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Printed Pages : 4   **TCE – 402**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0050   Roll No. ☐☐☐☐☐☐☐☐☐☐

B. TECH.

(SEM. IV) EXAMINATION, 2006-07
STRUCTURAL ANALYSIS - I

*Time : 3 Hours]*   *[Total Marks : 100*

Note :   (1)   *Attempt **all** questions.*
            (2)   *All questions carry **equal** marks.*
            (3)   *In case of numerical problems assume suitable data wherever not provided.*
            (4)   *Be precise in your answer*

1   Attempt any **four** part of the following :   **5×4=20**

(a)   Find out maximum deflection in a simply supported beam acted upon by single concentrated load will be under the load only when the load acts at mid span.

(b)   What do you understand temperature stresses in thru Hinged Arch.

(c)   A beam AB of span 6 mtr. carries a point load of 45 kN at a distance 4 mtr. from the left end A. Find slope at A and deflection under the load.
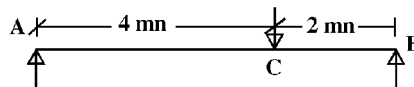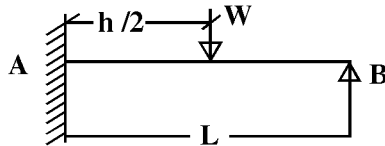

(d)   Compare the strain energy of a beam which are simply supported at its ends loaded with a U.d.l. with that of the same beam loaded with a central concentrated load and each having the same value of the maximum bending stress.

V–0050]   **1**   **[Contd...**

(e) Draw B M diagram for the propped contiliver loaded shown in figure. The supports A and B remain at the same level after the load.


(f) What is the position of U.d.l. for maximum shear force and maximum Bending Moment in a simply supported beam ?

2 Attempt any **four** parts of the following :   **5×4=20**

(a) Describe the procedure for finding out the prop reaction of a cantiliver.

(b) What do you understand by the term Redundant Frame ?

(c) Draw influence line for the horizontal thrust and B.M. when a point load rolls over the arch from left to right.

(d) Define the term opposite joint. What important role does it play in drawing the influence line of truss?

(e) A cable of span 100 mtr and a dip 5 mtr. is subjected to a rise of temperature of $15^{\circ}C$. Find the increase in dip due to rise of temperature. Take $\alpha = 12 \times 10^{-6}/^{\circ}C$.

(f) Explain the term equivalent uniformly distributed load and indicate its practical application.

3 Attempt any **two** part of the following :   **10×2=20**

(a) A girder of 15 mtr. span is traversed by a moving load as shown in fig. Determine the maximum B.M. at D, 7 meter from the left hand support.
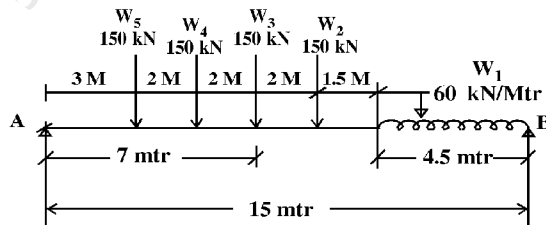

V–0050]   2   [Contd..

(b) A single Rolling load of 100 kN moves on a girder of span 20 mtr. construct the influence line for.

(i) Shear force

(ii) Bending moment for a section 5 mtr. from the left support.

(c) A suspension cable of span 100 mtr. and dip 10 mtr carries a U.d.l. of a kN/m of horizontal span over the full span. Find the vertical and horizontal forces transmitted to the supporting Pylons.

4 Attempt any **two** part of the following : **10×2=20**

(a) Using the method of tension coefficient, analyse the space truss shown in figure and find the forces in the members of the truss.
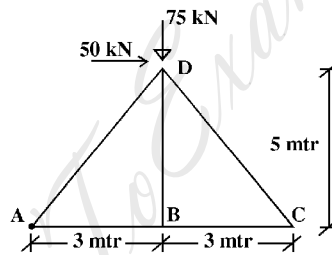
(b) A beam AB of span 6 mtr. carries a point load of 45 kN at a distance of 4 mtr. from the lift end A shown in figure. Find

(i) Slope at A

(ii) Deflection under the load

(iii) Section where the deflection is maximum.
Take E = 200 kN/m^2.
I= 8.325 x 10^7 mm^4.
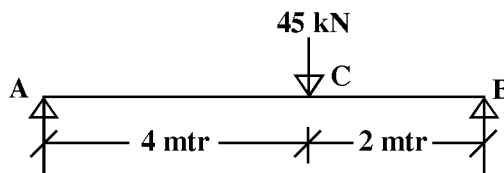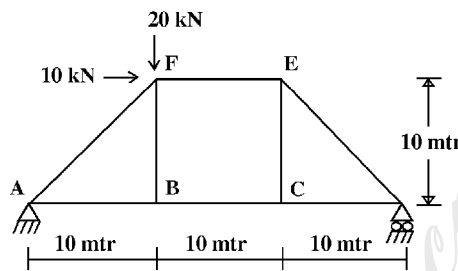
(c) Find the forces in the various members of the truss shown in figure. The ratio of length to the cross sectional area for all the members is the same. The frame is pinned at A and rests on roller at D.

5 Attempt any **two** parts of the following : **10×2=20**

(a) A suspension bridge cable hangs between two points A and B seperated horizontally by 120 mtr. and with A is 20 mtr. above B. The lowest point in the cable is 4 mtr. below B. The cable supports a stiffening girder which is hinged vertically below A, B and the lowest point of the cable. Find the position and magnitude of the largest BM which a point load of 10 kN can induce in the girder together with the position of the load.

(b) Define slope deflection method and explain why its use is not encouraged in the modern design offices these days; How does sinking of a prop differ from a rigid prop?

(c) A thru Hinged Parabolic Arch of span 30 mtr. has its support at depths of 4 mtr. and 16 mtr. below crown C. The arch carries a load of 80 kN at a distance of 5 mtr. to the left of C and a second load of 100 kN at 10 mtr. to the right of C. Determine the reactions at supports and Bending Moment under the loads.