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320551(20)

B. E. (Fifth Semester) Examination, April-May/Nov.-Dec. 2020

(New Scheme)

(Civil Engg. Branch)

STRUCTURAL ANALYSIS-II

(Theory)

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) from each question is compulsory. Attempt any* **two** *parts from parts (b), (c) and (d) of each question.*

Unit-I

1. (a) Explain principle of superposition'. 2

(b) Analyse the continuous beam shown in fig. (a). Using three moment equation and draw the bending moment diagram. 7

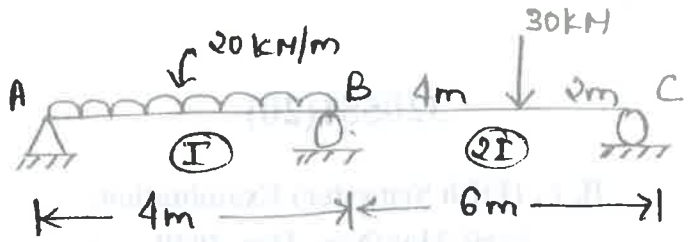

Fig. (a)

(c) Analyse a moments of a continuous beam shown in fig. (b) using three moment equation and draw shear force and Bending moment diagram. Take *EI* constant. 7

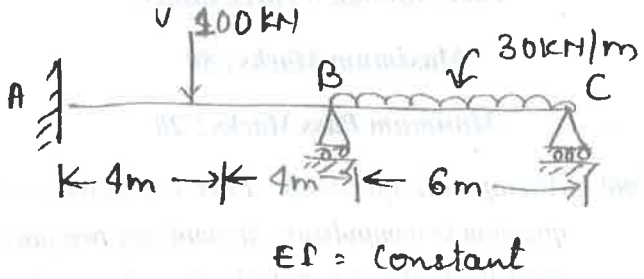

Fig. (b)

(d) Using the method of consistent deformation, determine for the beam given in figure (c) the reaction R_B treating it as the redundant. *EI* is constant. 7

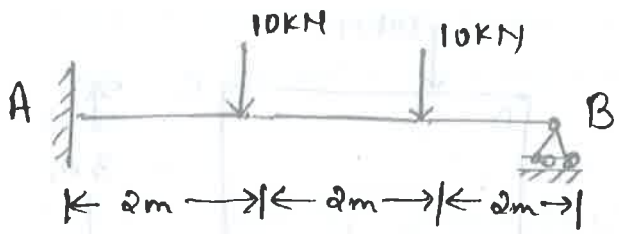

Fig. (c)

Unit-II

2. (a) What do you understand by lack of fit in trusses? 2

(b) Determine vertical deflection at point *C* of the frame using strain energy method. Take $E = 200$ GPa and $I = 1 \times 10^8$ mm^4 fig. (d). 7

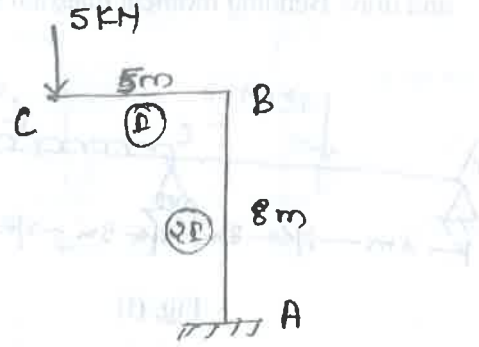

Fig. (d)

(c) Analyse the frame shown in fig. (e) by strain energy method and plot the bending moment diagram. 7

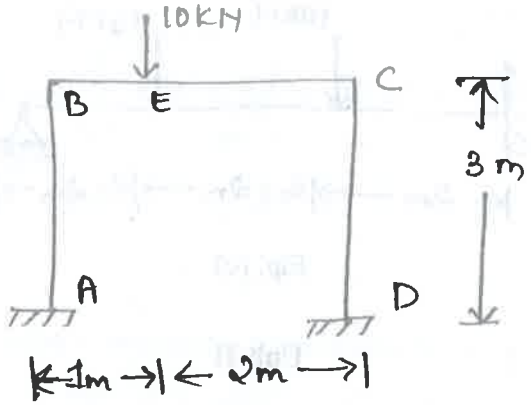

Fig. (e)

(d) Using strain energy method, draw the bending moment diagram, indicating values at salient points and draw Bending moment diagram fig. (f). 7

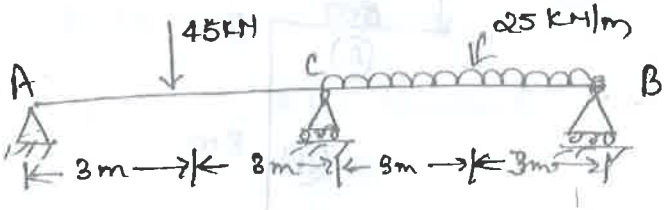

Fig. (f)

Unit-III

3. (a) Define distribution factor used in moment distribution method. 2

(b) Analyse the frame shown below fig. (g) using moment distribution method and plot the bending moment diagram. 7

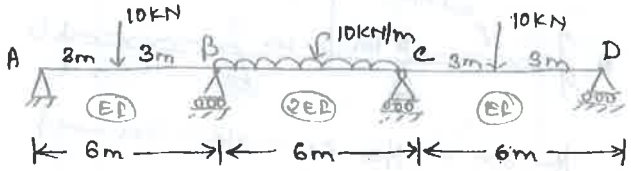

Fig. (g)

(c) Analyse the symmetrical portal frame shown in fig. (h) below using moment distribution method. Draw bending moment and shear force diagram. 7

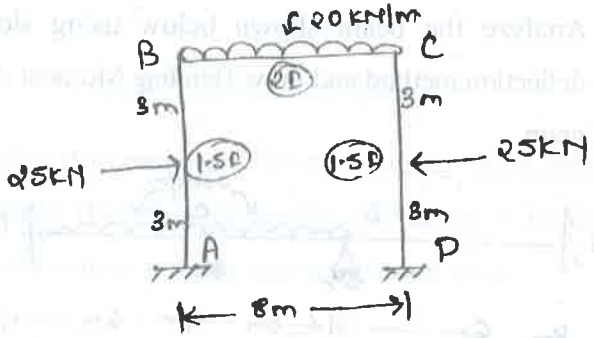

Fig. (h)

(d) Determine the support moments for the continuous beam as shown in fig. (i) using moment distribution method. Under the load support B sinks by 2·5

mm. Take $I = 350 \times 10^{-6}$ m^4 and $E = 200 \times 10^6$ kN/m^2 for all members. 7

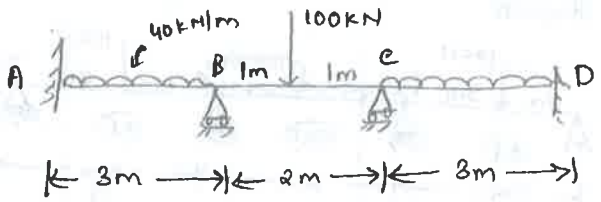

Fig. (i)

Unit-IV

4. (a) Write fundamental equation used in slope deflection method. 2

(b) Analyze the beam shown below using slope deflection method and draw Bending Moment diagram. 7

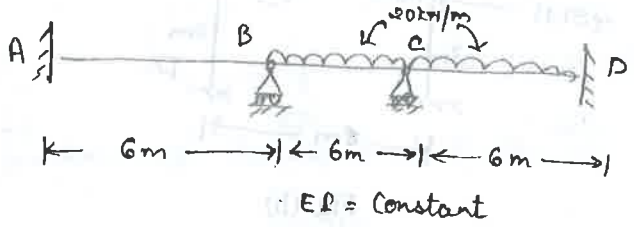

Fig. (j)

(c) Analyze the frame shown in figure by slope deflection method and draw bending moment diagram. 7

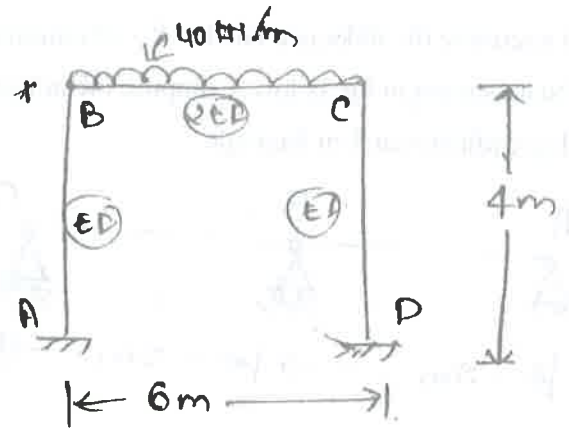

Fig. (k)

(d) What is the basic concept behind the column analogy method? 7

Unit-V

5. (a) Define Muller-Breslau Principles. 2

(b) For the continuous beam shown in figure below, draw the influence line for reaction at A. Indicate the values at every quarter of each span. 7

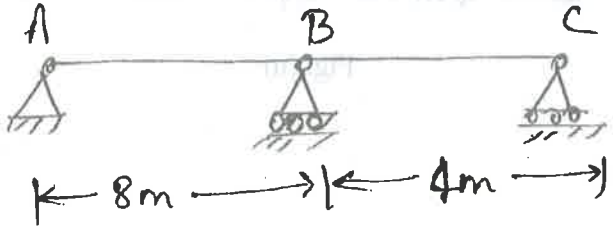

Fig. (*l*)

(c) Determine the influence line for R_A for continuous beam shown in fig. below. Compute the influence line ordinates at 1 m intervals. 7

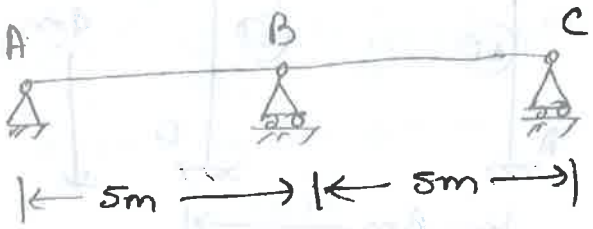

Fig. (m)

(d) Determine the influence line for shown force at D, the mid point of span BC of a continuous beam shown in figure. Compute the influence line ordinate at 1·5 m intervals. 7

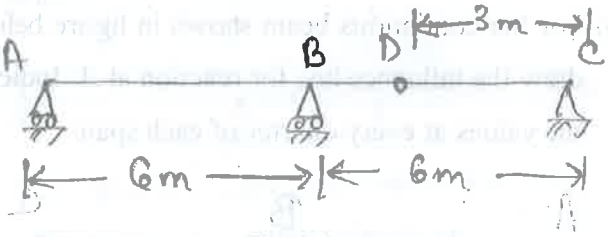

Fig. (n)