KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER-V EXAMINATION NOV-2016

Subject Code : CV-506 **Subject Name: Structural Analysis - III**

Date : 22 / 11 /2016 **TIME : 10:30 am to 01:30 pm** **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. Assume Necessary Data.

SECTION - I

Q-1 **[A]** Write the Assumptions of Cantilever Method of Approximate Method of Analysis. **[5]**

[B] Enlist various Nature of Stresses in Spherical Dome and explain about Meridional Thrust and Hoop Compression with Figure. **[5]**

[C] A Roof of hall having diameter 20m is to be covered by a conical dome of 100 mm thickness and 4m rise. Assuming live load and another loads as 1.5 kN/m^2, calculate stresses in the dome. **[5]**

OR

[C] A Spherical dome with a span of 15 m and central rise of 3 m has all inclusive load of 10 kN/m^2. Calculate all the stresses at the mid height. **[5]**

Q–2 A Beam Circular in plan is loaded with UDL of 140 kN/m inclusive of self weight. The Radius of the beam is 5 m. The Beam is supported by six symmetrically placed columns. Draw S.F., B.M. and T,M, diagram for one of the spans. **[10]**

OR

Q–2 A Beam is in the form of quarter circle in plan with both the ends fixed. If the radius of the beam is 4 m and is loaded by a UDL of 30 kN/m, draw the B.M., S.F. and T.M. Diagrams. **[10]**

Q–3 Analyse the RC frame shown in **figure 1** by Approximate method (Portal Method) of Analysis. Draw A.F., S.F. and B.M. Diagrams. **[10]**

OR

Q–3 Analyse the Frame shown in **Figure 2** by Cantilever Method and draw S.F., B.M. , and A.F. Diagrams. **[10]**

[P.T.O.]

SECTION - II

Q-4 **[A]** Write Characteristics of Flexibility Matrix. **[5]**

[B] Write Characteristics of Stiffness Matrix. **[5]**

[C] A Simply supported beam of span L and flexural rigidity EI is subjected to actions as shown in **Figure 3**. Formulate Flexibility and Stiffness Matrices and show that F.S. = 1. **[5]**

OR

[C] For a given beam show that F and S matrices are reciprocal to each other or prove that F x S = Unit Matrix. Refer **Figure 4**. **[5]**

Q–5 Analyse the Beam shown in **Figure 5** by Flexibility Method. Choose M_A and M_B as Redundant. **[10]**

OR

Q–5 Analyse the beam by Flexibility Method. **Figure 6**. **[10]**

Q–6 Analyse the beam shown in **Figure 7** by Stiffness Method. EI = Constant **[10]**

OR

Q–6 For a Structure shown in **Figure 8** calculate the stiffness matrix and load vector. Take H_B (⟶), M_B (Anticlock) and M_C (Anticlock) as Redundant. Also calculate Nodal displacements and hence draw the S.F. and B.M. Diagrams. **[10]**

[P.T.O.]

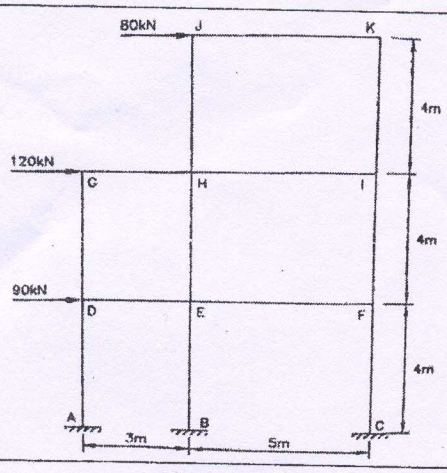

Figure 1

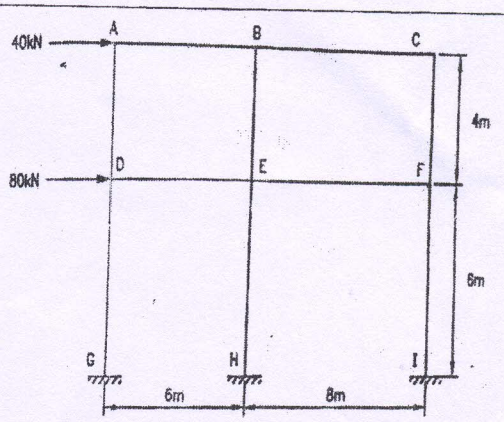

Figure 2

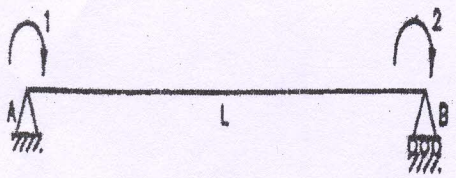

Figure 3

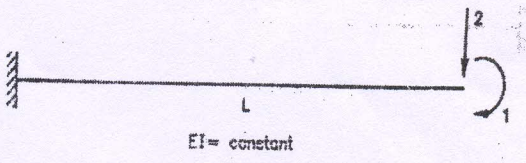

Fig.4

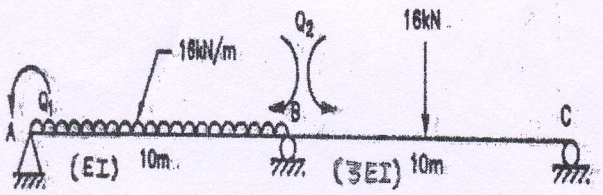

Fig.5

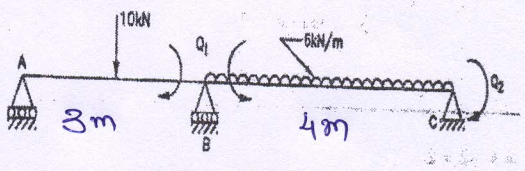

Fig.6

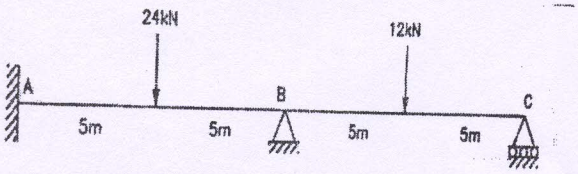

Figure 7

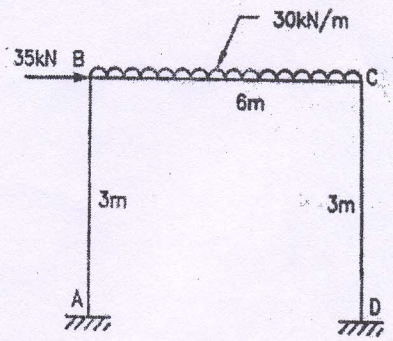

Figure 8

KADI SARVA VISHWAVIDYALAYA

B.E. (Civil) Semester-V Remedial Examination, April'2015

Subject Code: CV506 **Subject: Structural Analysis III**

Date: 25/04/2015 **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 continuous beam shown in **Fig.1** by stiffness matrix method. Draw Shear force diagram and Bending moment diagram. EI= constant. **[10]**

(B) A spherical dome of thickness 105 mm , base diameter 14 m and central rise of 3.5 m as shown in **Fig.2** is subjected to uniformly distributed load of 3.5 kN/m^2 over surface including self-weight .Determine Meriditional and hoop stress at ring beam level. **[5]**

OR

(B) Enlist the difference between stiffness matrix method and flexibility matrix method. **[5]**

Q-2 **Answer the following Questions**

(A) Analyse the frame shown in **Fig. 3** and evaluate approximately the column end moments, beam end moments and reactions by portal method. **[10]**

OR

(A) Analyse the continuous beam as shown in **Fig.4** by flexibility matrix method. Only determine unknowns .EI= constant. **[10]**

Q-3 **Answer the following Questions**

(A) Give aspects of beam curved in plan. **[5]**

(B) Give characteristics of stiffness matrix. **[5]**

OR

(A) A curved beam in circular plan is symmetrically supported on six columns has radius of 6 carries uniformly distributed load of 40 kN/m as shown in **Fig.5**, including self-weight. Calculate Shear force, bending moment and twisting moment at 10^0 intervals. **[10]**

Section-II

Q-4 **(All Compulsory)**

(A) Develop stiffness matrix for frame shown in **Fig.6.** EI=constant. **[5]**

(B) Give different possibility for selection of redundant in fixed beam. **[5]**

(C) Give classification of domes .Also give uses of dome. **[5]**

OR

(C) Differentiate between straight beam and curved beam. **[5]**

Q-5 **Answer the following Questions**

(A) A conical dome has 9 m span and 4.5 m rise. It has a thickness of 100 mm. It is subjected to load of 4900 N/m^2.including self-weight and concentrated load at vertex of 9000 N. Calculate stresses in the dome. **[10]**

OR

(A) Estimate approximate column reactions, beam and column moments using cantilever method of the frame shown in **Fig. 3**. The columns are assumed to have equal cross sectional areas. **[10]**

Q-6 **Answer the following Questions**

(A) Develop flexibility matrix for a frame as shown in **Fig.7** .EI= constant. **[5]**

(B) Analyse continuous beam shown in **Fig.8** by stiffness matrix method. Only determine unknowns. EI=constant. **[5]**

OR

(A) A conical dome of 100 mm thickness and 3.5 m rise is to be used to cover a hall of 20 m diameter. The live of 2 kN/m^2 is acting over dome surface. Calculate Meridional stress and hoop stress at base of dome. Density of concrete is $25kN/m^3$. **[5]**

(B) Show forces develop for a beam curved in plan with neat sketch. **[5]**

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

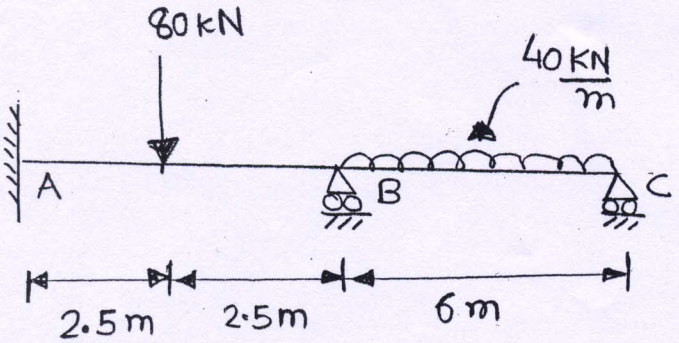

Fig.1

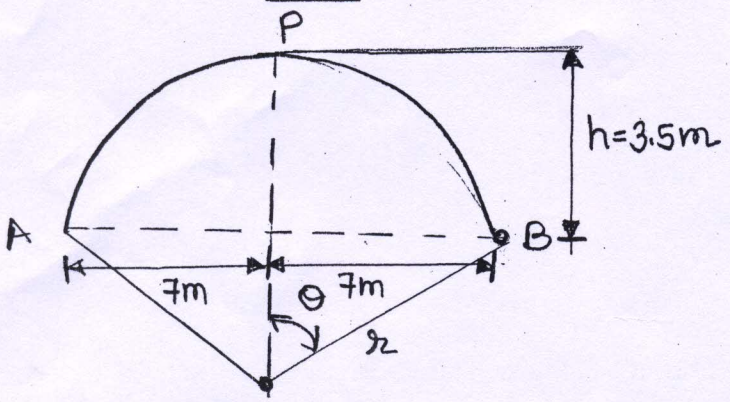

Fig.2

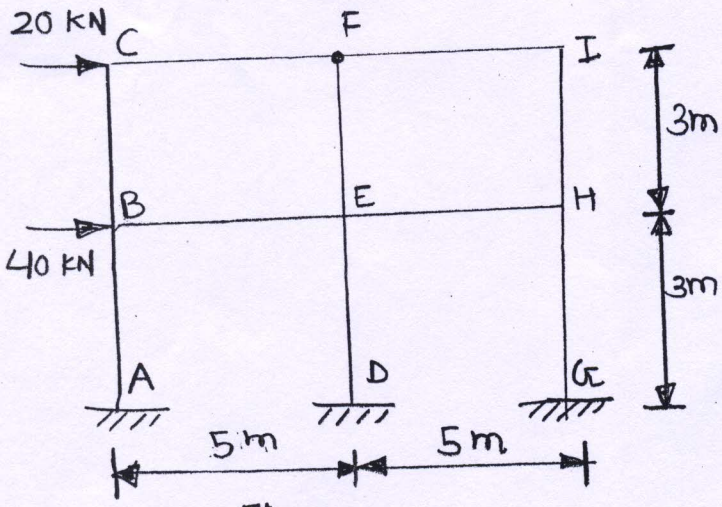

Fig.3

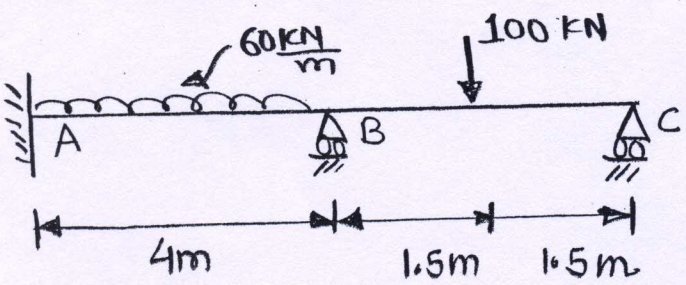

Fig.4

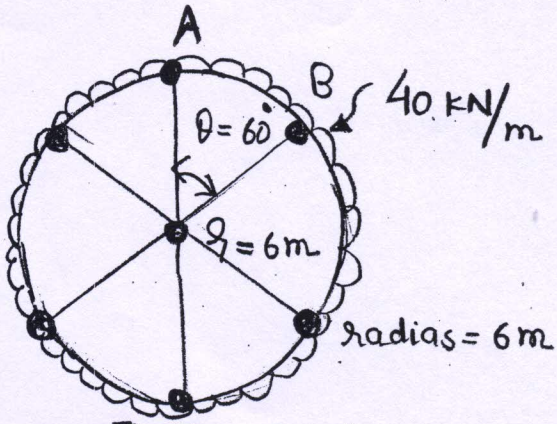

Fig.5

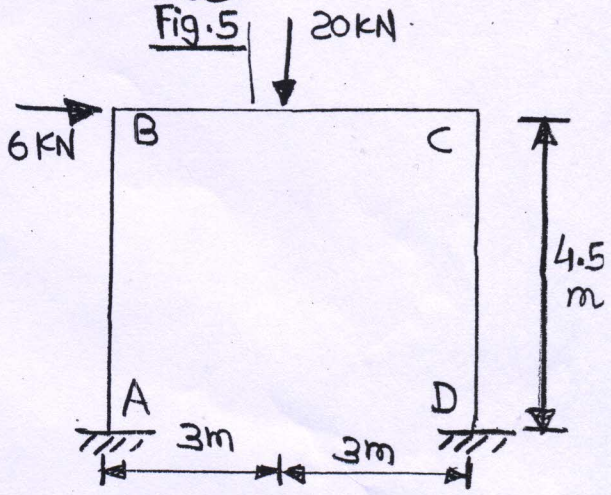

Fig.6

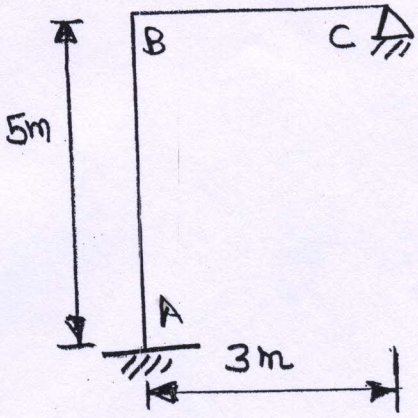

Fig.7

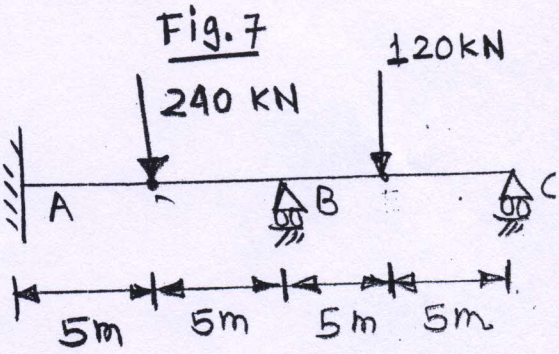

Fig.8

KADI SARVA VISHWAVIDYALAYA

B.E. V Semester Examination (NOV-2014)

SUBJECT CODE: CV 506 SUBJECT NAME: STRUCTURAL ANALYSIS III

DATE: 24/11/2014 TIME: 10:30 AM TO 1:30 PM TOTAL MARKS: 70

Instruction: (1) Answer each section in separate answer sheet.
(2) Use of Scientific calculator is permitted.
(3) Assume the data if it is required.

SECTION-I

Q.1 A. Draw all possibilities to convert fixed beam in to a determinate beam. 5

B. Why stiffness method is most suitable for computer program? Explain with example. Draw neat sketches for your example 5

C. Generate flexibility matrix for the figure (Q.1-C) 5

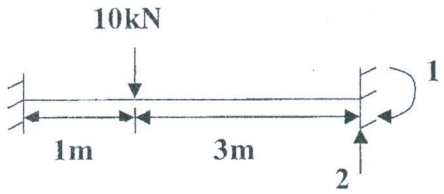

Figure (Q.1-C)

OR

C. Generate load matrix for figure (Q.1-C) 5

Q.2 A. Draw shear force and bending moment diagram for the figure (Q.2-A) using flexibility method 10

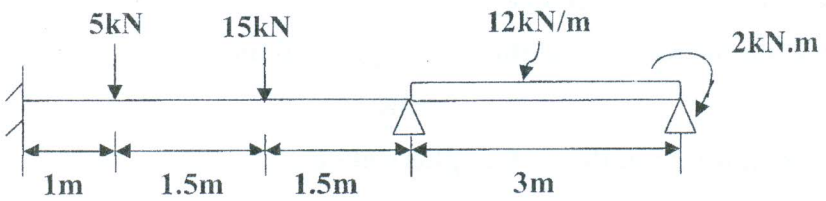

Figure (Q.2-A)

OR

A. Draw shear force and bending moment diagram for the figure (Q.2-A) using stiffness method. 10

Q.3 A. Draw shear force and bending moment diagram for figure (Q.3-A) 10

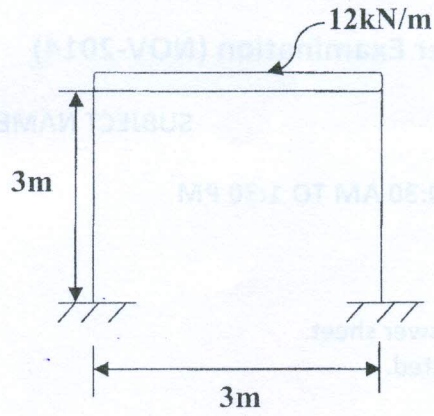

Figure (Q.3-A)

OR

A. Find member forces in all members of truss of figure (Q.3-A'). 10

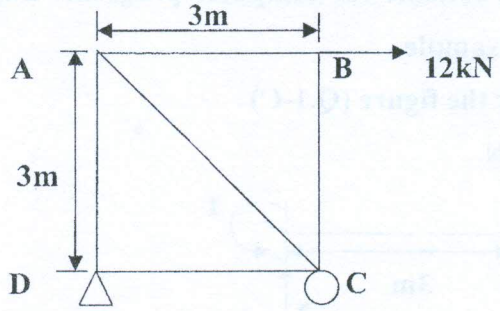

Figure (Q.3-A')

SECTION – II

Q.4 A. Differentiate beam straight in plan and beam curved in plan. 5

B. Differentiate Dome and regular slab. 5

C. Derive Expression for meridonial thrust for spherical dome. 5

OR

C. Derive Expression for hoop thrust for spherical dome. 5

Q.5 A. Draw shear force and bending moment diagram for figure (Q.5-A) using portal method. 10

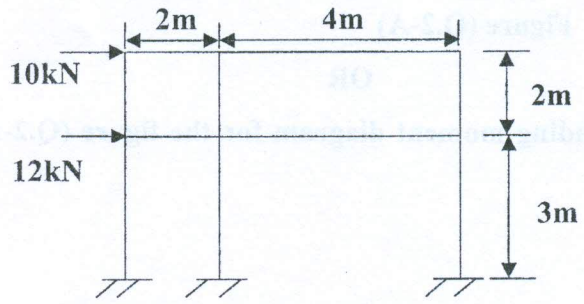

Figure (Q.5-A)

OR

A. Draw shear force and bending moment diagram for figure (Q.5-A) using cantilever method. 10

Q.6 A. Find meridonial thrust and hoop force at bottom of concrete spherical dome of diameter 20m and rise 4m. Thickness of the dome is 100mm. Live load on the dome is $4kN/m^2$. 5

B. A circular beam curved in plan is subjected to UDL of 100 kN/m. The radius of beam is 6m, and the beam is supported by eight symmetrically placed columns. Draw SFD, BMD, TMD. 5

OR

A. Find meridonial thrust and hoop force at bottom of concrete conical dome of diameter 20m and rise 4m. Thickness of the dome is 100mm. Live load on the dome is $4kN/m^2$. 5

B. A beam is in the form of a quarter circle in plan with both the ends fixed. If the radius of beam is 4m and is loaded by UDL of 15kN/m. Draw SFD, BMD and TMD. 5

****** ALL THE BEST ******

KADI SARVA VISHWAVIDYALAYA

B.E. (Civil) Semester-V Examination, November'2015

Subject Code: CV506 **Subject: Structural Analysis-III**

Date: 30/11/2015 **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) Enlist the difference between stiffness matrix method and flexibility matrix method. [5]

(B) Formulate load vector and stiffness matrix for a beam as shown in **Fig.1.** [5]

(C) Give uses of dome and beam curved in plan. [5]

OR

(C) A spherical dome with span of 14 m and central rise of 3.5 m supports total uniformly distributed load of 3.5 kN/m^2 over surface inclusive of self weight. Find out meridional thrust and hoop stress at ring beam level. Assume dome thickness 105 mm. [5]

Q-2 **Answer the following Questions**

(A) Analyze the continuous beam as shown in **Fig.2** by stiffness matrix method. Draw shear force diagram and bending moment diagram. [10]

OR

(A) A rectangular beam curved in plan of size 400 mm x 1000 mm depth is a circular arc subtending angle of 45^0 at centre and fixed at two ends. It is loaded with uniformly distributed load of 150 kN/m. Radius of the beam is 3.6 m. Take G= 0.4 E for concrete. Draw shear, moment and torque diagrams. [10]

Q-3 **Answer the following Questions**

(A) Derive equation for hoop stress and meridional stress for conical dome subjected to point load at vertex. [5]

(B) Formulate flexibility matrix for a beam as shown in **Fig.3.** [5]

OR

(A) Analyze the beam as shown in **Fig.4** by flexibility matrix method. Determine end moments only. [10]

Section-II

Q-4 **(All Compulsory)**

(A) A conical dome having 8 m span and 4 m rise is subjected to a load of 5 kN/m^2 including self weight and concentrated load at vertex is 10 kN. Calculate stresses in dome. Thickness of dome is 100 mm. **[5]**

(B) A curved beam circular in plan symmetrically supported on six columns has radius of 6 m carries uniformly distributed load of 40 kN/m including self weight. Calculate shear force and bending moment at 10° interval **[5]**

(C) Analyze a frame as shown in **Fig.5** by flexibility matrix method only determine unknown redundant. **[5]**

OR

(C) Determine DQL (displacement in basic determinate structure due to given loading) matrix for a frame as shown in **Fig.6.** **[5]**

Q-5 **Answer the following Questions**

(A) Fill the blanks. **[5]**

(i)._____ approach of stiffness method is suitable for computer program.
(Member, Direct)

(ii)._____ method is known as compatibility method.
(Slope deflection, Stiffness, Flexibility)

(iii).Construction material used for dome of Taj Mahal _____(Masonary, RCC ,stone)

(iv):Principal diagonal stiffness coefficients are _____.
(always positive, always negative, may be positive or negative)

(v).Centre of Gravity of loads for beam curved in plan lies on_____.
(line joining of supports, on axis of beam, away from axis of beam)

(B) A conical dome has following details. **[5]**
Span of dome = 18 m.
Rise = 3 m.
Live load = 1.5 kN/m^2.
Calculate maximum meridional thrust and hoop force in dome.

OR

(A) Analyse a frame as shown in **Fig.7** by stiffness matrix method. Draw SFD and BMD. **[10]**

Q-6 **Answer the following Questions**

(A) Analyse the frame shown in **Fig.8** and evaluate approximately the column end moments, beam end moments and reactions. Use portal method. **[10]**

OR

(A) Analyse the frame shown in **Fig.8** and evaluate approximately the column end moments, beam end moments and reactions. Use cantilever method. **[10]**

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

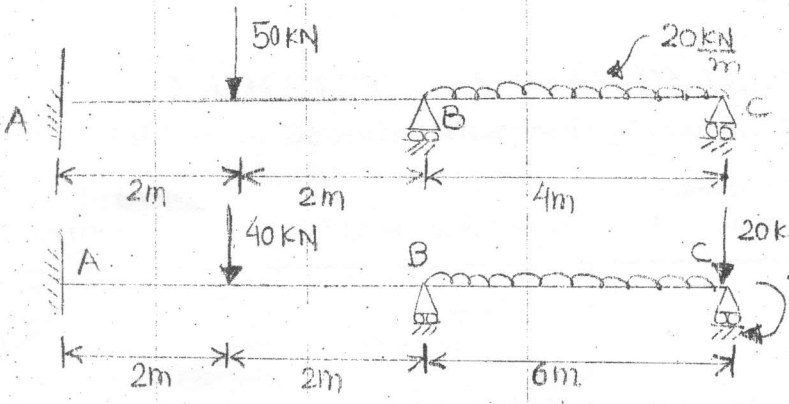

Fig. 1

Fig. 2

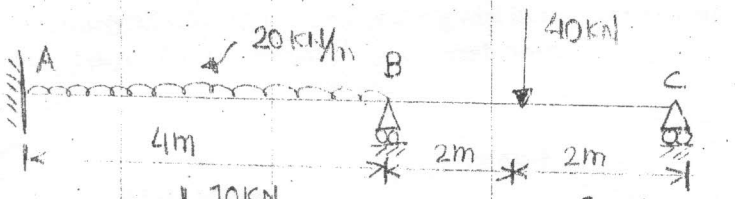

Fig. 3

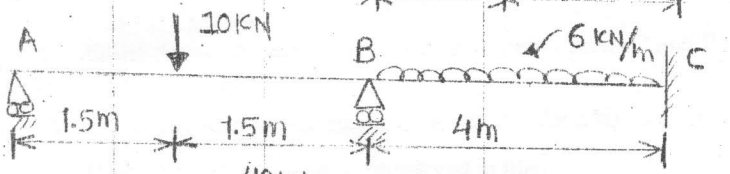

Fig. 4

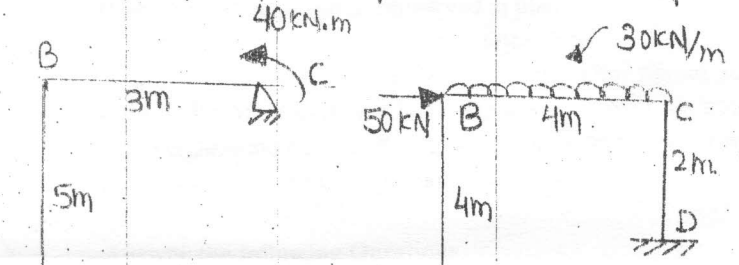

Fig. 6

Fig 5

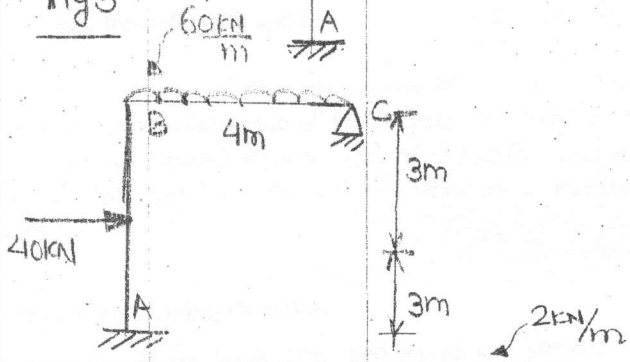

Fig. 7

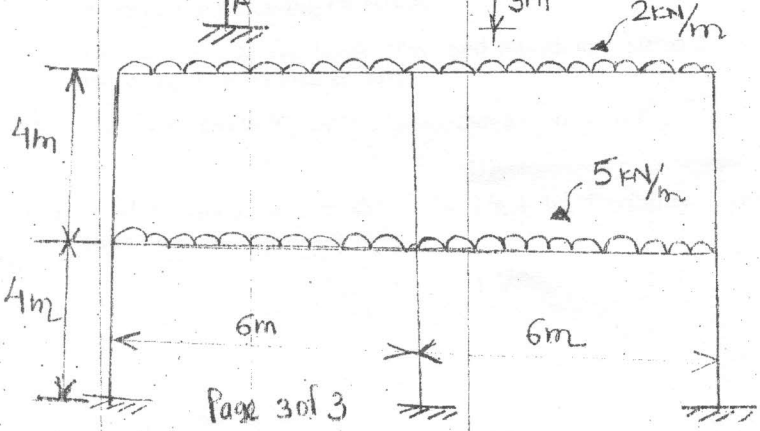

Fig. 8