R09

Time: 3hours   Max.Marks:60

Answer any five questions
All questions carry equal marks
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1.   The span of the knee braced roof truss over an industrial building of 36 m long is 16 meters. The spacing of the roof truss is 3.6m. The pitch of the roof is 1 in 4. Basic wind pressure is 1.5 kN/m^2. The height of the eaves above ground level is 8.6 m. Prepare a suitable type of truss. Also determine the loads at various panel points.

2.   Analyse the frame by cantilever method. Take the area of the central column as double the area of outer column.(Fig-1)
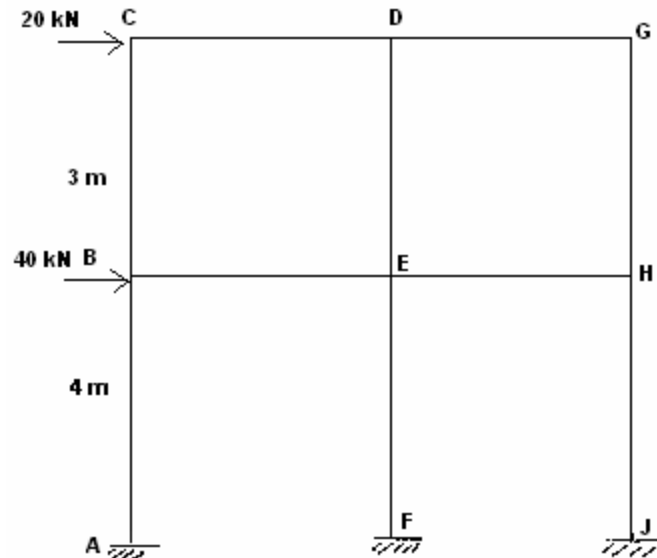

Fig-1

3.   Find the values of β_1 and β_2 for the minimum weight design for the frame shown in figure 2. Loads acting are ultimate loads.
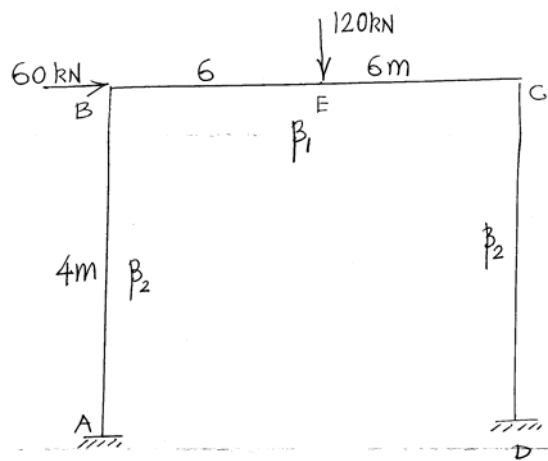
Fig 2

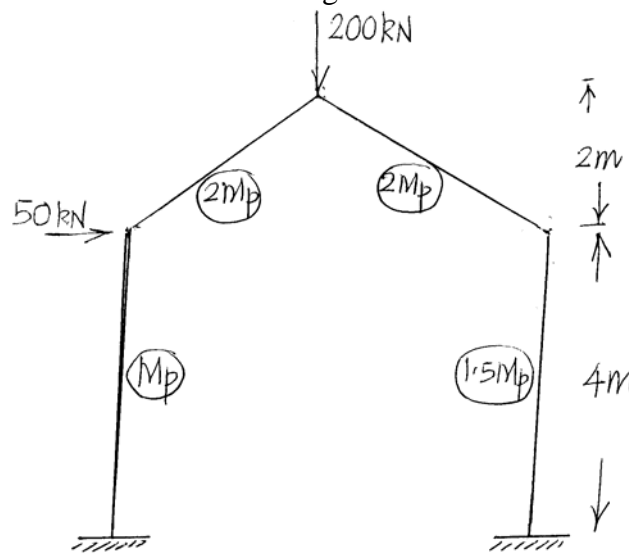4.   Analyse the Gable frame shown in Fig-3. Loads are ultimate loads.

Fig-3

5.a)   A member transmits a moment of 600 kNm and an axial force of 1200 kN. Design the section by plastic method.

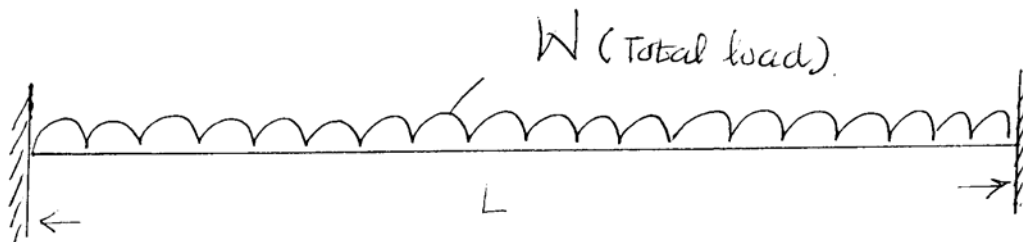 b)   Find the central deflection of the beam shown in Fig 4 using plastic Analysis.

Fig-4

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6. Design the full storey X brace and the beam shown in Fig 5. The wind force is 250 kN across the bay. The floor beam may be assumed to be fully supported laterally by the floor slab which transmits a uniform load of 20 kN/m.
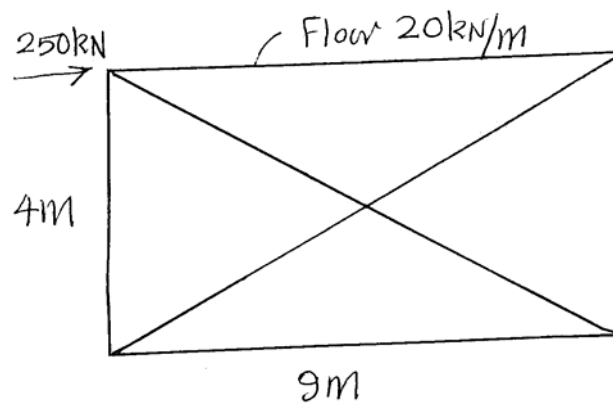

Fig-5

7. Design a continuous strut 9.0m long used as principal rafter of the roof truss. The reactions from the purlins are 2kN, 3kN and 4kN at the intermediate points as shown in figure 6. In addition to the above, the rafter is subjected to a compressive force of 100 kN.
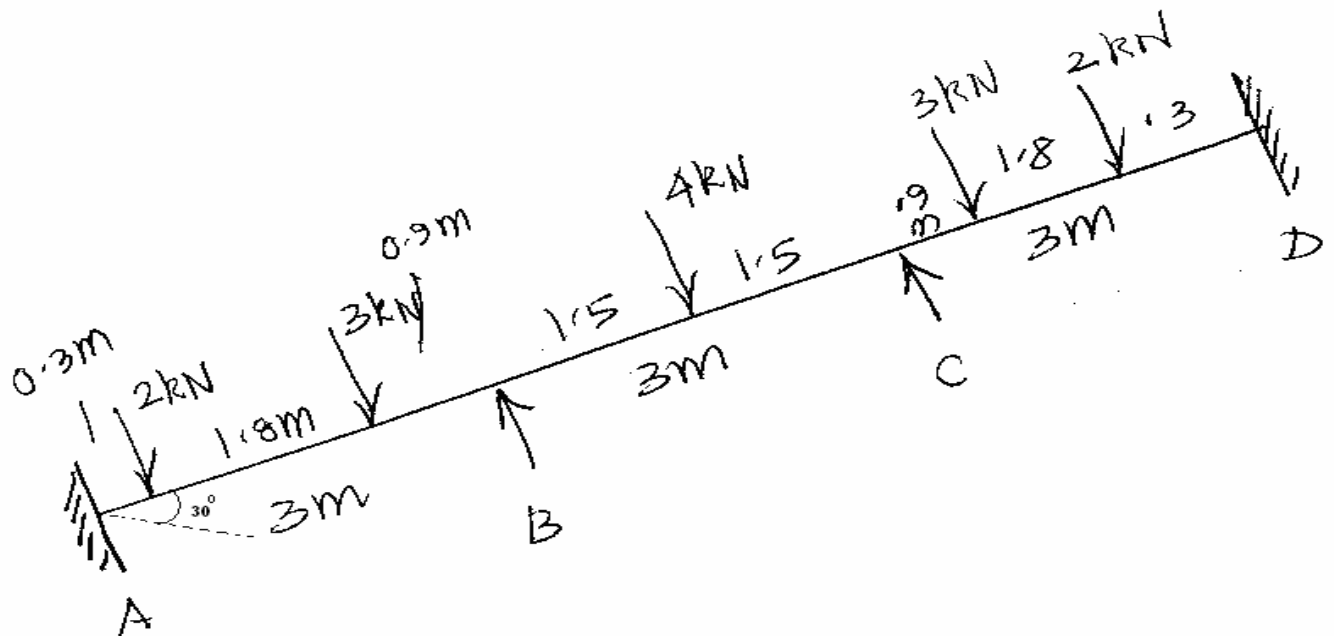

Fig-6

8. Write short notes on
   a) Design procedure for bracings
   b) Different types of independent mechanisms
   c) Redistribution of moment, plastic hinge and rotation capacity
   d) Advantages and disadvantages of space frames.

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