APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY D

FIRST SEMESTER M. TECH DEGREE EXAMINATION

Civil Engineering

(Structural Engineering & Construction Management)

04 CE 6407 Advanced Design of Concrete Structures

Max. Marks: 60 Duration: 3 Hours

Use of IS-456-2000, IS 13920:2016 and Interaction curves are permitted.
Assume suitable data wherever necessary

PART A

Answer All Questions

Each question carries 3 marks

1. Explain effective length of a column.
2. What is a flat slab? List the different types.
3. Write short notes on design of shear walls
4. What are the assumptions of portal frame method?
5. What are the advantages of redistribution of moments
6. Explain limit analysis of a RCC structure.
7. Explain moment –rotation of a singly reinforced member just after cracking
8. Write a short note on quality control of concrete.

PART B

Each question carries 6 marks

9. Design the reinforcements in the column of size 500mm x600mm subjected to factored loads Pu= 2000kN, Mux= 150 kNm and Muy= 120kNm. Assuming M 20 grade concrete and Fe 415 steel.

OR

10. A Single span of deep beam has an overall depth of 4m and an effective depth of 6m, width of beam is 400 mm. The beam supports a uniformly distributed live load of 300 KN/m over the entire span. Using M20 grade concrete and Fe 415 HYSD bars, design suitable reinforcements for the beam and sketch the details.
11. Flat slab is supported on 500 mm diameter columns spaced 6m x 5 m apart in both directions. Column head has a diameter of 100 cm. Live load on the slab is 5 KN/m^2 .Determine the moments in an interior panel, also check the flat slab in shear at interior support

OR

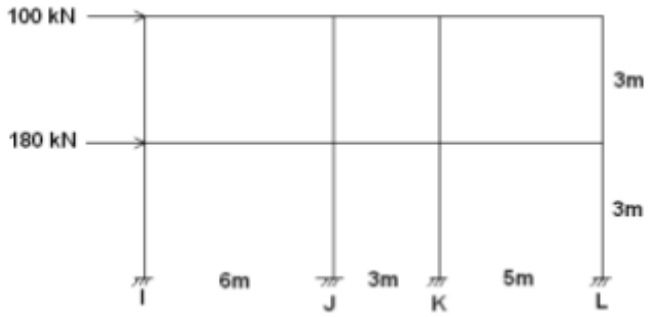
12. A rectangular Slab of siz 4m x 6m Simply supported at edges for a service load of 4 KN/m^2 take μ =0.4 ,f_{ck} =20 N/mm^2 , fy=415 N/mm^2 ,design using yield line theory

13. Design a R.C grid floor to be designed to cover a floor area of 13.5 m X 19.5 m.the spacing of the ribs in mutually perpendicular direction is 1.5 m, Live load on the floor is 2 KN/m adopting M-20 concrete , Fe-415, Design the Grid floor System

OR

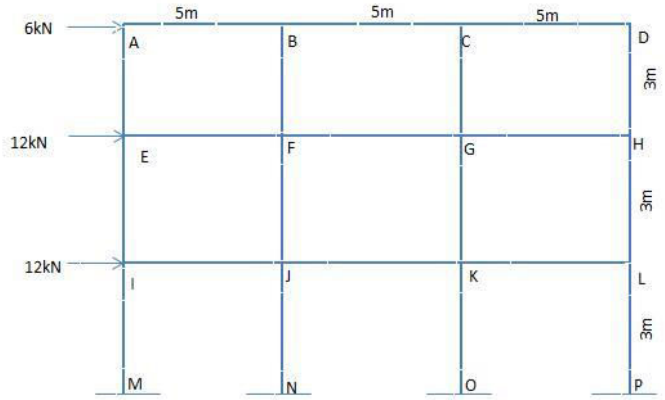
14. Define shear wall. Classify different types of shear walls with sketches. Explain the design principles flanged shear walls.

15. Analyse the 2nd Storey of building frame subjected to horizontal forces as shown in figure below using cantilever method and determine a). Moments at the end of columns b). Axial forces in columns c). Shear at the ends of beam



OR

16. Analyze the frame shown in figure using portal method.



17. A beam AB of span 4 m fixed at the ends carries a UDL of 30 KN/m at collapse, draw maximum B.M diagram as per IS 456 recommentations

OR

18. Determine approximate M-Ø values at salient points for a rectangular beam of size 300 mm x 800 mm. assume f_{ck} =37 N/mm^2 ,f_y =500 N/mm^2 ,effective cover =50 mm, A_{st} =1900 mm^2. Also find the ductility factor .

19. Following are the details of an internal beam column joint of type (1) joint, subjected to reversals which are not due to earthquake. Column: 600mm x 600mm with 8nos 25 mm diameter bars. Column factored load is 1400KN, Storey height=3m.Beams on either side are 400mm x 500mm with 3 bars of 28 mm dia (1846mm^2) at top and 3 bars of 25 mm diameter at bottom (1473mm^2).Assume f_{ck} = 25 N/mm^2 f_y= 415 N/mm^2. Design the joint with respect to strength, stability and shear

OR

20. Write short notes on strengthening of RC structures.