GANPAT UNIVERSITY

B.Tech. Semester V CIVIL ENGINEERING

Regular Examination – November / December: 2012

3CI 501: Structural Analysis – II

Max.Time: 3 Hours **Max. Marks: 70**

Exam No. of the candidate: _____ Supervisor's dated initial: _____

Instructions: - (1) Answer to the two sections must be written in separate answer books.

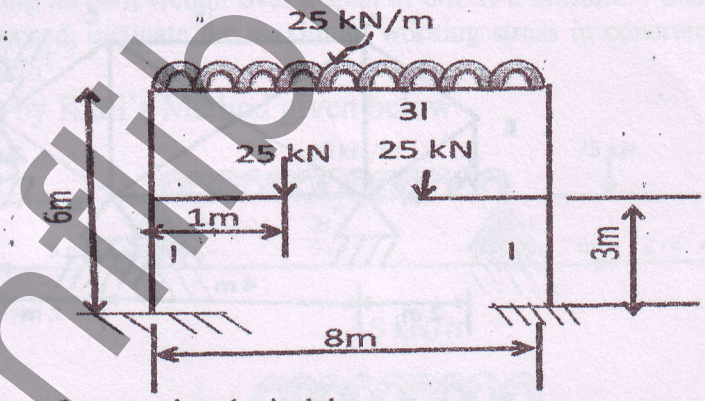
(2) Figures to the **right** indicate **full** marks.

(3) Assume suitable data if required.

Section – I

1 Answer the following question. 12

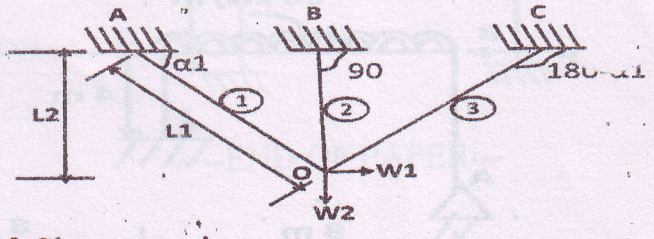
(A) A portal frame PQRS fixed at P and hinged at S as shown in figure. Solve the frame by SDM and plot SFD and BMD. (08)



(B) Explain the nature of stresses in spherical domes. (04)

OR

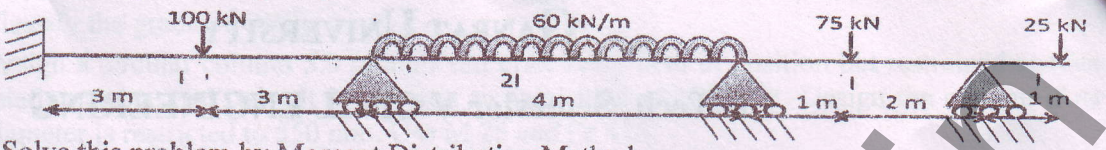
1 (A) Determine the horizontal and vertical displacements at joint O of the structure shown in figure. All the bars have same area and Young's Modulus. Also, determine the forces in various members. Solve this problem by displacement methods. (09)



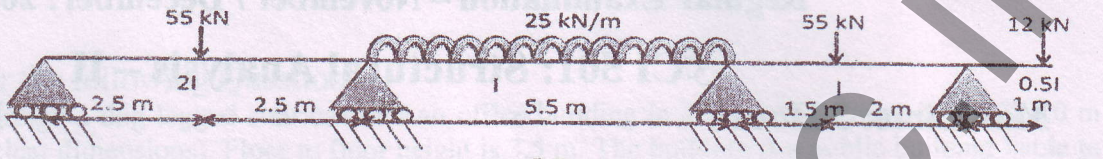
(B) Explain in brief: Shear equation. (03)

2 Answer the following question.

(A) Solve this problem by Slope Deflection Method:



(B) Solve this problem by Moment Distribution Method: (05)



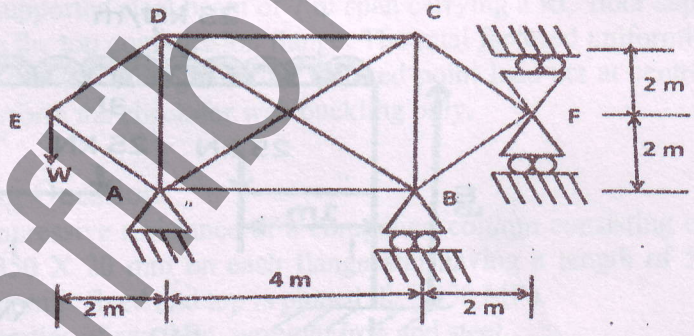
OR

2 Answer the following question. 11

A continuous beam PQRS is fixed at P. It is continuous over the supported Q and R, the portion RS overhanging. PQ = 5 m, QR = 5 m and RS = 3 m. Span PQ carries a concentrated moment of 75 kNm at 2.5 m from P, span QR carries a uniformly distributed load of 15 kN/m over its whole span and there is a concentrated load of 15 kN at the free end S. Calculate the bending moments at P and Q. Draw B.M. and S.F. diagrams for the beam PQRS. Also draw the free body diagram for the span PQ and QR. Solve this problem by Slope deflection method.

3 Answer the following question. 12

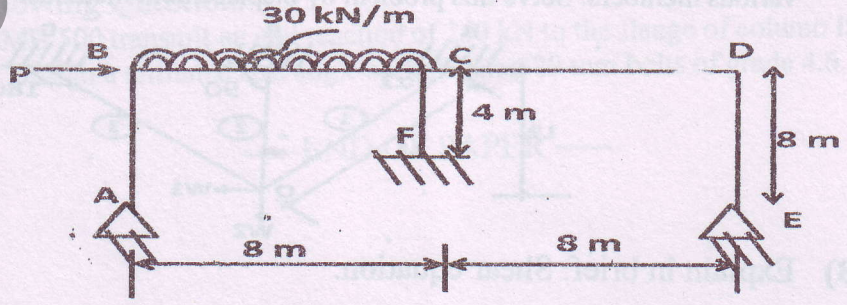
Analyze the frame shown in figure. All the members have cross sectional area of 10 cm^2 and are made of the same material.



Section – II

4 Answer the following question. 12

(A) Draw the B.M diagram for the frame shown in figure. It has stiff joints at B,C and D; the ends A and E are hinged and F is encastred. The frame is of constant throughout. 09



(B) Differentiate Flexibility matrix and Stiffness matrix. 03

OR

4 Answer the following question.

(A) A portal frame MNOP has hinged ends at M and P with stiff joints at N and O. The columns are 8 m long while the beam is 6 m long. It carries a point load of 60 kN at 2.0 m from N. Draw the B.M. diagram for the frame which is of constant section throughout. 08

(B) Find out the fixed end moment for fixed end member MN of length 'l' and constant flexure rigidity EI, loaded with a couple M at a distance a from M and b from N. 04

5 Answer the following question. 11

(A) Compare advantages and disadvantages of prestresssed concrete versus reinforced concrete. 06

(B) A box girder of prestressed concrete bridge of span 40m has overall dimensions of 1200mm by 1800mm. The uniform thickness of the wall is 200mm. The live load analysis indicates a maximum live-load moment of 2000kNm at the centre of the span. The beam is prestressed by parabolic cables with an effective force of 7000kN. The cables which are concentric at supports have an eccentricity of 800mm at the centre of the span section. Compute the resultant stresses at the centre of span section. 05

OR

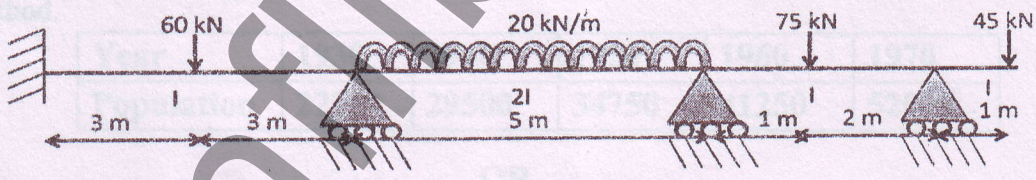
5 Answer the following question.

(A) Explain about pressure line in prestressed concrete beam. 06

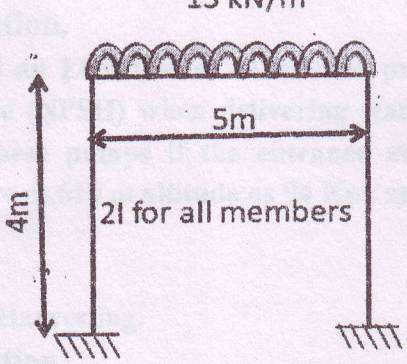
(B) A rectangular concrete beam of cross section 30cm deep and 20cm wide is prestressed by means of 15 wires of 5mm diameter located 6.5cm from the bottom of the beam and 3 wires of diameter of 5mm, 2.5cm from the top. Assuming the prestress in the steel as 840N/mm^2, calculate the stresses at the extreme fibres of the mid span section when the beam is supporting its own weight over a span of 6m. If a uniformly distributed live load of 6kN/m is imposed, evaluate the maximum working stress in concrete. The density of concrete is 24kN/m^3. 05

6 Solve the structures by Kani's Method given below. 12

(A) 06



(B) 06



----END OF PAPER---