

Code No: 126AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech III Year II Semester Examinations, May - 2016

ENVIRONMENTAL ENGINEERING

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) What are the components of a water supply system? [2]
- b) List four factors affecting per capita water demand. [3]
- c) What is the purpose of coagulation? [2]
- d) List out four coagulants used in treatment of water. [3]
- e) How do you quantify Sewage? [2]
- f) What are the factors affecting the selection of materials for sewer construction? [3]
- g) Distinguish between unit operations and unit processes. [2]
- h) What are the objectives of grit removal? [3]
- i) What is the role of algae in aerobic pond? [2]
- j) What is the role of acetogenic bacteria in anaerobic digestion? [3]

PART B

(50 Marks)

- 2.a) What is the importance of public water supply schemes in the present day life?
- b) Draw the flow diagram of a typical water supply scheme using an impounded reservoir as the source of water supply and show there the different works involved. [5+5]

OR

- 3.a) How the quantity of water required for a town is estimated while designing the water supply scheme for the same?
- b) Given the following data, calculate the population at the end of next three decades by Decreasing rate method. [5+5]

Year	1980	1990	2000	2010
Population	90000	140000	188000	328580

- 4.a) What is Disinfection? Explain the Break Point Chlorination.
- b) Design a set of rapid sand filters for treating water required for a population of 50000. The rate of supply being 180 lpcd. The filters are rated to work at 5000 liters/hour/sq.m. Assume any other suitable data required. [5+5]

OR

- 5.a) Compare the design and working features of the slow sand filter and rapid sand gravity filter.
- b) Design coagulation cum sedimentation tank for a population of 1 lakh persons with a water supply of 150 LPCD. Assume any other suitable data required, [5+5]

- 6.a) What do you mean by variation in flow of sewage? Explain average flow, dry weather flow, and maximum flow.
- b) A 30 cm dia sewer with an invert slope of 1 in 400 is flowing $1/3^{\text{rd}}$ of the full depth. Calculate the velocity and the rate of flow in the sewer. Is it self-cleaning velocity? Use $n=0.015$. [5+5]

OR

- 7.a) Explain the importance of determination of solids in sewage. How do you determine the suspended solids in a given sample of waste?
- b) The 3 day 37°C BOD of a sample of sewage is 300 ppm. What will be its 10 days – 20°C BOD and 5 day 30°C BOD? [5+5]

- 8.a) What do you understand by secondary treatment (or biological treatment) of wastewater? Enumerate various treatment techniques used for biological treatment.
- b) A sedimentation tank treats 8 mLd containing 240 mg/l of suspended solids. The tank removes 65% of the suspended solids. Compute the weight and volume of the sludge produced yearly if the moisture content is (i) 97% (ii) 94% [5+5]

OR

- 9.a) Differentiate between aerobic and anaerobic treatment of sewage, giving major end products. Name one treatment method in each category.
- b) Estimate the solids production from a trickling filter plant treating $1000\text{ m}^3/\text{day}$ with a BODs of 200 mg/l and SS of 250 mg/l. Assume that primary clarification removes 30 percent of the BOD and 60 percent of the influent solids. [5+5]

- 10.a) What do you understand by 'digestion of sludge'? Differentiate between anaerobic and 'aerobic digestion'. Explain the mechanism of anaerobic digestion.
- b) Explain, with the help of a flow chart, various processes involved in sludge treatment and disposal. [5+5]

OR

- 11.a) Write a note on sludge conditioning. Why elutriation is necessary before chemical conditioning?
- b) Design an oxidation pond for treating sewage for a town of 20,000 persons. [5+5]
Sewage flow = 200 lpcd
BOD of raw sewage = 300 mg/l
Organic loading rate = 300kg/hectare/day.
Depth of pond = 1.2m

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Code No: 126AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech III Year II Semester Examinations, May - 2016

TRANSPORTATION ENGINEERING – I

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A**(25 Marks)**

- 1.a) Classify the road systems at regional/ national and urban level. [2]
- b) What are the factors effecting highway alignment? [3]
- c) What are the design issues in highway geometrics? [2]
- d) How do you frame design controls in geometrics of highway explain from each feature with specification? [3]
- e) What are the different traffic signs and their relevance? [2]
- f) Present different types of road markings, their specifications and their relevance. [3]
- g) Draw and explain different types of grade separated interchanges. [2]
- h) Draw typical conflict points in an intersection and suggest different types of treatments. [3]
- i) Present different types of pavement failures. [2]
- j) Draw the cross sectional view of joints and filler in concrete pavements. [3]

PART - B**(50 Marks)**

- 2.a) Present on different road developments in India.
- b) What are the different road network patterns and explain their benefits? [5+5]

OR

- 3.a) Present on Engineering surveys to be conducted for highway construction.
- b) Present the different drawings to be developed for facilitating to construct a highway. [5+5]

- 4.a) Develop the equation form for super elevation design.
- b) What is the IRC suggested approach for super elevation implementation? [5+5]

OR

- 5.a) Develop the equation form for Extra widening at transition curve.
- b) Develop the equation forms for designing the different vertical curves. [5+5]

- 6.a) Explain the survey procedure for speed studies and present the different forms of representation.

- b) What are the different types of parking surveys and explain them in detail? [5+5]

OR

- 7.a) Present on accident record form and different processing diagrams to analyze accidents.

- b) Present the design procedure of isolated traffic signal. [5+5]

- 8.a) Present the different types of islands and their functionality in reducing the conflicts.
b) Present the design procedure of rotary as traffic Control Island. [5+5]
- OR**
- 9.a) What are the requirements of at grade intersection?
b) Present on different types of intersections. [5+5]
- 10.a) Present the construction procedure of any black top road?
b) Present the test procedures to characterize the highway materials? [5+5]
- OR**
- 11.a) Present the construction procedure of cement concrete road?
b) Present the construction procedure of concrete joints? [5+5]

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Code No: 126DV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech III Year II Semester Examinations, May - 2016

FOUNDATION ENGINEERING

(Common to CE, CEE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) What are the sampling methods. [2]
- b) Give the preparation of soil investigation report. [3]
- c) List out the types of slope failures. [2]
- d) Define the factor of safety for an infinite slope. [3]
- e) What are the assumptions of Coulombs theory? [2]
- f) Describe the MSE walls. [3]
- g) Differentiate between Shallow and deep foundations. [2]
- h) Explain settlement in pile foundation. [3]
- i) What do you mean by sinking of wells? [2]
- j) Discuss about tilt and shift. [3]

PART - B

(50 Marks)

- 2.a) Explain the need for soil exploration.
- b) Discuss the soil exploration methods.
- c) What is boring and sampling? [3+4+3]

OR

- 3.a) Discuss the boring methods
- b) Write the bore log report for soil investigation. [5+5]

4. A homogeneous dam section is 25m high with upstream slope of 2.5 to 1.0 and downstream slope of 2 to 1. There is a 12m long horizontal filter at the downstream end. Taking a free board of 3m determine a) Factor of safety of downstream slope under steady seepage conditions, b) factor of safety of upstream slope under sudden drawdown conditions. Using Bishops simplified method. [5+5]

OR

5. A vertical cut of 10m is made in a soil deposit, $\gamma=19 \text{ kN/m}^3$, $c=30 \text{ kN/m}^2$, $\phi=0^\circ$. There is a hard stratum below the original soil surface at a depth of 12m. Find the safe slope of cutting if the factor of safety is 1.50 for $D_f=1.20 \text{ m}$. Use Stability Charts. [10]

6. A retaining wall with a vertical back 6 m high supports a cohesionless backfill of unit weight 19.6 kN/m^3 . The upper surface of the backfill rises at an angle of 10° with the horizontal, from the crest of the wall. The angle of internal friction for the soil is 35° and the angle of wall friction is 20° . Find the total active pressure per metre length of the wall and mark the direction of point of application of the resultant pressure. [10]

OR

7. A retaining wall has a smooth vertical back and is 8.5m in height. It retains a horizontal backfill of sand with $\phi=33^\circ$. Find out the total active earth pressure per meter length of wall, if $\gamma=18 \text{ kN/m}^3$ and $\gamma_{\text{sat}}=20 \text{ kN/m}^3$.

a) The water table is far below the base of the wall

b) The water table rises upto 4.0 m level above the base.

[5+5]

8.a) Describe the types of foundation and discuss the selection criteria of a foundation.

b) For a continuous foundation of 0.9m depth and 1.2m width, using Terzaghi's bearing capacity factors determine the gross allowable load per unit area that the foundation can carry. Given $\gamma=18 \text{ kN/m}^3$, $c'=10 \text{ kN/m}^2$, $\phi'=20^\circ$, Factor of safety=3. Assume general shear failure.

[5+5]

OR

9.a) Discuss different methods for the installation of piles. How would you estimate the load carrying capacity of a pile in cohesionless soils?

b) Design a friction pile group to carry a load of 3500 kN including the weight of pile cap, at a site where the soil is uniform clay to a depth of 10 m underlain by rock. The average compressive strength of clay is 50 kN/m^2 . The clay may be assumed to be of normal sensitivity and normally loaded with a liquid limit of 70%. Adopt a factor of safety 2.5 against shear failure.

[5+5]

10.a) What are the forces acting on well foundation.

b) What are the problems encountered in well sinking.

c) Give the measures for rectifying tilts and shifts.

[3+3+4]

OR

11.a) With a neat sketch, state different components of a well foundation.

b) What are types of well foundations? Discuss different shapes of well foundations. [5+5]

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Code No: 126DX

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech III Year II Semester Examinations, May - 2016

PRINCIPLES OF ENTREPRENEURSHIP

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) Explain the success of business model of Uber and OYO rooms. [2]
- b) How is an entrepreneur different from a Manager? [3]
- c) How would you use internet to market a product like ladies foot wear? [2]
- d) Imagine that you are in fast food business having your operations near JNTU campus. Now that you want to expand your business near to corporate offices, what strategies would you adopt for expansion? [3]
- e) What is the role of Technical Consultancy Organization? [2]
- f) State the need for Khadi and Village Industries commission. [3]
- g) For a mobile phone costing Rs. 55,000 who would be your market segment? Justify. [2]
- h) What is ABC analysis? How does it help in inventory control? [3]
- i) Define available surplus as per payment of bonus act. [2]
- j) When does the liability for payment of compensation to worker arises? [3]

PART - B

(50 Marks)

2. Explain the different sources of business Idea. [10]
- OR**
3. Who is your role model entrepreneur? Outline the entrepreneur traits of your role model entrepreneur. [10]
 4. What is e-commerce? What advantages do you have when using e-commerce? [10]
- OR**
5. State the different sources of Finance. Explain merits and demerits of different sources of finance. [10]
 6. Explain the role of State financial corporation in development of small entrepreneurs. [10]
- OR**
7. State the objectives and functions of, Small Industries Service Institute. [10]

8. What are the different pricing methods? Explain the pricing strategy for electronic goods. [10]
- OR**
9. What is channel of distribution? Explain different channels of distribution. [10]
10. Explain the provisions relating to safety as per Factories Act. [10]
- OR**
11. Define the terms: a) Lay off b) Lock out c) Settlement d) Strike as per industrial dispute act. [10]

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Code No: 126DY

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech III Year II Semester Examinations, May - 2016

STEEL STRUCTURES DESIGN AND DRAWING

(Common to CE, CEE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Note: Use of IS 800-2007 and Steel tables is allowed:**PART - A****(25 Marks)**

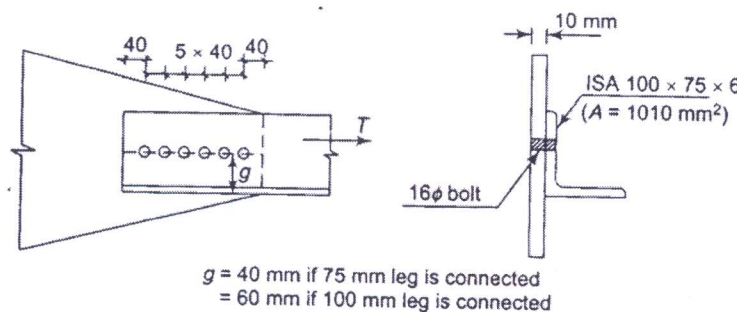
- What are the load combinations for design purposes? [2]
- Mention the advantages and disadvantages of welded connections. [3]
- State four standard support conditions of compression members and state corresponding expressions for effective length. [2]
- Name the lateral systems that are used in compound beams and which is the mostly used one. [3]
- What is the maximum deflection that is to be allowed in steel beams? [2]
- What are laterally supported beams? [3]
- What is stiffened seat connection? [2]
- What is web angle connection? [3]
- Mention basic design assumptions of plate girder. [2]
- What is the purpose of providing bearing stiffener in plate girders? [3]

PART - B**(50 Marks)**

- Two plates 10 mm and 18 mm thick are to be joined by a double cover butt joint. Assuming cover plates of 8 mm thickness, design the joint to transmit a factored load of 500 KN. Assume Fe 410 plate and grade 4.6 bolt. Assume the thickness of packing plate as 8 mm. [10]

OR

- A single unequal angle $100 \times 75 \times 6$ is connected to a 10 mm thick gusset plate at the ends with six 16 mm diameter bolts to transfer tension as shown in figure-1. Determine the design tensile strength of the angle assuming that the yield and the ultimate stress of steel used are 250 MPa and 410 MPa if the gusset is connected to the 100 mm leg. [10]

**Figure-1**

4. Design a column having an effective length of 6 m and subjected to a factored axial load of 2400 KN. Provide the channels back to back connected by welded battens. Assume Fe 410 grade steel. Sketch the details of the section. [10]

OR

5. Design a slab base for a column ISHB 350 carrying an axial factored load of 1200 KN. M25 concrete is used for the foundation. Provide welded connection between column and base plate. Sketch the column base. Sketch the details of the section. [10]
6. A simply supported steel joist of 4 m effective span is laterally supported throughout. It carries a total uniformly distributed load of 40 KN inclusive of self-weight. Design an appropriate section using steel of grade Fe 410. Sketch the details of the section. [10]

OR

7. Design I section purlin for a trussed roof for the following data:
 Span of roof = 10 m
 Spacing of purlins along slope or truss = 25 m
 Spacing of truss = 4 m
 Slope of roof truss = 1 vertical to 2 horizontal
 Wind load on roof surface normal to roof = 1100 N/m²
 Vertical load from roof sheet = 150 N/m². Sketch the details of the roof. [10]
8. Determine the safe load P that can be carried by the joint shown in figure -2. The bolts used are 20 mm diameter of grade 4.6. The thickness of the flange of I-section is 9.1 mm and that of bracket plate 10 mm. [10]

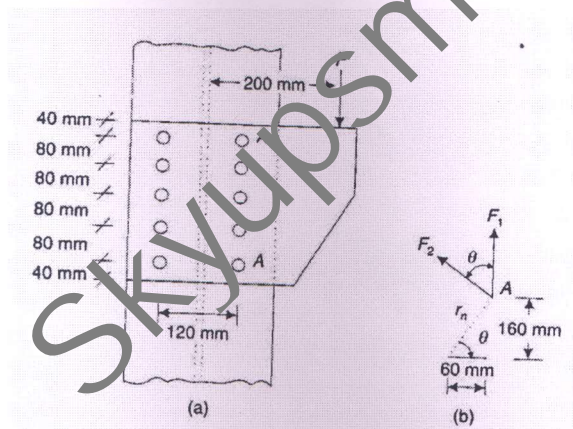


Figure-2
OR

9. Design a stiffened seat angle for a reaction of 250 KN from a beam of ISMB 400 using M20 bolts of grade 4.6. The beam has to be connected to ISMC 200 column. Assume $f_y = 410$ MPa. [10]
10. Design a welded plate girder of span 24 m to carry a superimposed load of 35 KN/m. Avoid use of bearing and intermediate stiffeners. Assume $f_y = 250$ MPa. Draw the cross section and longitudinal elevation of plate girder. [10]

OR

11. A plate girder is made of 500 mm x 30 mm flanges with 10 mm thick web. The overall depth is 1560 mm. The girder has to carry a factored shear of 1500 KN. Assuming the tension field action is not utilized in the design; determine whether intermediate stiffeners are necessary? If intermediate stiffeners are to be provided, what would be the thickness of web? $f_y = 250 \text{ N/mm}^2$. Draw the cross section and longitudinal elevation of plate girder. [10]

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No: 126DZ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech III Year II Semester Examinations, May - 2016

STRUCTURAL ANALYSIS - II

(Common to CE, CEE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A (25 Marks)

- 1.a) Distinguish between the joint stiffness factor and the modified stiffness factor. [2]
- b) Define the carry-over factor and obtain the carry-over factor for a beam of prismatic member shown in Fig. 1. [3]

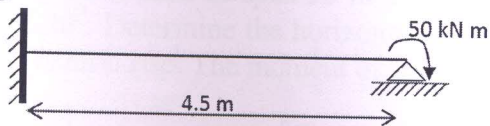


Fig. 1

- c) Define kinematic degrees of freedom with two examples. [2]
- d) A two hinged parabolic arch of span 'L' and central rise 'H' is subjected to uniformly distributed load 'w/m' over its entire span. Determine the horizontal thrust. [3]
- e) What is a substitute frame? [2]
- f) Explain the cantilever method of frame analysis. [3]
- g) Distinguish between static and kinematic indeterminacy. [2]
- h) Explain the procedure of stiffness method of analysis. [3]
- i) Differentiate between the internal and external indeterminacies. [2]
- j) Draw the ILD for the support moment at the fixed support of a propped cantilever beam. [3]

PART B (50 Marks)

- 2. Using moment distribution method, analyse the frame supported and loaded as shown in Fig.2. Draw BMD. [10]

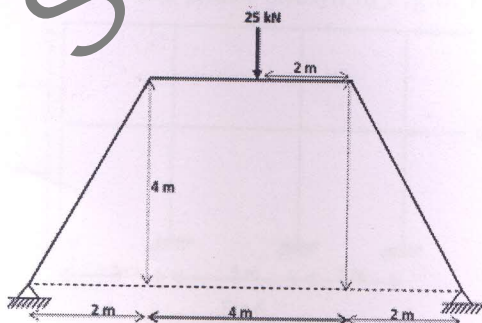


Fig.2

OR

- 3. Analyse the frame shown in Fig.3 by Kani's method. Draw BMD and elastic curve. [10]



Fig.3

Analyse the frame shown in Fig.4, by Slope-deflection method. Assume the constant flexural rigidity. Draw BMD. [10]

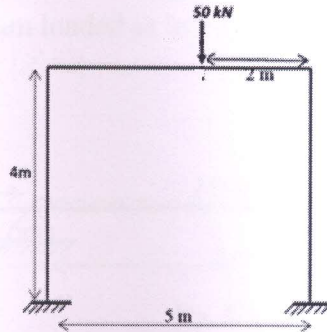


Fig.4

OR

5. A two hinged steel parabolic arch of span 30 m and central rise 6 m is subjected to a rise of temperature of 30° . Determine the horizontal thrust developed in the arch. Also find the change in the central rise. The moment of inertia of the arch at the crown is $125 \times 10^8 \text{ mm}^4$. Adopt $E = 2 \times 10^5 \text{ N/mm}^2$ and $\alpha = 12 \times 10^{-6} / ^{\circ}\text{C}$. [10]

6. Analyse the frame shown in Fig.5, using cantilever method. Draw BMD. [10]



Fig.5

OR

7. Using portal method, analyse the frame shown in Fig.6. Draw BMD. [10]

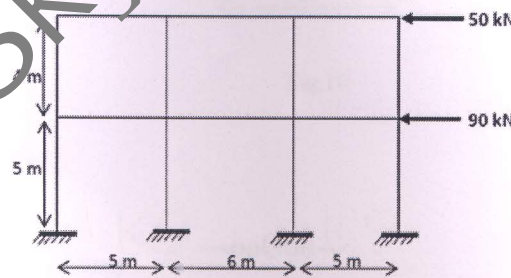


Fig.6

8. Analyse the plane truss supported and loaded as shown in Fig.7. Adopt the cross-sectional area of each member is 1200 mm^2 and modulus of elasticity is 200 kN/mm^2 . [10]

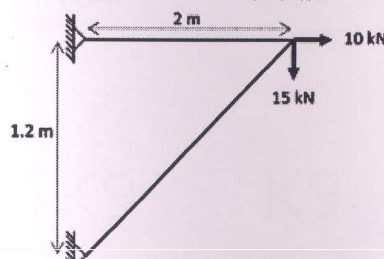


Fig.7

OR

Analyse the continuous beam loaded as in Fig. 8 by flexibility method. Draw BMD and elastic curve. [10]

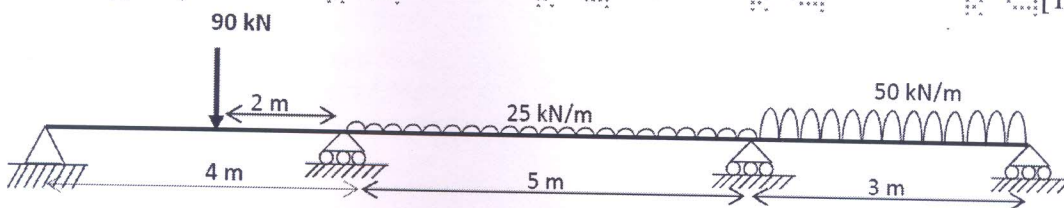


Fig. 8

10. Draw the influence line diagram for the bending moment at the section X-X of a beam supported as shown in Fig. 9. [10]

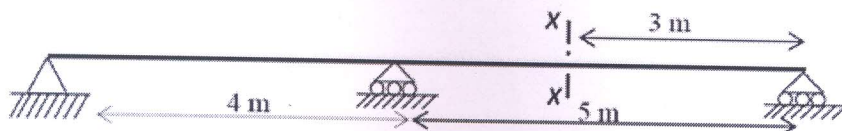


Fig. 9

OR

11. Analyse the plane truss supported and loaded as shown in Fig. 10. Assume AE is constant. [10]

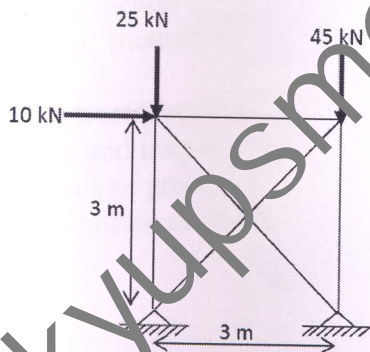


Fig. 10