

[3 Hours]

[Total Marks : 80]

Please check whether you have got the right question paper.

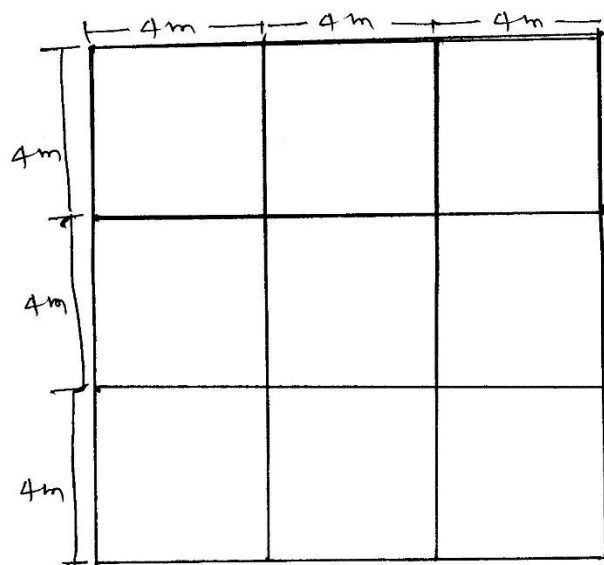
N.B:

1. Questions No. 1 is compulsory.
2. Solve any three questions form remaining questions.
3. IS 1893 is permitted.
4. Assume any suitable data if required and justify the same.

1. a) Explain the response spectrum method. (05)
 b) Describe briefly the direct and indirect effect of an earthquake. (05)
 c) Explain equivalent diagonal strut method for the analysis of infilled frames : (10)
 - i) infilled wall without opening.
 - ii) infilled wall with opening.

2. a) Explain the following mathematical models with sketch : (10)
 - i) Idealized plane frame model.
 - ii) Equivalent shear wall from model.
 - iii) Plane frame model of coupled shear wall.
 b) Design a rectangular beam for 8 m span to support a dead load of 10 KN/m and a live load of 12 KN/m inclusive of its own weight. Moment due to earthquake load is 100 KNm and shear force is 80 KN. Use M20/Fe415. (10)

3. The plan of four storey building is shown in fig. The intensity of dead load is 10 KN/m² and live load on each floor is 4 KN/m². Determine the design seismic loads on the structure by static analysis. The building is located in seismic zone V. Storey height 4 m, R = 5, I = 1. (20)



4. Design a shear wall for a 10 storey building for the following data length of shear wall is 6m. (20)
 Axial load on shear wall 2000KN. Bending moment at the base is 3000KNm. Use M30/Fe415. Building is situated in zone IV.

5. a) What are the causes of instability of steel buildings? Discuss in detail the P-Δ effect. (05)
 b) What are the protection against spalling of concrete with high temp? (03)
 c) Design a rectangular column for the following load combinations. Using M30/Fe415 (12)
 and height of column 3 m.

	DL	LL	EL
Axial load (KN)	1800	800	800
Moment (KNm)	180	60	200

6. The hall of 8 m × 32 m is prepared to be covered with RCC slab supported on a rectangular portal frame 4 m c/c height above plinth is 5 m. Structure is one storey. Analyse and design the portal frame by LSM. Take live load on slab 3 KN/m². (20)

- Use M25/Fe415.

Draw neat sketch showing reinforcement details.