

[M19 ST 1106]

**I M. Tech I Semester (R19) Regular Examinations
 BRIDGE ENGINEERING
 STRUCTURAL ENGINEERING
 MODEL QUESTION PAPER**

TIME: 3 Hrs.

Max. Marks: 75 M

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

			CO	KL	M
		UNIT - I			
1.	a).	Identify different types of loads on a concrete bridge according to IRC.	1	K3	7
	b).	Make use of general design requirements in design of concrete bridges.	1	K3	8
		OR			
2.	a).	Identify different types of bridges.	1	K3	7
	b).	Organize distribution of concentrated loads in design of deck slabs.	1	K3	8
		UNIT - II			
3.		Distinguish between Pigeaud's method and Hendry-Jaugar method.	2	K4	15
		OR			
4.		A reinforced concrete T beam bridge is to consist of 5 beams 1.75 m apart. The span of the bridge is 12m clear with end bearings of 600 mm. The live load on the bridge 17kN/m ² including impact. The carriageway over the bridge is to be 7 m wide with a footpath of 1.5 m width on other side. The loading on the footpath may be taken as 3.9 kN/m ² . Design the bridge. Use M20 grade concrete and Fe415 steel.	2	K4	15
		UNIT - III			
5.		Design a reinforced concrete box culvert having a clear vent way of 3m x 3m. The superimposed dead load on the culvert is 12.8 kN/m ² . The live load is estimated as 50 kN/m ² . Density of soil at site is 18 kN/m ³ . Angle of repose is 30°. Adopt M20 grade concrete and Fe415 steel. Sketch the details of reinforcement in the box culvert. The design shld conform to the specifications IRC: 112 -2011.	2	K4	15
		OR			
6.		Design a reinforced concrete box culvert with inside dimensions 3m height and 4.5 m width. The box culvert has to carry a superimposed load of 10 kN/m ² and a live load of 50 kN/m ² . The density of soil is 20kN/m ³ . Angle of repose is 30°. Adopt M20 grade concrete and Fe415 steel. Sketch the details of reinforcement in the box culvert.	2	K4	15
		UNIT - IV			
7.		Design an un-stiffened welded plate girder with THICK web, for a simply supported bridge with a clear span of 24 m, subjected to a factored bending moment 4800 kN-m and factored Shear force 1000 kN. The girder carries two factored moving loads of 180 kN each spaced at 2 m center to centre. The plate girder is restrained laterally and prevented from rotation.	4	K4	15

		OR			
8.		Design an un-stiffened welded plate girder with THIN web, for a simply supported bridge with a clear span of 24 m, subjected to a factored bending moment 4800 kN-m and factored Shear force 1000 kN. The girder carries two factored moving loads of 180 kN each spaced at 2 m center to centre. The plate girder is restrained laterally and prevented from rotation.	4	K4	15
		UNIT - V			
9.		Design a pipe culvert thrgh a road embankment of height 8 m. The width of the road is 7.5 m and the formation width is 10 m. The side slope of the embankment is 1.5:1. The maximum discharge is $6\text{ m}^3/\text{s}$. The safe velocity is 4 m/s. Class AA tracked vehicle is to be considered as live load. Assume bell-mouthed entry. Given $C_e = 1.5$, $C_s = 0.010$ and the unit weight of the soil = 20 kN/m^3 .	5	K4	15
		OR			
10.		Design suitable RCC non pressure pipe culvert to suit the following data: Discharge thrgh pipe culvert = $1.57\text{ m}^3/\text{s}$, Velocity of flow thrgh pipe = 2 m/s, Width of road = 7.5 m, Bed level of stream = 100 m, Top of embankment = 103 m, Top width of embankment = 1.5:1 Loading is IRC class AA wheel load of 62.5 kN Draw longitudinal section, plan and end view of pipe culvert	5	K4	15

CO: Course Outcome

KL: Knowledge Level

M: Marks