G.R. No.	

PAPER CODE | P122 - 214 ISE 25TR

MAY 2020 / INSEM+ENDSEM
F. Y. M. TECH. (Civil-Structures) (SEMESTER – II)
COURSE NAME: Design of Earthquake Resistant Structures
COURSE CODE: CVPB12204B
(PATTERN 2020)

Time: [3 Hours]   [Max. Marks: 60]

Instructions to candidates:

1) All Questions are compulsory
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed
4) Use suitable data where ever required
5) Use of SP 16, IS 456:2000, IS 1893 (Part1):2016 and IS 13920:2016 is allowed

Q.1) a) What are iso - seismal lines? Explain why the intensity of an earthquake is more relevant while designing the building than the magnitude of an earthquake.   (6)

b) Discuss the learning from the past earthquake for R.C. framed structures   (4)

Q2) a) Explain the significance of Strong Column and Weak Beam concept of seismic design of buildings.   (5)

b) Comment on "Un-symmetric buildings twist during an event of earthquake"   (5)

Q3) a) Describe the four virtues of earthquake resistant buildings.   (5)

b) Compare the Braced Frame System, Moment Resistant Frame buildings and Structural Wall-Frame system with reference to bending moments due to lateral loads.   (5)

Q4) Determine the base shear and the lateral loads acting on a residential building using the following data: (10)

Seismic Zone – IV, Type of Soil: Soft, Height of the building=17.5 m, Floor to Floor Height=3.5 m. S.M.R.F building, Live Load on the floor= 3 KN/sq.m., Size of Columns= 400 mm X 400 mm, Size of Beams= 300 mm X 600 mm, Thickness of slab= 150 mm, Thickness of internal walls= 150 mm, Thickness of external walls= 230 mm, Unit weight of masonry= 20 KN/cubic m. Length of the building= 25 m (5 bays of 5 m each) and Width of the building= 12 m (4 bays of 3 m each). Use Equivalent Static Method of analysis.

Q5) Draw the sketches showing: (10)

    1) Shear Reinforcement in the beam
    2) Special Confining reinforcement in the column
    3) Splicing of longitudinal bars of the beams
    4) Moment Capacity Ratio of the Beam Column Joint, as per the provisions of IS 13920:2016.

Q6) Design the section of the beam for flexure using the data as mentioned below: (10)

Ultimate Hogging Moment= 300 KN-m
Ultimate Sagging Moment= 175 KN-m
Use of SP: 16, IS 475:2000 and IS 13920:2016 is allowed. Check for member size and longitudinal reinforcement is mandatory.