KADI SARVA VISHWAVIDYALAYA

B.E. (Civil) Semester-IV Examination, May'2014

Subject Code-CV-405 **Subject: Structural Analysis - II**

Date: 17 / 05 / 2014 **Time: 10:30 am to 1:30 pm** **Total Marks: 70**

Instructions:

(1) Answer each section in separate answer sheet
(2) Use of scientific calculator is permitted
(3) All questions are Compulsory
(4) Indicate **Clearly**, the options you attempt along with its respective questions number.
(5) Use the last page of main supplementary for **rough work**

Section-I

Q-1 **(All Compulsory)**

(A) Explain advantages and disadvantages of a fixed beam. **[5]**

(B) A Fixed beam of 4 m span is carrying a u.d.l. of 10 kN / m over the entire span and a point load of 10 kN at the mid span by Fixed Beam method, if EI = 2500 kNm^2. **[5]**

(C) Determine the reaction components for **fig.1**. by Fixed beam method EI is constant. **[5]**

OR

(C) Determine the reaction components for **fig.11**. by Fixed beam method. EI is constant. **[5]**

Q-2 **Answer the following Questions**

(A) Determine the vertical deflection of joint C of the truss shown in **fig.2** by unit load method. The cross sectional area of each member is 400 mm^2. E = 2 x 10^5 N/mm^2. **[5]**

(B) Draw the influence lines for (i) reaction at B, (ii) and reaction at A, for the beam as shown in **fig.3** . Compute the ordinates at intervals of 2.0 meter. **[5]**

OR

(A) For continuous beam ABC as shown in **fig.4** determine support reactions with the use of Castigliano's theorem. **[5]**

(B) Find the displacement at C, as shown in **fig.13** by using Castigliano's theorem. E = 2 x 10^4 N / mm^2. **[5]**

Q-3 **Answer the following Questions**

(A) State and explain Castigliano's theorems. **[5]**

(B) Generate the influence line diagram for R_A and R_B. Ref. **fig.12** **[5]**

OR

(A) What is Influence line Diagram? Explain its importance in structural analysis. **[5]**

(B) Draw the ILD for reaction at A for a beam shown in **fig.5**. Find the ordinates at 3m intervals. **[5]**

[P.T.O.]

Section-II

Q-4 **(All Compulsory)**

(A) Mention the grade of concrete and grade of steel used in prestressed concrete. **[5]**

(B) A Post-tensioned beam is provided with a cable subjected to an initial stress of 1100 N / mm^2. If a slip of 4.5 mm is observed at the jacking end, find the Percentage Loss of stress due to anchorage slip, if the span of the beam is 18 m. Es = 2 x 10^5 N / mm^2. **[5]**

(C) A beam is pre-stressed by a wire carrying initial pre-stress of 750 N / mm^2. Estimate percentage Loss of pre-stress due to shrinkage of concrete if, (i) beam is pre-tensioned (ii) beam is post-tensioned.; Age of concrete at transfer = 8 Days, Es = 200 KN / mm^2. **[5]**

OR

(C) A Simply supported concrete beam 10 m. span, rectangular in section 600 mm x 900 mm is subjected to prestressing force of 5600 KN at an eccentricity of 200 mm below the centroid of the section. Find top and bottom fiber stresses at transfer and after application of live load of 80 Kn/m. Consider 15% losses. Draw stress distribution diagram at mid span. **[5]**

Q-5 **Answer the following Questions**

(A) Determine the support moments for the continuous beam shown in **fig.6** and draw B.M.Diagram by moment distribution method. **[5]**

(B) Analyse the continuous beam as shown in **fig.7** by slope and deflection and draw bending moment diagram. **[5]**

OR

(A) Analyse the beam ABCD shown in **fig.8** by moment distribution method. **[5]**

(B) Determine the support moments for the continuous beam shown in **fig.6** and draw B.M.Diagram by slope deflection method. **[5]**

Q-6 **Answer the following Questions**

(A) Briefly explain various losses in prestress. **[5]**

(B) Determine the support moments for the continuous girder shown in **fig.9** by Slope deflection method if the support B sinks by 2.50 mm. For all members I = 3.50 x 10^7 mm^4, E = 200 kN/mm^2. **[5]**

OR

(A) Explain carry over factor and distribution factor with illustration. **[5]**

(B) Analyse the continuous beam shown in **fig.10** by moment distribution method. **[5]**

[P.T.O.]

***** All the Best*****

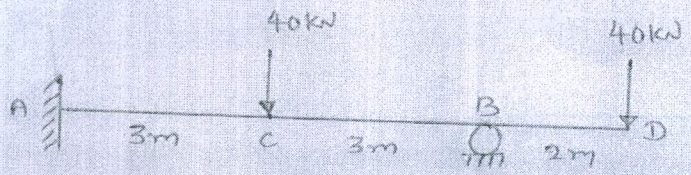


Figure 1

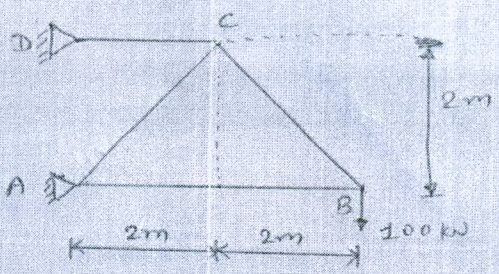
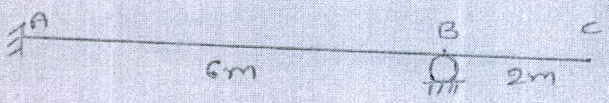


Figure 2



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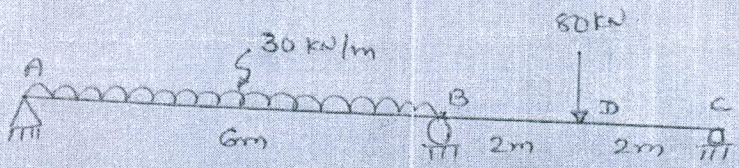


Figure 4

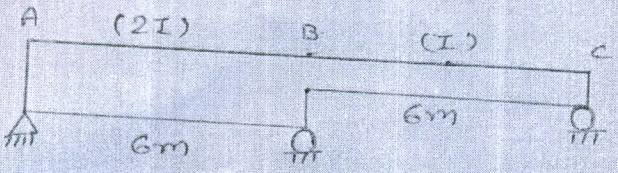
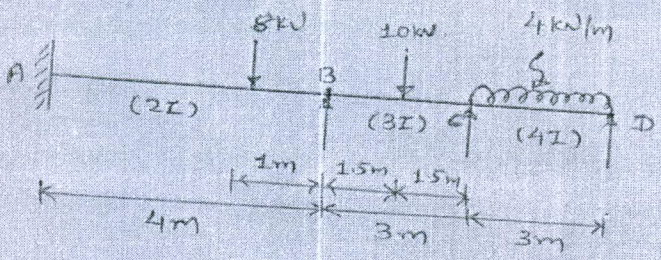


Figure 5



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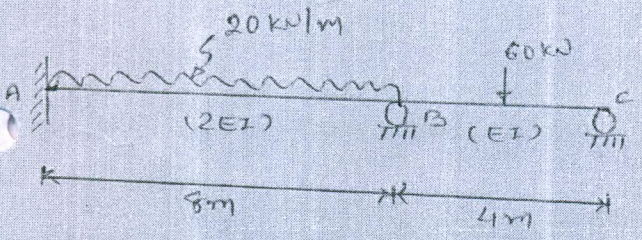


Figure 7

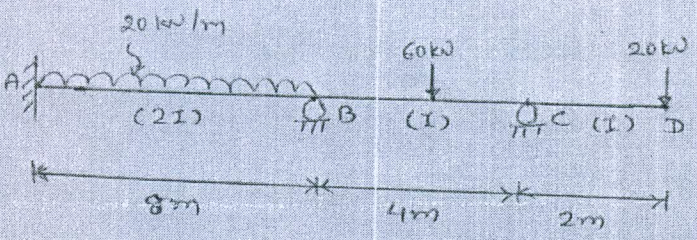


Figure 8

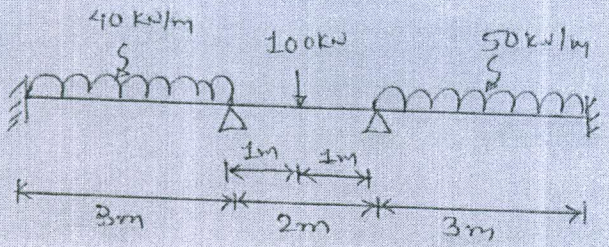


Figure 9

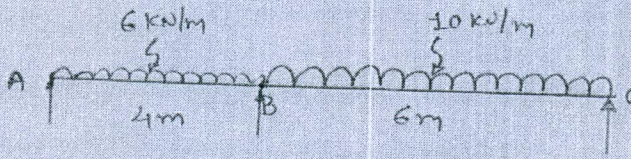


Figure 10

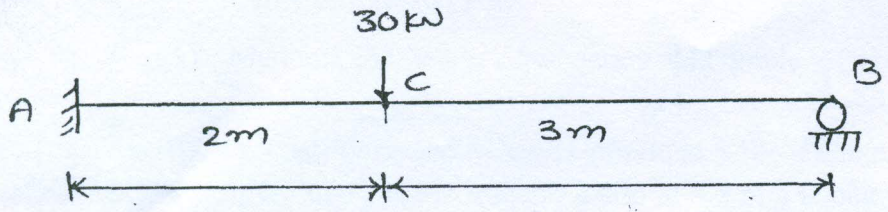


Fig. 11

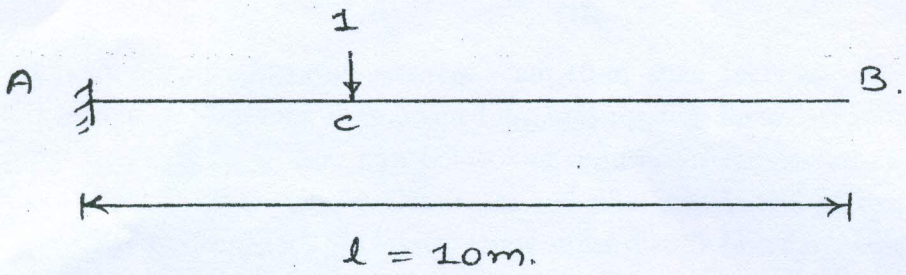


Fig. 12

KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER-IV EXAMINATION NOVEMBER-2014

Subject Code : CV405 **Subject Name: Structural Analysis - II**

Date : 10/11/2014 **TIME : 10:30am To 1:30pm** **Total marks: 70**

Instruction:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly** the options you attempted along with its respective question number
5. Use the last page of supplementary for rough work.

SECTION - I

Q-1 **[A]** Differentiate Statically Determinate and Indeterminate Structures. **[5]**

[B] Analyze the fixed beam shown in **fig.1** using moment area theorem. **[5]**

[C] Analyse the beam shown in **fig.2** by Consistant deformation method. EI is constant. **[5]**

OR

[C] Analyse the propped cantilever beam shown in **fig.3** using Consistant deformation method. **[5]**

Q–2 **[A]** Prove Castigliano's first theorem. **[5]**

[B] Determine the vertical deflection at free end in the overhanging beam as shown in **fig.4** assume EI constant. Use Castigliano's method. **[5]**

OR

Q–2 **[A]** Prove Castigliano's second theorem. **[5]**

[B] Determine the vertical deflection of joint C of the truss as shown in **fig.5** by unit load method. The cross section area of each member is 400 mm^2. $E = 2 \times 10^5$ N/mm^2. **[5]**

Q–3 **[A]** Prove Muller Breslau Principle. **[5]**

[B] Draw Influence line diagram of reaction at B (R_B) for a continuous beam ABC with both span length of 8 m having interval of 2 m using Muller Breslau Principle. **[5]**

OR

Q–3 **[A]** Draw Qualitative I.L.D. for three span continuous beam. **[5]**

[B] Draw the ILD for reaction at A for a beam shown in **fig.6** Find the ordinates at 3 m intervals. **[5]**

[P.T.O.]

SECTION - II

Q-4 [A] Differentiate Pre tensioning and Post tensioning. [5]

[B] A Straight pretensioned concrete beam 15 m long with a cross section of 400 mm x 400 mm is concentrically prestressed with 900mm^2 of steel wires which are anchored to the bulkheads with a stress of 1050 N / mm^2. Determine loss of prestress due to elastic shortening of concrete taking modular ratio as 6. [5]

[C] A Simply supported prestressed concrete beam 10m. span, rectangular in section 600 mm x 900 mm is subjected to prestressing force of 5600 KN at an eccentricity of 200 mm below the centroid of the section. Find top and bottom fiber stresses at transfer and after application of live load of 80KN/m. Consider 15% losses. Draw stress distribution diagram at mid span. [5]

OR

[C] Find loss of prestress due to elastic shortening of concrete, creep of concrete and shrinkage of concrete for rectangular beam of size 230 mm x 450 mm is prestressed with the use of 10 nos. 10 mm diameter bar with centroidal location at 80 mm below centroidal axis of the beam. Take initial prestress of 1600 N/mm^2., characteristic cube strength of concrete is 45 N/mm^2, creep coefficient is 2.2 and E_S = 200 KN / mm^2. [5]

Q–5 [A] Explain how do you account for sway in slope - deflection method for portal frames? [5]

[B] Using Slope deflection method analyse the beam shown in **fig.7**. Take M_fAB = - 160KN.m, M_fBA = 160KN.m, M_fBC = -96 KN.m, M_fCB = 144 KN.m. [5]

OR

Q–5 [A] Derive fundamental equation of Slope deflection method. [5]

[B] Using Slope deflection method, compute the end moments shown in **fig.8** The beam has constant EI for both the spans. [5]

Take M_fAB = - 2.4KN.m, M_fBA = 3.6KN.m, M_fBC = - 5 KN.m, M_fCB = 5 KN.m.

Q–6 [A] Define : Carry over Moment and Carry over factor. [5]

[B] Analyze the beam as shown in **fig.9** by moment distribution method. The beam has constant EI. [5]

OR

Q–6 [A] Define Stiffness and Distribution factor. [5]

[B] Determine the support moments using Moment distribution method for the given beam as shown in **fig.1**. [5]

[P.T.O.]

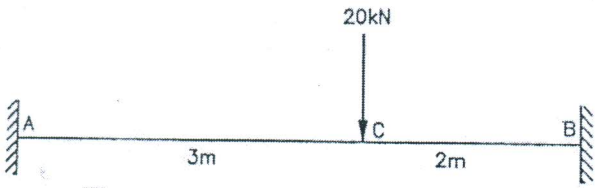


Fig.1

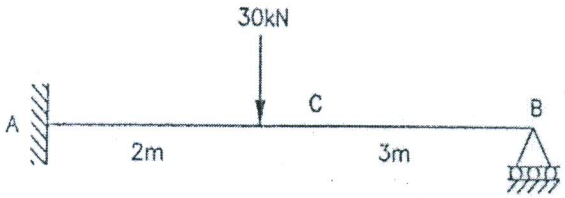


Fig.2

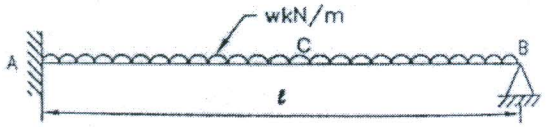


Fig.3

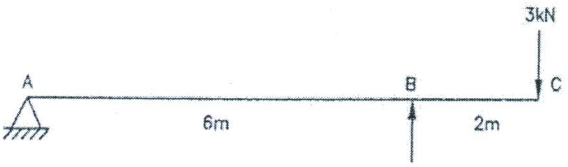


Fig.4

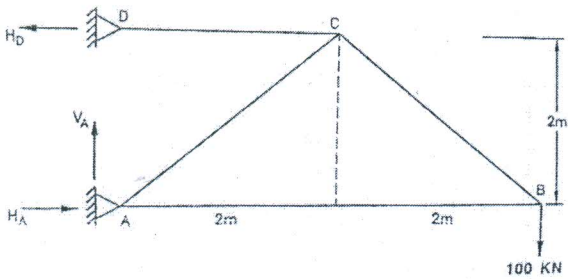


Fig.5

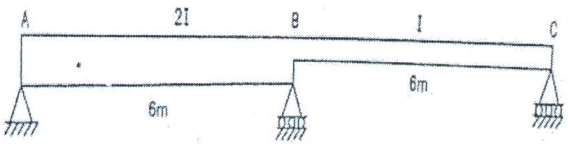


Fig.6

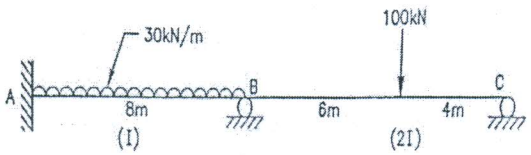


Fig.7

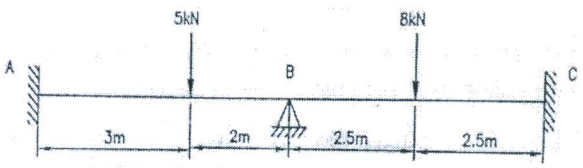


Fig.8

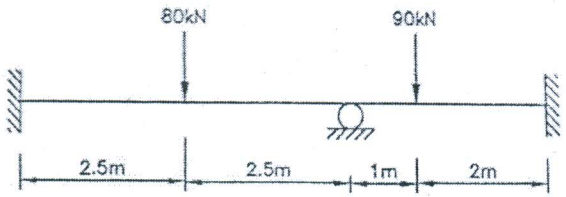


Fig.9

KADI SARVA VISHWAVIDYALAYA

B.E. (Civil) Semester-IV Final Examination, April-May'2015

Subject Code: CV405 **Subject: Structural Analysis II**

Date: 09/05/2015 **Time: 10:30 am to 1:30 pm** **Total Marks: 70**

Instructions:

(1) Answer each section in separate answer sheet
(2) Use of scientific calculator is permitted
(3) All questions are Compulsory
(4) Indicate **clearly**, the options you attempt along with its respective questions number.
(5) Use the last page of main supplementary for **rough work**

Section-I

Q-1 **(All Compulsory)**

(A) Analyse Fixed beam as shown in **Fig.1**.Draw shear force diagram and bending moment diagram. **EI=constant.** **[10]**

(B) Enlist different losses in prestress and explain any one in detail. **[5]**

OR

(B) State and Explain Muller Breslau's principle. **[5]**

Q-2 **Answer the following Questions**

(A) Analyse continuous beam as shown in **Fig.2** by slope deflection method. Draw Shear force diagram and Bending moment diagram. **EI=constant.** **[10]**

OR

(A) Using Castiglano's first theorem, Determine vertical deflection in free end of overhanging beam as shown in **Fig.3. EI=constant.** **[5]**

(B) Explain: (i).Carry over factor (ii).Distribution factor. **[5]**

Q-3 **Answer the following Questions**

(A) Analyse the continuous beam shown in **Fig.4** by moment distribution method. Draw shear force diagram and bending moment diagram. **[10]**

OR

(A) A prestressed concrete beam of section 400 x 600 mm is subjected to prestressing force of 2000 kN at an eccentricity of 100 mm from bottom. It is subjected to live load of 30 kN/m over span of 12 m. Calculate extreme fibre stresses at top and bottom at mid-span at transfer and after the application of live load. Assume total loss of prestress to be 10%.Draw bending stress distribution diagrams. Take unit weight of concrete=24 kN/m^3 **[10]**

Section-II

Q-4 **(All Compulsory)**

(A) Analyse continuous beam as shown in **Fig.5** by any convenient method. Draw shear force diagram and bending moment diagram. **[10]**

(B) Draw **qualitative Influence line diagram** for R_A, R_B,M_A,SF_C,M_C propped cantilever beam shown in **Fig.6** **[5]**

OR

(B) Give advantages and disadvantages of fixed beam. [5]

Q-5 Answer the following Questions

(A) Analyse propped cantilever beam as shown in **Fig.7.Only determine unknowns. EI=constant.** [5]

(B) A concrete beam rectangular section 100 mm wide and 300 mm deep is prestreesed by five wires of 7 mm diameters located at an eccentricity of 50 mm. The initial prestrees is 1200 N/mm^2.Estimate loss of prestress due to creep of concrete. [5]
Creep coefficient=1.6
E_c=35 kN/mm^2.
E_s=210 kN/mm^2.

OR

(A) Draw Influence line diagram for continuous beam as shown in **Fig.8** for R_A, R_B and R_C at 2 m interval. [10]

Q-6 Answer the following Questions

(A) Analyse continuous beam as shown in **Fig.9** by Moment distribution method. **Only determine final moments.** [5]

(B) (i).Bending moment in any section of conjugate beam gives _____in actual beam.(Slope, Deflection, Shear force) [5]

(ii) Castigliano's first theorem is used for _____(Determinate beam, indeterminate beam, determinate and indeterminate beam)

(iii).Shape of bending moment diagram for a cantilever beam subjected to point load at end is a rectangle. (True/False)

(iv).There are two point of contraflexure exist in fixed beam subjected to point load at centre. (True/False)

(v).In moment area method, area of M/EI diagram gives_____.
(Shear force, Bending moment, deflection)

OR

(A) For a propped cantilever beam as shown in **Fig.10,** determine support reactions using Castigliano's second theorem. **EI=constant.** [10]

***** All the Best*****

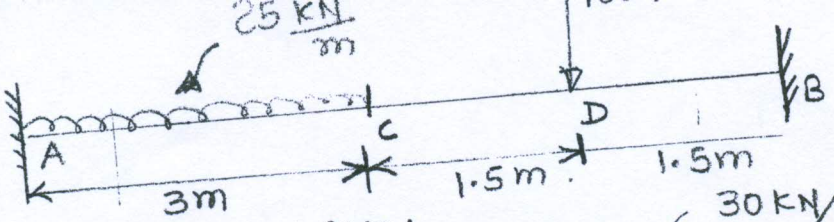


Fig.1

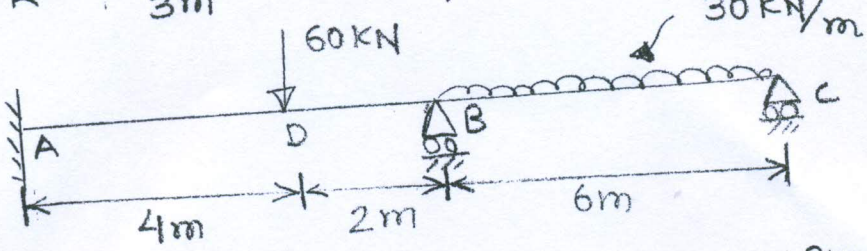
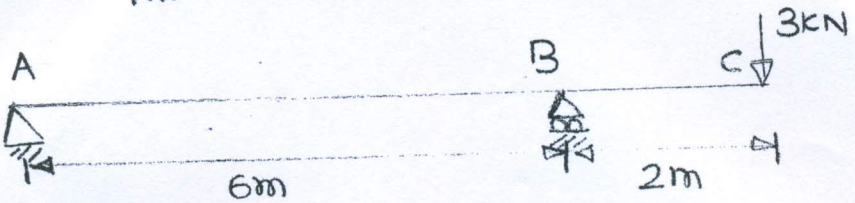


Fig.2



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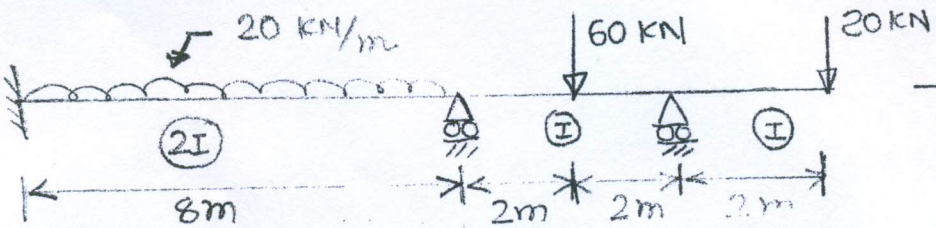

Fig.4

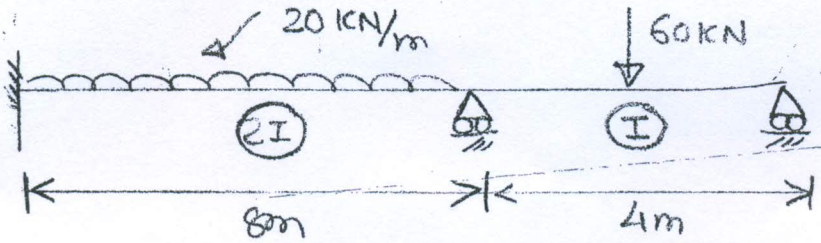

Fig.5

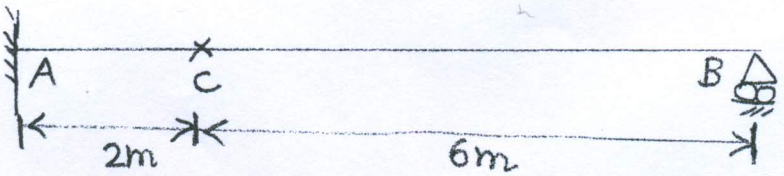

Fig.6

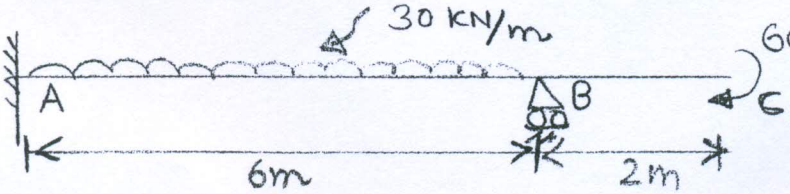

Fig.7

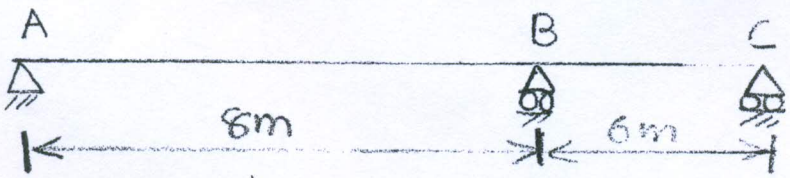

Fig.8

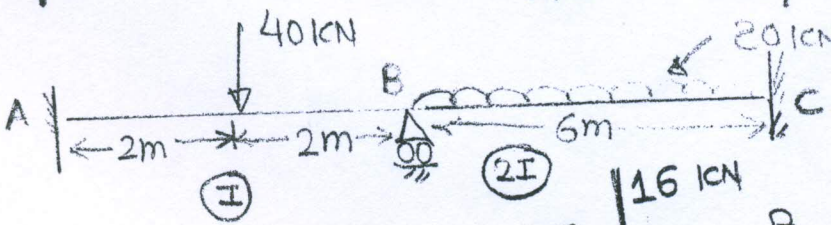

Fig.9

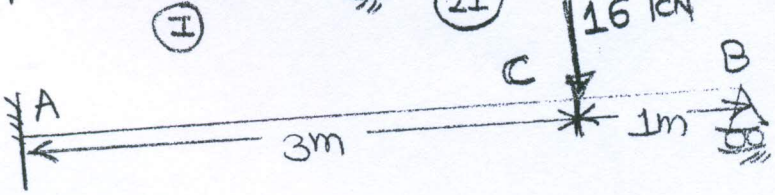

Fig.10

KADI SARVA VISHWAVIDYALAYA

B.E. (Civil) Semester-IV (ATKT) Examination, October'2015

Subject Code: CV405 **Subject: Structural Analysis-II**

Date: 30/10/2015 **Time: 10:30 p.m to 1:30 p.m** **Total Marks: 70**

Instructions:

(1) Answer each section in separate answer sheet

(2) All questions are Compulsory

(3) Indicate **clearly**, the options you attempt along with its respective questions number.

(4) Use the last page of main supplementary for **rough work**

Section-I

Q-1 **(All Compulsory)**

(A) Give advantages and disadvantages of fixed beam. [5]

(B) Enlist losses in prestressed material .Explain any one in detail. [5]

(C) Analyze propped cantilever beam as shown in **Fig.1.** [5]

OR

(C) Explain carry over factor and distribution factor. [5]

Q-2 **Answer the following Questions**

(A) Analyze a beam as shown in **Fig.2** by slope deflection method. Determine final end moments. [10]

OR

(A) Determine unknown reactions for a fixed beam as shown in **Fig.3.** [10]

Q-3 **Answer the following Questions**

(A) Calculate support reactions for a propped cantilever beam of 4 m span carrying point load of 16 kN at 3 m from left support using castiglano's second theorem. [5]

(B) Calculate final end moments for a beam as shown in **Fig.4** using moment distribution method [5]

OR

(A) Find loss of prestress due to elastic shortening of concrete, creep of concrete and shrinkage of concrete for rectangular beam of size 230 mm x 450 mm is prestressed with use of 10 nos. 10 mm diameter bar with location 80 mm below centroidal axis of beam. [10]

Initial prestress=1600 N/mm^2

Cube strength of concrete=45 N/mm^2

Creep coefficient=2.2

Es= 200 kN/mm^2

Section-II

Q-4 **(All Compulsory)**

(A) Differentiate between RCC and prestressed concrete. [5]

(B) Analyze propped cantilever beam as shown in **Fig.5.** [5]

(C) Explain prestressing. Give grade of concrete and steel used in prestressed concrete. [5]

OR

(C) Explain castiglano second theorem . [5]

Q-5 Answer the following Questions

(A) State and explain Muller- Breslau principle. [5]

(B) Calculate deflection at B for a beam as shown **Fig.6** using castiglano first theorem. EI=10 x 10^{13}N.mm^2 [5]

OR

(A) Analyze a beam shown in **Fig.7** by any convenient method. Determine final end moments only. [10]

Q-6 Answer the following Questions

(A) Draw influence line diagram for R_A,R_B, SF_c,M_c for a beam as shown in **Fig.8.**plot values of ordinate at 1 m interval [10]

OR

(A) Analyze fixed beam as shown in **Fig.9**. [10]

***** All the Best*****

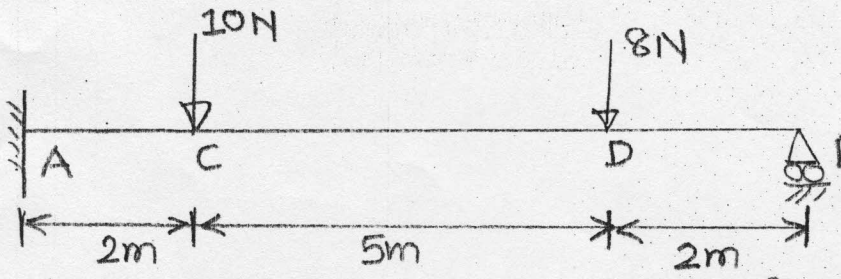

Fig. 1

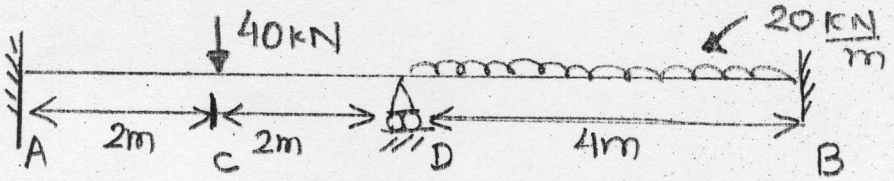

Fig. 2

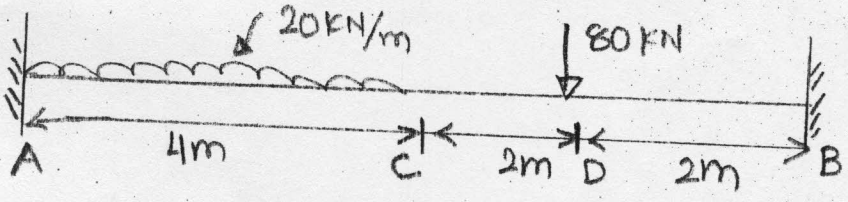

Fig. 3

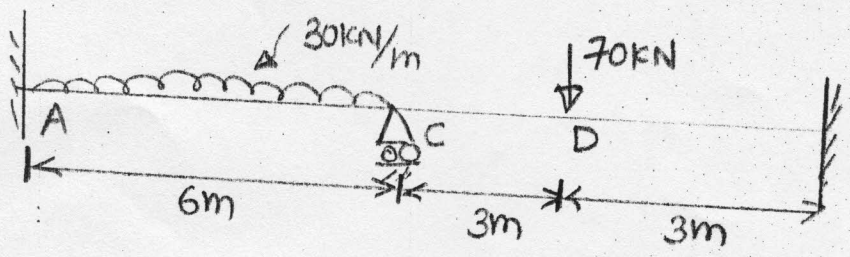

Fig. 4

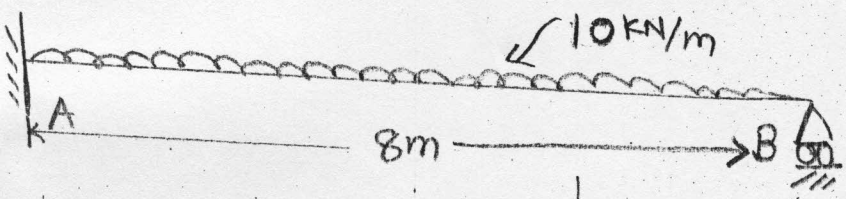

Fig. 5

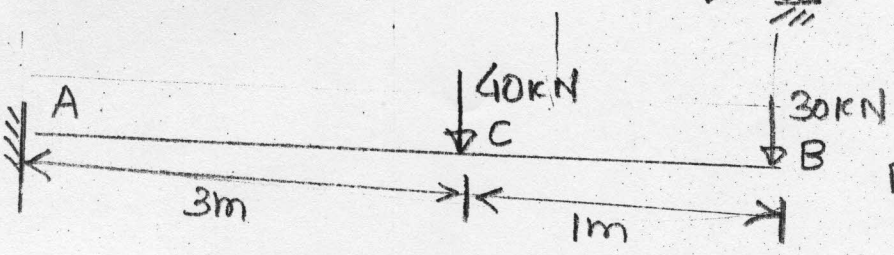

Fig. 6

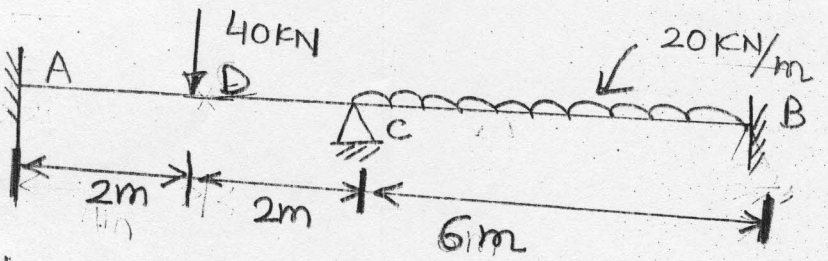

Fig. 7

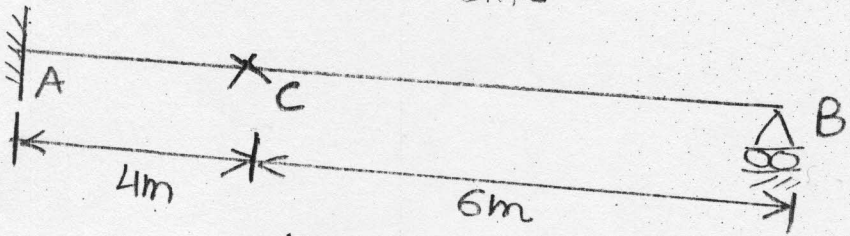

Fig. 8

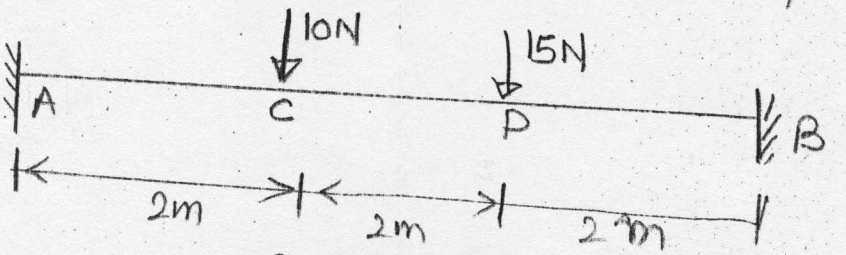

Fig. 9