Total No. of Questions : 6]

SEAT No. :

P4

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APR - 18/TE/Insem. - 4

T.E. (Civil Engineering)

STRUCTURAL DESIGN - II

(2012 Pattern) (Semester - II)

Time : 1½ Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4 and Q5 or Q6.***
2) ***Figures to the right side indicate full marks.***
3) ***Use I.S.456-2000 and non programmable calculator is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Assume suitable data, if necessary.***

Q1) a) Define limit state, and write comment on why limit state is more desirable than working stress method. **[5]**

b) Explain balanced, under reinforced and over reinforced section w.r.t. LSM. **[5]**

OR

Q2) a) Derive the design constants used in LSM for M20 and Fe500. **[4]**

b) Design a RCC beam section using WSM subjected to Bending moment of 85 KN-m using M20 and Fe415. Assume b = 2d. **[6]**

Q3) A RCC beam of size 230 mm × 525 mm is reinforced with 4 no's of 20 mm dia. Beam having effective span of 5.0 m and clear cover to reinforcement is 30 mm. Calculate safe working UDL including self weight the beam can carry using WSM and LSM, Use M20 and Fe415. **[10]**

OR

Q4) For an assembly hall 15 m × 7 m floor beams are spaced at 3.75 m and have a simply supported span of 7.0 m, these beams support a floor slab of 125 mm thick the size of beam is 230 mm × 525 mm overall, Design the intermediate flanged section for flexure only using LSM. Refer data given below : **[10]**

P.T.O.

a) Live load on slab = 4 kN/m^2

b) Floor finish = 1.5 kN/m^2

c) Wall on beam = 230 mm thick and 2.6 m height

d) Effective cover = 50 mm

e) Material - M20 and Fe500.

Q5) Design a corridor slab over a passage 3 m × 8 m at the entrance of a public building, the slab is supported by 300 mm wide beams and carries a live load of 4 kN/m^2 and F.F of 1.5 kN/m^2 use M20 and Fe415 design for flexure, shear and development length and show details of reinforcement. **[10]**

OR

Q6) Design the first flight of a dog-legged staircase for the following data : **[10]**

a) Centre line dimension of staircase room - 2.2 m × 4.75 m.

b) Floor to floor height = 3.0 m.

c) Rise = 150 mm Tread = 300 mm.

d) Width of landing = 1.25 m.

e) Type of building - Residential with F.F. 1.5 kN/m^2.

f) Material - M25 and Fe500.

g) Draw details of reinforcement.