

BRIDGE ENGINEERING

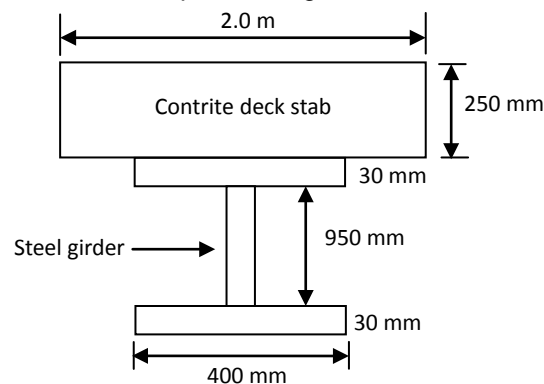
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Explain the basic forms of a bridge structure.
(b) List the loads to be considered in the design of railway bridge.
(c) What do you understand by racking force and where this term used?
- 2 Discuss the different loading cases for the design of single vent reinforced concrete box culvert. For which type of loading the box culvert subjected to maximum B.M and S.F.
- 3 (a) Explain the analysis or methodology pertaining to dispersion of loads in deck slab spanning in two directions.
(b) Sketch typical reinforcement details for the deck slab of a reinforced concrete culvert with a clear span of 6.0 m. Assume width of road way is double lane.
- 4 Design main girder of RCC T-beam bridge with the following data:
Clear width of road way = 7.5 m
Width of Kerbs = 750 mm
Effective span = 22 m
Live load = IRC class AA tracked vehicle. Thickness of wearing coat = 80 mm
Number of main girders = 4
 M_{20} concrete and Fe415 steel
Spacing of main girders = 2.5 m.
- 5 Design a welded plate girder bridge deck for BG track to suit the following data:
Effective span = 40 m
Dead load of track = 10 kN/m
EULL for BM calculation / track = 3498 kN
EULL for shear force calculation/track = 3815 kN.
- 6 Design shear connectors for the composite bridge shown, below. Take maximum shear force is 400 kN



- 7 (a) Sketch the basic deformations for an elastometric pad bearing under load.
(b) Describe the various types of fixed bearings.
- 8 (a) Describe the different types of bridge pier.
(b) What are the functions of approach slab?
(c) Sketch a typical cross section of a masonry abutment and indicate the forces acting on the abutment.
