* K C - 8 0 6 1 *

KC-8061

B. E. II (Sem. III) (Civil) Examination

November / December - 2012

Structural Analysis - I

(New Scheme)

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

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. II (Sem. III) (Civil)

Name of the Subject :

☛ Structural Analysis - I (New)

☛Subject Code No. : 8 0 6 1 ☛Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

(2) Figures to the right indicates full marks.

(3) Assume **suitable data** if **necessary** and mention them **clearly.**

1 Derive torsional equation. $T/J = q/R = G\theta/L$ [10]

2 Attempt Any TWO [20]

(i) Calculate the diameter of the shaft required to transmit 50 kW at 100 rpm. The maximum torque is likely to exceed the mean by 20%, for a maximum permissible shear stress of 50 N/mm2. Calculate also the angle of twist for a length of 2 m. $G = 80 \times 10^3$ N/mm^2.

(ii) A thin sphere of 1.5m diameter is filled with fluid which exerts internal pressure of 3kN/m^2. Calculate the thickness required for the sphere if the change in the volume is not to exceed 2% of the original volume.

(iii) A three-hinged parabolic arch of span 20 m & rise 4 m carries a UDL of 50 kN/m on left half of the span. Find thereaction at the supports and the position & amount of maximum bending moment. Also draw BM diagram also.

3 Attempt any TWO [20]

(i) A simply supported beam of span 14m is carrying a point load of as shown in fig 1. Find slopes at supports & deflection at mid span. Take E=200 GPa, I=24x10^6 mm^4.

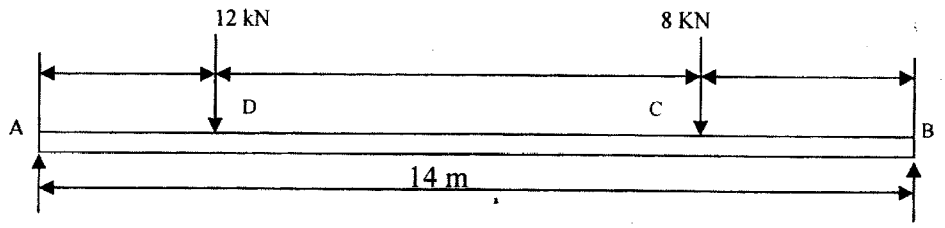


Fig 1

(ii) A simply supported beam of span 4m is carrying a point load of 100kN at it's mid span as shown in fig 2. Find slopes at supports & deflection at mid span. Take E=200 GPa, I=24x10^6 mm^4.

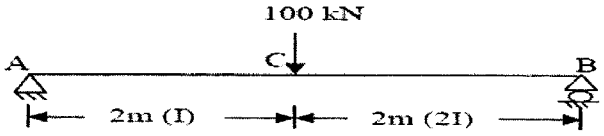


Fig 2

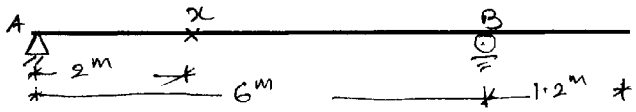
(iii) Differentiate
(a)Statically Determinate Structure & Statically Indeterminate Structure
(b) Static Indeterminacy & Kinematic Indeterminacy

4 (a) Define Proof Resilience, Modulas of Resilience and resilience 06
(b) Define influence line. How influence line diagram for BM is different than normal BM diagram. 07
(c) Explain kernel of the section 07

5 (a) Draw ILD for M_A, R_A and SFx for a cantilever beam having a length of 1.5m. Section X-X is at 0.7m from fixed end A. 10
(b) Derive the Eular's formula when the column having both ends are hinged. 10

OR

5 (a) Elaborate the limitations of Eular's formula. 10
(b) Draw ILD for reactions and SFx and BMx for following figure 1. 10



6 A hollow circular column 250 mm external diameter and 25 mm metal thickness is subjected to axial load of 250 kN and 50 kN load applied on the bracket at 400 mm from centroid. Find maximum and minimum stresses in the column 10