(2) C/C distance of beam supporting slab = 2.5 m

(3) Total uniform load over beam = 20 kN/m

(4) Grade of concrete = M_{15}

(5) Thickness of slab = 110 mm

(6) Modulus Ratio = 18 15

Faculty of Engineering & Technology

Eighth Semester B.E. (Civil)/Eighth Semester B.E. P.T. (Civil) Examination

ADVANCED STEEL DESIGN

Elective—III

Sections—A & B

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Answer **TWO** questions from Section A and **TWO** questions from Section B.

(3) Due credit will be given to neatness and adequate dimensions.

(4) Assume suitable data wherever necessary.

(5) Diagrams and chemical equations should be given wherever necessary.

(6) Illustrate your answers wherever necessary with the help of neat sketches.

(7) I.S.I. Hand Book for structural steel section, I.S. Code 800/1962 or 1964, I.S. 456 (Revised), I.S. 875 may be consulted.

SECTION—A

1. Design suitable section for Gantry girder for following data :

   (1) Crane capacity = 210 kN

   (2) Weight of crab = 40 kN

   (3) Span of Gantry Girder = 9 m

   (4) Weight of Crane Girder Excluding crab = 200 kN

   (5) Approach of Crane to the Gantry Girder = 1.5 m

   (6) Wheel base = 3.5 m

   (7) C/C distance between gantry Girders = 18 m

   (8) Crane is electrically operated

   (9) Yield stress of steel = 250 N/mm²

   (10) Self GA of rail = 0.3 kN/m 20

2. Design cross girder, one top and one bottom member of foot bridge truss; use following data :

   (1) Span of N-type Truss (6 panel of 3 m c/c) = 18 m

   (2) Ht. of Truss = 2.5 m

   (3) Width of Bridge = 3.0 m

   (4) Live load on bridge = 4.0 kN/m²

   (5) Bridge flooring 120 mm thick RCC slab. 20

3. (a) Explain in detail various forces considered in design of bridges. 6

   (b) State explain factors for selection of types of bridges. 7

   (c) What are functions of bearings ? Enlist type of bearings and explain any one of them in detail. 7

SECTION—B

4. Design a rectangular tank of capacity 1,00,000 litres of water supported over 12 m staging. Columns are supported over concrete pedestal of M20 grade. Beaning capacity of soil is 120 kN/m². Plate of 1.25 m × 8.75 m length are available. 20

5. Design a rectangular steel bunker of 14 m length and 6 m width supported on Eight columns (4 along each side) to store a coal of bulk density 8 kN/m³ and angle of Internal friction is 30°. Ht. of vertical portion is 4.5 m and height of Hopper position is 4.5 m. 20

6. (a) Explain Role of shear connector in composite beam and then explain types of shear connector used. 5

   (b) Design a composite beam with flexible shear connectors for following data :

   (1) Span of beam = 6 m