



- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Due credit will be given to neatness and adequate dimensions.
  7. Assume suitable data whenever necessary.
  8. Illustrate your answers whenever necessary with the help of neat sketches.
  9. Use of non programmable calculator is permitted.
  10. ISI hand book for standard steel section IS 800, IS 456, IS 875 may be consulted.

1. Design a suitable section to be used as a gantry girder for following data : **20**
- |  |   |             |
|--|---|-------------|
| i) Crane capacity  | = | 250 kN      |
| ii) Weight of crab   | = | 75 kN       |
| iii) Span of gantry girder                                   | = | 6.4 m       |
| iv) End clearance  | = | 1.25 m      |
| v) Wheel base  | = | 2.4 m       |
| vi) C/C of gantry rails                                      | = | 16 m        |
| vii) Electrically operated single crane is to be considered. |   |             |
| viii) Weight of crane including                              | = | 180 kN crab |

**OR**

2. Design a roof truss for an industrial building given the following data **20**
- |                           |   |                        |
|---------------------------|---|------------------------|
| overall length            | = | 46 m                   |
| overall width             | = | 12.5 m                 |
| Width c/c of roof columns | = | 13 m                   |
| Height of columns         | = | 12 m                   |
| Roofing material          | = | Asbestos cement sheets |
| Side covering             | = | Asbestos cement sheets |

3. a) State & explain factors for selection of types of bridges. **5**
- b) Design a rocker bearing for a 22 m span truss girder railway bridge with the following **15**  
data :  
The reaction due to dead load, live load and impact load is 1330 kN. The vertical reaction due to overturning effect of wind load at each of the girder is 60 kN. The lateral load due to wind load effect at each bearing is 55 kN. The tractive force and braking force are 981 kN and 606 kN respectively.

**OR**

4. Design one top, one bottom and one vertical member for an 'N' type bridge truss. Use following data : **20**
- i) Span of truss 18 m (6 panels @ 3m c/c)
  - ii) Height of truss = 1.4 m
  - iii) Width of bridge = 2 m
  - iv) Live load on bridge = 4 kN/m<sup>2</sup>
  - v) Bridge Flooring = 12.5 mm thick RCC flooring.

5. a) Design an open web section for a fixed beam of span 6.5 m and subjected to UDL 40 kN/m on entire span. **14**
- b) Write short notes on :
- i) Functions of Bearing. **3**
  - ii) Types of bearing. **3**

**OR**

6. Design a steel bunker of rectangular shape 12.5 m length and 6.2 m width supported on 8 columns (4 along each long side) to store a coal of Bulk density of 8.2 kN/m<sup>3</sup> and angle of Internal friction 35°. Ht. of vertical portion is 4.2 m and Ht. of Hoper portion is 4.2 m. **20**
7. a) Explain the composite construction in detail **7**
- b) State the different types of advanced welding techniques. Explain any two methods in detail. **7**
- c) State and explain the method of design for composite section consisting of I-beam. **6**

**OR**

8. Design the steel beam and shear connector for a bridge deck slab having the following data : **20**
- i) Span girder = 12.5 m
  - ii) Spacing of girders = 3m
  - iii) Live load on floor = 4 kN/m<sup>2</sup>
  - iv) Thickness of slab including wearing coat = 300 mm

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