

SEVENTH SEMESTER B. TECH (CIVIL ENGINEERING)

END SEMESTER EXAMINATION, NOV-DEC 2023

BRIDGE ENGINEERING (CIE 4075)

TIME: 3 HRS.

MAX. MARKS: 50

Note: 1. Answer all questions.

2. Any missing data may be suitably assumed.

Q. NO	QUESTION				CO	BL
1A	For a bridge the following details are available. Determine the most			4	CO1	4
	economical span fr					
	Span (m)	Superstructure cost (Rs)	Substructure cost (Rs)			
	5	19000	250000			
	9	80000	263000			
	14	135000	270000			
	18	178000	272000			
	24	225000	276000			
1 P	Explain the factors considered for selecting a guitable site for bridge				CO1	3
ID	Explain the factors considered for selecting a suitable site for bridge.			3	01	3
1C	Discuss the significance of afflux and scour depth in bridge design.			3	CO1	2
2A	A pipe culvert must be designed through a road embankment of height				CO2	4
	5m and side slope 1.5H:1V. The width of road is 7.5m and formation					
	width is 9m. The maximum discharge is 6m ³ /s. The safe velocity is					
	2.5m/s. The live load of class AA tracked vehicle must be considered and					
	the culvert has bell mouthed entry. Determine the length and number of					
	pipes required and					
	Ce = 1.5, Cs = 0.02					
	kN/m ³ .					
2B	A pier supports a	6	CO4	4		
	forces acting on the pier are, dead load from slab = 1800kN, Live load					
	reaction from each span = 900 kN, Braking force = 150 kN and Bouyancy					
	force. The material of pier is 1:3:6 cement concrete. The density of					
	concrete is 24 kN					
	developed at the base of the pier due to the above-mentioned loads during					
	floods.					

	HFL 1m 2m 8.5m 8m 3.5m ELEVATION PLAN			
3 A	A deck slab for following details must be designed. Clear span 5m, width of footpath 0.6m on either side, wearing coat thickness 100mm, loading	7	CO3	4
	IRC class AA tracked vehicle, road width is two lane, M30 concrete with			
	Fe415 steel is used. Assume overall thickness of slab as 90mm/m.			
	Determine the design bending moment.			
3B	Explain the purposes of T beam bridges.	3	CO3	2
4 A	Explain with a neat sketch well foundation and its components.	5	CO4	2
4B	Discuss with neat sketch about sliding and elastomeric bearing.	5	CO4	2
5A	Differentiate between i) External and internal prestressing.	5	CO5	3
	ii) Transfer stage and working stage			
5B	A prestressed concrete slab bridge has slab thickness of 350mm with	5	CO5	4
	effective span of 7m. The compressive stress permissible at transfer is			
	18N/mm ² and the tensile stresses are not permitted. Assuming loss ratio			
	as 0.82 and service load bending moment at center of span sections as 280			
	KIN-m/m due to IKU loads, check for the adequacy of the section. Also,			
	evaluate the minimum prestressing force and corresponding eccentricity			
	at mu span section.			

