA tracked vehicular load at a particular section of a RCC T-bridge, using Courbon's method . Cross section of the outer and inner girders are 300mm x 800mm and 400mm x800 mm respectively. There are four longitudinal girders and spaced at distances of 3.2m.

$18\frac{1}{3}+15=33\frac{1}{3}$

2. Design a short RCC column with a suitable Pile cap against an axial compressive force of P=1900 KN and biaxial moments M_x=155 KN-m and M_y= 125 KN-m. Use 500 dia. RCC piles of capacity 3900 KN. Grade of concrete M25. Grade of steel Fe 415. Apply Limit State Method of design as per IS 456. Partial safety factor against load and moments may be considered 1.5. Show detail of reinforcements through neat sketches. $33\frac{1}{3}$

3. Design a Cantilever type retaining wall to retain a soil of full height and an uniformly distributed surcharged load of 20 KN/m^2 at top surface level . Safe bearing capacity of cohesionless soil = 200 KN/m^2. γ_s = 16 KN/m^2 , ϕ= 31^0 . Grade of concrete M25. Grade of steel Fe 415. Show detail of reinforcements through neat sketches. $33\frac{1}{3}$

4. Design a Prestressed concrete girder having rectangular section of span 25 m against a live load of 35 kN/m . Allowable stress of concrete in bending compression are 14 N/mm^2 at transfer and 12 N/mm^2 at service. Allowable stress of concrete in bending tension is 2 N/mm^2 both at transfer and service. Loss may be considered 18%. Use Graphical method .

$33\frac{1}{3}$