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M.Tech. (Civil Engineering) (2016 Onwards) (Sem.–1) BRIDGE ENGINEERING Subject Code : CE-502 M.Code : 35203

Time : 3 Hrs. INSTRUCTIONS TO CANDIDATES : Max. Marks : 100

- 1. Attempt any FIVE questions out of EIGHT questions.
- 2. Each question carries TWENTY marks.

Q1. a) Which factors you will consider during the appropriate site selection for a bridge? Discuss in detail. (10)

b) Explain the relative advantages and disadvantages of pre-stressed concrete bridge and RCC bridges. (10)

Q2. The RCC T-beam girder deck for a bridge crossing using the following data: Clear width of road way = 7.5mm, width of kerbs = 600mm, Effective span = 18m, footpaths one meter on either side, Live load =IRC class -AA, thickness of wearing coat = 100mm, Number of main girders = 4, Adopt M-20 grade of concrete and Fe-415 grade of steel, spacing of cross-girders = 4m, spacing of main girders = 2.5m, Design the deck slab and main girder using Courbon's method.

Q3 a) What is Abutment and give the typical detail of reinforcement concrete abutment. (10)

- b) What are the forces considered while designing the abutment?
- Q4. What are the functioned of bearing in bridges? Sketch an elastomeric bearing and rocker cum roller bearing and explain its parts. (20)
- Q5. Write down the step by step procedure for the design of well foundations. What are the causes of tilt and shift. (20)

Q6. Proportion an RC abutment for a bridge of span 20m and width 9m. Angle of repose (II) and unit weight of backfill are respectively 30° and 18kN/m. Dead load and live load from the superstructure are found to be 150kN/m and 100kN/m respectively. Three neoprene pad bearings of overall size 320 × 500 × 65 mm are provided for transferring the load from superstructure. Check the strength and stability criteria. The permissible compressive and tensile stresses can be taken as 5MPa and 0.5MPa. (20)

(10)

Q7. a) Explain with neat sketches deck and through type truss girder in steel bridges.	(12)
b) Explain the various loads acting on railway steel bridges.	(8) (20)
Q8. Design a well foundation for a bridge using the following particulars :	

- a) Diameter of well: 3 meters
- b) Depth of well- 15 meters
- c) Type of soil- Stiff clay

Material M25 & Fe415

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.