B.E. (Civil Engineering) (Old) Eighth Semester

Elective – III : Advanced Steel Design

P. Pages : 2 **TKN/KS/16/2408**

Time : Three Hours * 0 6 2 6 * Max. Marks : 80

Notes : 1. All questions carry equal marks.
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. Illustrate your answers wherever necessary with the help of neat sketches.
6. I.S.I. Hand Book for structural steel section, I.S. Code 800/1962 or 1964. I.S. 800 : 1984, I.S. 875 may be consulted.

1. Design a suitable section for Gantry girder for the 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 girder rails = 16 m
vii) Weight of crane including crab = 180 KN.
viii) Electrically operated single crane is to be considered.

2. Design one top, one bottom, and one vertical member for an 'N' type bridge truss. Use following data, **20**

a) Span of truss = 18 m (6 panels @ 3 mc/c)
b) Height of truss = 1.4 m
c) Width of bridge = 2 m
d) Live load on bridge = $4\,KN/m^2$
e) R.C.C. Bridge flooring 125 mm thick.

3. a) What are the functions of bearing? Enlist the types of bearing. Explain one of them. **7**

b) The dead load, live load and impact load reaction at the end of a bridge girder as 1200KN. The vertical reaction of each end of a girder due to overcoming effect of wind is 60KN. Design the roller bearing. The least allowable perpendicular distance between the faces of adjacent roller after their revolved position may be taken as 6mm. The center of roller travels 25 mm. **13**

SECTION – B

4. An overhead rectangular water tank consists of a container of plan dimensions 7.5 m x 12.5 m and height 2.5 m. The tank is supported at two – tier beam system placed on top of four columns. c/c distance between columns along longer span of container is 11.3 m. **20**

Design :

i) Bottom plates of container and joint between two plates.
ii) Upper tier and lower tier of beams,

Assume adequate spacing and number of beams.

5 Design rectangular steel bunker of 13m length and 6.5 m width supported on light columns (four along each long side) to store coal of bulk density $8 KN/m^3$ and angle of internal friction 35º, height of vertical portion is 4 m, height of hopper portion is 4 m. **20**

6. a) Enlist the advanced welding technique and explain one of them in details. **6**

b) Design the steel beam and shear connector for a bridge deck slab having the following data : **14**

i) Span of girder = 12.5 m
ii) Spacing of girders = 3 m
iii) Live load on floor = $4 KN/m^2$
iv) Thickness of slab including wearing coat = 300 mm.
v) Grade of concrete = M 20.

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