B. CONS. ENGG. 4TH YEAR 1ST SEM EXAM.-2019

BRIDGE ENGINEERING

Time : Three hours **Part - I ;** Full Marks : 100

Answer **any two** Questions. Relevant IRC & IS Codes are allowed.
Assume any other relevant data not provided. Draw neat sketches to explain your answer.

1. a) What are the ideal characteristics for selection of a **Bridge** site? **5**

   b) Calculate the Live Load moment of a two-lane Culvert due to 70R Wheeled vehicle with following data. **20**

   i. Clear span = 6.0 m
   ii. Bearing width = 320 mm
   iii. Thickness of Deck Slab = 300 mm
   iv. Size of kerb = 600 mm X 300 mm
   v. Thickness of Wearing Coat = 50 mm
   vi. Size of Hand Rail = 80 mm X 1000 mm = 1KN/m
   vii. Value of 'α' = 2.87

2. a) Discuss Class A train of vehicles and its Impact factor as per IRC code **5**

   b) Calculate the Live load moment for the External Longitudinal Girder of a RCC girder bridge by Courbon's method with following details. **20**

   The effective span of the bridge is 20 m.
   Width of Carriageway = 7.5 m; Size of Kerb = 1000 X 300
   Thickness of Deck Slab = 200 mm; Thickness of Wearing Coat = 60 mm
   No. of Longitudinal girder = 3; No. of Cross girder = 5
   Size of bottom flange of Longitudinal Girder = 750 X 400 mm
   Web thickness of Longitudinal Girder = 250 mm
   Centre to centre of Longitudinal Girder = 3000 mm
   Overall depth of Longitudinal Girder = 1800 mm
   Size of fillets = 150 mm X 150 mm
   Thickness of Cross girder = 200 mm
   Overall depth of Cross Girder = 1250 mm

3. a) What is role of Cross girder and Bearings in bridges? **5**

   c) Calculate the **Dead Load and Live load moment** of the cantilever slab of the RCC girder bridge of problem 2(b). The thickness of cantilever slab = 325 mm to 150 mm.

   15

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B. CONSTN. ENGG. FINAL EXAMINATION, 2019

(1st/2nd Semester / ~~Repeat/Supplementary/Annual/Bi-Annual~~)

SUBJECT - BRIDGE ENGINEERING

(Name in full)

PAPER.....

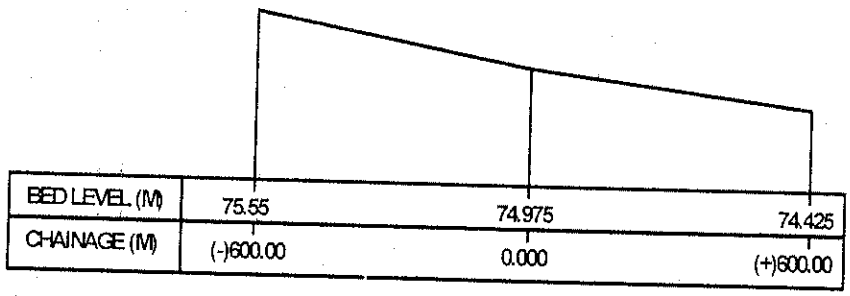
106

Full Marks

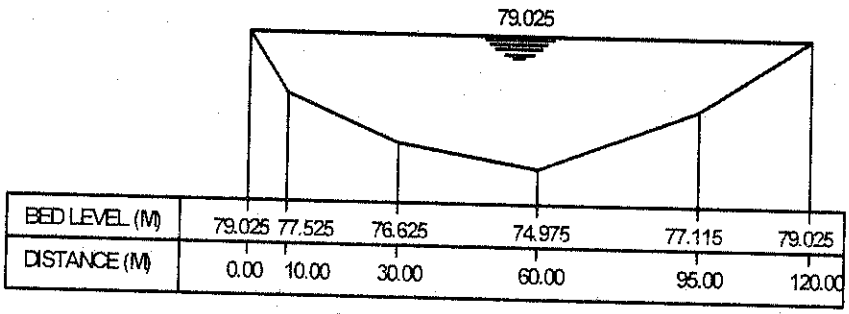
Time : ~~Two hours~~/Three hours/~~Four hours/Six hours~~ (50 marks for each part)

~~Use a separate Answer Script for each part~~

No. of questions	PART II	Marks
	Answer any two	
1.	For what type of soil Lacy's equation for calculating "Regime Width" is valid? State and explain Manning's formula for calculation of flood velocity. Calculate discharge and "Regime Width" at a particular location of a waterway with the following data. Assume rugosity coefficient 'n' = 0.03.	7+18
2.	Design an Elastomeric bearing with the data given below. Draw a neat labeled sketch of the bearing. Span of the bridge = 22.0 M No. of girders = 4 Dead Load per girder (all inclusive) per M length of bridge = 5.0 T/M	



LONGITUDINAL PROFILE OF BED THROUGH DEEPEST CHANNEL



CROSS SECTION AT BRIDGE LOCATION

FIGURE - 1

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Ref. No.

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PAPER.....

Full Marks 100

Time : ~~Two hours~~/Three hours/~~Four hours/Six hours~~ (50 marks for each part)

~~Use a separate Answer - Script for each part~~

	Maximum Live Load Reaction on one girder = 36.0 T (including impact) Minimum Live Load Reaction on one girder = 5.0 T (including impact) Maximum Live Load Moment on one girder = 177.0 T-M (including impact) Total long. horizontal (braking) force acting on superstructure = 20.0 T Long. Seismic coefficient = 0.12 Moment of Inertia considering full section of superstructure = 0.5337 M^4	25
3.	a. Suppose in an individual storm "F" cm rain fall. In "T" hours. What is the relationship between mean intensity of rainfall "I" and intensity of rainfall "i" over a short period of time within the duration of rainfall?. Explain the terms "One Hour Rain fall" and "Time of concentration". What are the other parameters required to calculate flood discharge by using "Rational formula". b. 16 cm rainfall has occurred over a catchment area of 15000 Hectares during a storm of duration 4 hours. Distance and level difference of furthest and highest point within the catchment from the location where a bridge is proposed to be constructed are 6 KM and 7.5 M respectively. Calculate flood discharge at the proposed bridge location. Consider "P" = 0.7 and "f"=0.675 c. Discuss different parameters one needs to look into while selecting a proper site for a river bridge.	10+10+5