Menoufiya University
Faculty of Engineering
Shebin El-Kom
Final First Term Examination
Academic Year: 2014-2015

Dept.: Production Engineering
Year: First
Subject: Properties of Materials
Code: PRE 111
Time Allowed: 3 hours
Date: 18/1/2015

Allowed Tables and Charts: *(None)*

Answer all the following Questions [85 Marks]

Question (1) *(15 Marks)*

1) A reinforced concrete column of size 230mm x400mm has 8 steel bars of 12 mm diameter .if the column is subjected to axial compression of 600KN.
Find the stresses developed in the steel and concrete. Assume E for steel: 2 x 10^6 kg/cm^2 and E for concrete=1.2x$10^{6/}$ Kg/.cm^2

Question (2) *(10 Marks)*

2) metallic bar 25cm x 10cmx5cm is loaded by 400 ton,40 ton and 200ton in the direction x,y and z respectively. Find the change in volume. Take E = 200 ton/cm^2 and passion' ratio 0.25. Also: find the change that should be made in the 400 tons load, in order that there should be no change in the volume of the bar.

Question (3) *(10 Marks))*

) A hollow shaft of diameter ratio 3/8 is required to transmit 800 meteoric horse powers at 110 r.p.m, the maximum torque being 20% greater than the mean. The shear stress is not to exceed 630 kg/cm^2 and the twist in a length of 3 m not to exceed 1.4^0 . Calculate the maximum external diameter satisfying these conditions. Take: G= 8.4 x 10^5 kg/cm^2

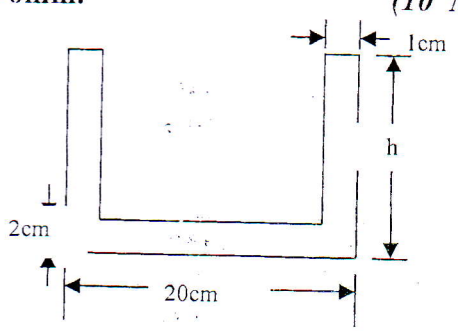
Question (4) *(15 Marks)*

For a beam has a channel cross-section of the given dimensions .determine the suitable value for hight "h" if (σ_c) = 3(σ_t) for the material Fig (1) *(15 Marks)*

Question (5)

6) A cantilever 2m. long carries a point load of 1000Kg at the free end, and a uniformly distributed load of 200 Kg/m over a length of 1,25 m from the fixed end. Find the deflection at the free end, if E= 200ton/cm^2. Take, I= 13824 cm^4. *(10 Marks)*

6)A cantilever 3m long and symmetrical cross- section 50 cm deep carries a uniformly distributed load of 3 ton per meter run through its length, if I= 5100 cm^4 and E= 2000ton/cm^2 Calculate the deflection at the free end. Also, what the maximum point load which the cantilever can carry at a distance 2.1m from the fixed end in addition to the distributed load if
a)The bending stress must to be now here exceed 1.4 ton/cm2
b) The deflection at the free end must not exceed 6mm. *(10 Marks)*



Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A3,A4,	B5,B17	C2,C3	D1and D5
Question No.	1and2	5	3and4	6