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CE-222

B.E., III Semester

Examination, December 2016

Choice Based Credit System (CBCS)

Strength of Materials

Time : Three Hours

Maximum Marks : 60

Note: i)   Attempt any five questions.

ii)   All questions carry equal marks.

iii)   Assume if any missing data suitably.

1.   a)   Draw and explain stress strain curve for M.S. and C.I.

b)   A RCC column of size 230×400mm has 8 steel bar of 12mm dia. If the column is subjected to an axial load of 600N (Compression). Find the stress developed in steel and concrete take Es = 18.67Ec.

2.   a)   Define temperature stresses.

b)   A rectangular block is subjected to a tensile stress of 10000N/cm^2 on a plane and a tensile stress of 4000N/cm^2 at right angle to the former together with a shear stress of 6000N/cm^2 on the same plane. Find

i)   The direction and magnitude of principal plane

ii)   Magnitude of maximum shear stress

3.   A horizontal beam AB is simply supported at A and B, 6m apart. The beam is subjected to a clockwise couple of 300kNm at a distance of 4m from the left end.

If E = 2 × 10^5 MPa and I = 2 × 10^{8}mm^4, determine :

i)   Deflection at the point where couple is acting and

ii)   The maximum deflection

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4.   a)   Define section modulus.

b)   A beam is of square section of the side 'a'. If the permissible bending stress is 'σ', find the moment of resistance when the beam section is placed such that

i)   Two sides are horizontal

ii)   One diagonal is vertical.

Find also the ratio of the moments of the resistance of the section in the two positions.

5.   a)   What do you mean by shear stresses in beams?

b)   A simply supported wooden beam of span 1.3m having a cross section 150mm wide by 250mm deep carries a point load W at the centre. The permissible stress are 7N/mm^2 in bending and 1N/mm^2 in shearing. Calculate the safe load W.

6.   a)   A cylinder of internal diameter 205m and of thickness 5cm contains a gas. If the tensile stress in the material is not to exceed 80N/mm^2, determine the internal pressure of the gas.

b)   Derive Torsional equation.

7.   a)   Define slenderness ratio.

b)   A hollow cast iron column 200mm outside diameter and 150mm inside diameter, 8m long has both ends fixed it is subjected to an axial compressive load. Taking a factor of safety as 6, σ_c = 560N/mm^2, α = 1/1600, determine the safe Rankine load.

8.   Define the following:

a)   Pure bending

b)   Shear center

c)   Unsymmetrical bending

d)   Poisson's ratio

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