

SE - Civil.  
sem - III (CBSGS)  
SOM.

02/12/2014.  
QP Code : 14590

(3 Hours)

[ Total Marks : 80

- N. B. :** (1) Question No. 1 is **compulsory**.  
(2) Attempt any **three** out of the remaining **five** questions.  
(3) Assume suitable data if not given.

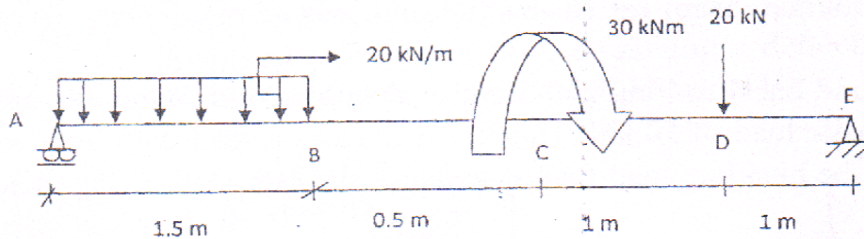
1. Attempt any **four** :-

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- (a) Write the assumptions made in the theory of simple bending.  
(b) Establish the relationship between shear force, bending moment and rate of loading.  
(c) Write a note on Mohr's Circle of stresses.  
(d) Establish relationship between young modulus of elasticity, modulus of rigidity and bulk modulus.  
(e) A cylindrical shell is subjected to an internal fluid pressure, find an expression for change in diameter and change in length of cylinder..

2. (a) Draw a shear force diagram and bending moment diagram for a beam as shown in figures below.

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- (b) Explain concept of contra flexure in bending and procedure to locate it.  
(c) Explain how to determine the young modulus of elasticity for mild steel and tor steel.

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3. (a) A steel rod of 3 cm diameter and 5 m long is connected to two grips and the rod is maintained at a temperature of 95 °C. determine the stress and pull exerted when the temperature falls to 30 °C, if:

- (i) The ends do not yield, and  
(ii) The ends yield by 0.12 cm, Take  $E = 2 \times 10^5 \text{ MN/mm}^2$  and  $\alpha = 12 \times 10^{-6} / ^\circ\text{C}$ .

(b) Distinguish between:

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- (i) Stress and strain  
(ii) Force and stress, and  
(iii) Tensile stress and compressive stress.

(c) Explain with Mohr's Circle method, the procedure for determining the magnitude and direction of shear stress and normal stress on a inclined plane in a member subjected to axial stress of a in horizontal direction. Also find maximum shear stress and its location.

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