CLASS: BARCH   SEMESTER :IV
BRANCH: ARCHITECTURE   SESSION : SP/19

SUBJECT: AR4035 THEORY OF STRUCTURE

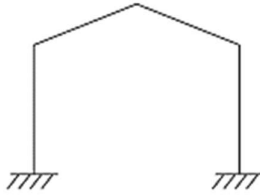TIME: 3.00 Hrs.   FULL MARKS: 60

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

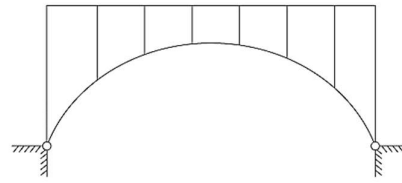Q.1(a)   What is meant by hyperstatic structures?   [2]
Q.1(b)   Determine degree of static indeterminacy of rigid frame structures given below: [4]
    i)   ii)

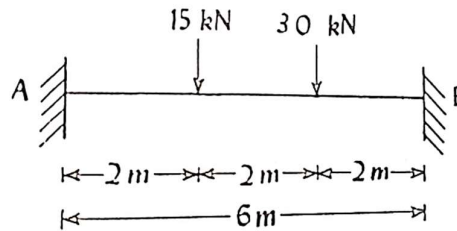Q.1(c)   Determine support reactions for the beam shown below by consistent deformation method. Consider   [6]
EI constant.

Fig. Q.1(c)

Q.2   Determine the support moment using theorem of three moment for the beam shown below. Also draw   [12]
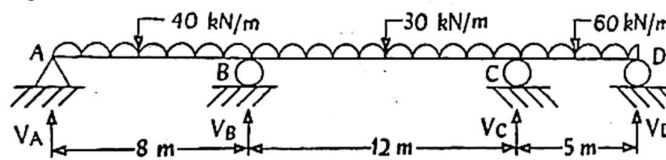shear and moment diagrams. Consider EI constant.

Fig. Q.2

Q.3   A portal frame PQRS has hinged ends at P and S with stiff joints at Q and R. The columns are 4m long   [12]
while the beam QR is 3m long and carries a uniformly distributed load of 40kN/m. Analyze the structure
using principle of least work. The frame is of constant section throughout.

Q.4   Determine the support moment for the problem of Q.2 (Fig. Q2) by slope deflection method.   [12]

Q.5   Determine the support moment for problem of Q.2 (Fig. Q2) by Moment Distribution method. Also   [12]
determine the support reactions

Q.6(a)   What is the difference between elastic material and elastic perfectly plastic material?   [2]
Q.6(b)   What is meant by plastic hinge? How plastic hinge is different from mechanical hinge.   [4]
Q.6(c)   Define shape factor? Determine shape factor of rectangular section.   [6]

Q.7(a)   Explain lower bound theorem and upper bound theorem in plastic theory.   [6]
Q.7(b)   Determine collapse load for the propped cantilever beam of span 'l' and subjected to point load at   [6]
mid span. The beam having plastic moment carrying capacity of M_p. Use virtual method.

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