

Roll No. ....

**24195**

**B. Tech. 4th Semester (Civil Engineering)**

**Examination – May, 2011**

**STRUCTURAL ANALYSIS - II**

**Paper : CE-202-F**

**Time : Three hours ]**

**[ Maximum Marks : 100**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

- Note :** (i) Attempt *five* questions in all.  
(ii) Question No. 1 is compulsory.  
(iii) Attempt *one* question from each Section.  
(iv) All questions carry equal marks.  
(v) Assume suitable data wherever required or missing.

1. (a) What is the degree of indeterminacy of beam shown in the figure



- (b) Calculate the Bending moment at the centre of a fixed beam of span  $L$  and a central load  $W$ .

- (c) Where are anchor cables used and how ?
- (d) Why a truss is assembled in a series of triangles ?
- (e) Define Eddy's theorem of Bending Moment:

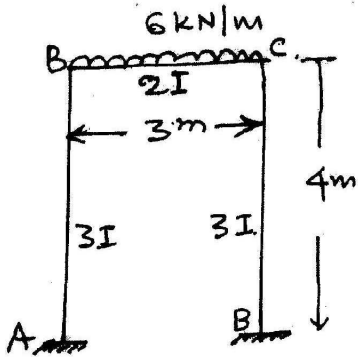
$5 \times 4 = 20$

**SECTION - A**

- 2. (a) Prove that the redundant reaction components of a statically indeterminate structure are such as to make the total strain energy stored up a minimum.
- (b) How will you analyze and externally redundant structure for first degree of redundancy ?

$10 + 10 = 20$

- 3. Draw B. M. and S. F. diagrams for the portal frame shown below after completely analyzing it. 20

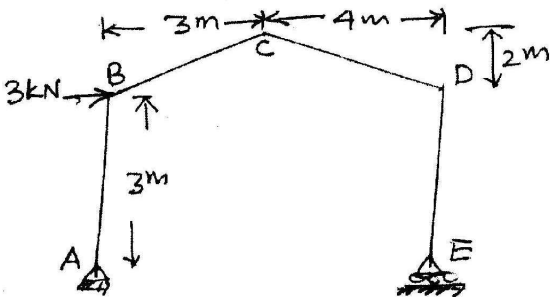


**SECTION - B**

- 4. (a) Write short notes on (i) Parabolic arch and (ii) circular arch.

- (b) A three hinged parabolic arch of span 20 m has a central rise of 5 m. Find the rise of the arch crown if the temperature rises through  $30^{\circ}\text{C}$ . Take coefficient of linear expansion for arch material as  $12 \times 10^{-6}$  per degree centigrade. 6 + 14 = 20

5. Draw the axial force, S : F and B.M. diagrams of a gable frame shown. Gable frame carries uniformly distributed load on span B, C, D as 1 KN/m. 20



**SECTION - C**

6. (a) Taking  $\sigma = ax + by$  as the general equation for Bending Stresses induced due to unsymmetrical bending deduce the values of constants 'a' & 'b'.
- (b) If a number of sections are taken along length of a beam, will the value of constants 'a' and 'b' in general equation  $\sigma = ax + by$  differ from section to section? Give reasons to support your answer.

10 + 10 = 20

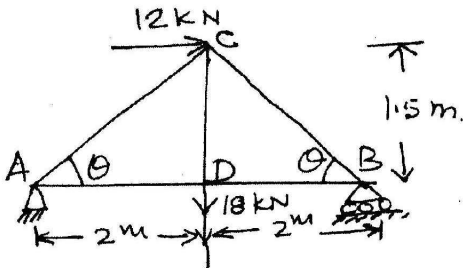
7. (a) A cable supported at  $120\text{m}$  apart at the same level has a central dip of  $12\text{m}$ , carries a load of 20 KN/m of horizontal length. Calculate change in

horizontal tension when temperature rises thro'  $20^{\circ}\text{F}$ . Take  $\alpha = 6 \times 10^{-6}$  per  $^{\circ}\text{F}$ .

- (b) Do stiffening girders transfer uniform distributed load to each suspender? Explain.  $14 + 6 = 20$

**SECTION - D**

8. Determine the forces in the truss shown below which carries a horizontal load of 12KN and a vertical load of 18KN at C & D respectively.



9. (a) Define deficient truss and perfect frame.  
(b) Analyse the truss shown by method of tension coefficients or method of sections and determine forces in members AB, AE, and BE.  $6 + 14 = 20$

