EX/ARCH/CE/T/215/2018

BACHELOR OF ARCHITECTURE 2ND YR 1ST SEM. EXAM. 2018

Subject: THEORY OF STRUCTURES- I **TIME: 3 Hours** **Full Marks: 100**

Assume any necessary data if required

No. of questions	Answer any Five questions.	Marks (5x20=100)
1. a)	Prove the basic equation of shear stress distribution at a point of a rectangular beam section i.e. q =F Q/I b. q= shear stress. F= shear force. Q= first moment of the area. I=moment of inertia. b= width of the section.	15+5= 20
b)	A beam of rectangular section 250 mm by 400 mm carries a concentrated load of 50 kN at the center of the span of 5m (simply supported). Find the maximum bending stress.	
2. a)	Deduce the relation between maximum shear stress of a rectangular beam section with the average shear stress of that section with neat sketch.	15+5=20
b)	Draw the shear stress distribution of a standard equal I section.	
3. a)	Construct Morh's circle for the case of biaxial stress where σ_x =5 N/mm^2 and σ_y = 0.	10+10 =20
b)	The principal tensile stresses at a point across two perpendicular planes are 50 N/mm^2 and 25 N/mm^2. Find the normal and tangential stresses on a plane at 25 degree with the major principal plane.	

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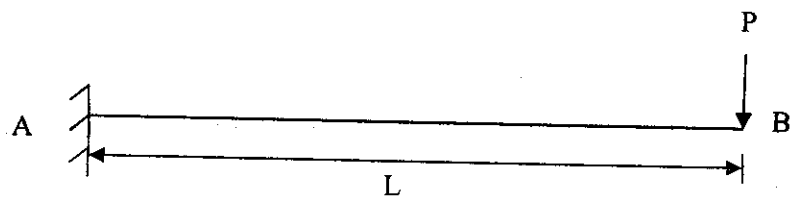
4. a) b)	What do you mean by short column and long column? Derive the Euler's formula for column buckling for a column with both end hinged condition.	5+15=20
5.	Determine end displacement (δ_B)and slope (θ_B) of a cantilever beam carrying a pint load as shown in figure 1. EI constant.  Figure 1.	20
6. a) b)	Write down the first and second theorem of moment area method with neat sketch. (Prove not required). Deduce and draw the shear stress distribution of a circular section.	5+15=20