Ref. No.: Ex/CON/PC/B/T/321/2024

B. CONS. ENGG. 3rd YEAR 2nd SEMESTER EXAM.-2024

BRIDGE ENGINEERING

Time : 3 hours | Full Marks : 100

(50 Marks for each Part)

Use separate answer script for each Part

PART I (50 Marks)

Answer any Two Questions of the following. Relevant IRC & IS Codes are allowed. Assume any other relevant data not provided. Draw **Neat sketches** to explain your answer.

1. a) Draw a cross section of a **Girder type Bridge** and show different components. **7**

   b) Discuss the **function of these components** of superstructure and substructure? **8**

   c) Comment True/ False on the following statements and discuss the logic 2 X 5 = **10**

   i) **Class A train of vehicles** is not governing for small culverts in general

   ii) Class **70R loads** is not generally considered on cantilever portion of girder bridge.

2. Calculate the **Design Moment** of the **Cantilever Portion** of the **RCC Girder Bridge** after drawing the cross section of the bridge **25**

   i. The Effective **Span** of the bridge is **24 m.**
   ii. **Width of Carriageway = 7.5 m;** Size of Kerb = 800 X 300
   iii. Thickness of Deck Slab = 210 mm; Thickness of Wearing Coat = 50 mm
   iv. **No. of Longitudinal girder = 3;** No. of Cross girder = 5
   v. Size of bottom flange of Longitudinal Girder = 750 X 350 mm
   vi. Web thickness of Longitudinal Girder = 200 mm
   vii. **Centre to centre** distance of Longitudinal Girder = 2100 mm
   viii. Overall depth of Longitudinal Girder = 2000 mm

3. Calculate the **Live Load moment** of a Two-lane Culvert due to **70R Tracked Vehicle** with following data. **25**

   i. Clear span = **9.5 m**
   ii. Bearing width = 300 mm
   iii. Thickness of Deck Slab = 375 mm
   iv. Size of kerb = 800 mm X 300 mm
   v. Thickness of Wearing Coat = 50 mm
   vi. Size of Hand Rail = 100 mm X 1000 mm = 1KN/m
   vii. Value of 'α' = 2.94

[Turn over

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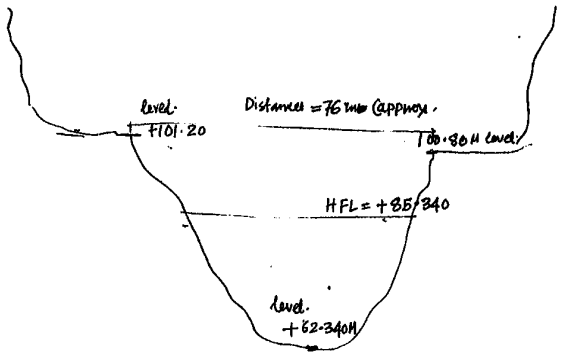
BRIDGE ENGINEERING

Time : Three hours **Full Marks : 100**

(50 Marks for each Part)

PART II (50 Marks)

Instructions : Use Separate Answer scripts for each Group
Answer All Questions

No of Questions	Part II	Marks
CO1 : 25		
Q1	Draw a Sketch of bridge pier up to pedestal level supported on well foundation. Draw the complete section through well foundation showing all components of well foundation and sub structure.	10
Q2	 The above section showing a typical cross section of a river of hilly terrain at Himalayan region, suppose you are bridge planning engineer and you have to suggest the ***most suitable type of bridge*** for this river cross section. Area is in Leh area of Jammu Kashmir, connectivity is very vulnerable in this area. (All Level and Distance ae n Meter)	15
CO2 : 10		
Q1	What is Scour depth in River ? Why Scour depth is a important guiding factor for bridge design during placement of foundation. What are the major factors for deriving the value of scour depth.	10
CO3 : 15		
Q1	Describe elastic theory with respect IRC - 45 for checking base pressure and ensuring safety in designing of well foundation in Bridge Construction.	15