Total No. of Questions : 8] SEAT No. :

P3515 [Total No. of Pages : 3

[4859] - 16
B.E. (Civil)
ADVANCED STRUCTURAL DESIGN
(Elective - III) (2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates :

1) ***Attempt Q. No.1 or Q. No.2, Q. No.3 or Q. No. 4 from section - I and Q. No.5 or Q. No.6, Q. No.7 or Q. No.8 from section - II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams should be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data if necessary.***
6) ***Use of cell phone is prohibited in the examination hall.***
7) ***Use of electronic pocket calculator, steel table and relevant IS code is allowed.***

SECTION - I

Q1) Design a castellated beam to carry an imposed load of 5.0 kN and dead load of 4.0 kN over a simply supported span of 12 m. The compression flange is laterally restrained along the complete span. Use yield stress, f_y = 250 MPa and design section as per limit state method of design. **[25]**

OR

Q2) a) State and explain in brief, the mode of failure of castellated beam. **[8]**

b) Explain in details composite roof deck system using light gauge section. **[7]**

c) Explain design steps of compression and tension members with usual notation using light gauge sections. **[10]**

Q3) Two channel sections without bent lips 200 mm × 50 mm and 2.5 mm thick are connected with webs to act as beam. The effective span of a simply supported beam is 6 m. The beam is laterally supported throughout its length. Determine the maximum uniformly distributed load which can be supported by the beam. Assume f_y = 232 N/mm^2 and I_x = 780 × 10^4 mm^4 **[25]**

P.T.O.

OR

Q4) Analysis the gable frames as shown in Fig. 4 by plastic method and determine the plastic moment m_p. **[25]**

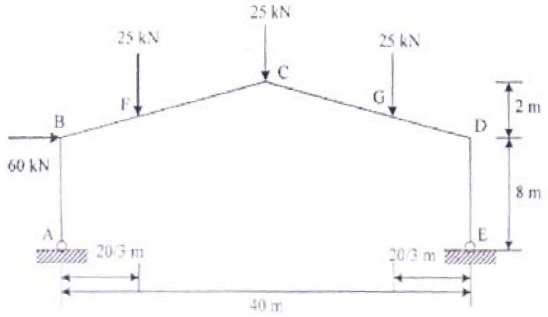

Fig. 4

Q5) Design an intermediate panel of a flat slab floor system of size 12m × 20 m for a residential building divided into panels of 4 m × 5 m . **[25]**

Loading class = 3 kN/m^2

Materials : M 30 grade of concrete and Fe 500 grade of steel

Column size = 400 mm × 500 mm

Sketch the reinforcement details in an interior panel of the flat slab.

OR

Q6) A reinforced concrete grid floor system of a porch is to be designed to cover an area of 10 m × 10 m, the spacing of the ribs in mutually perpendicular direction being 2.5 m c/c. Live load is 3 kN/m^2. Adopt M30 grade of concrete & Fe 500 grade of steel. Analyze the grid floor & design suitable reinforcements in the rib & slab. Draw the cross section of the grid showing reinforcement details in the two perpendicular directions. **[25]**

Q7) An elevated water tank of capacity 200 m^3 is supported on 8 equally spaced columns along periphery and 1 column at center, along a circle of 8850 mm diameter. Decide suitable dimensions of all components of the container and design the, following components : **[25]**

a) Top slab.

b) Top ring girder.

c) Cylindrical tank wall.

Use M30 concrete and Fe500 steel. Draw neat sketches, showing details of reinforcement.

OR

Q8) Design a RCC staging for ESR, circular in plan for 300 m^3 with staging height 13 m using M30, Fe500 in earthquake zone V. Safe bearing capacity is 200 KN/m^2. **[25]**

Assume approximate dimension of container, wall, top, bottom slab thickness, beam sizes & number & pattern of columns. Design must include calculations of vertical loads and horizontal force calculations. Design the bracings, columns & foundations. Draw the reinforcement details. Design of container is not required.