DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

TY

Mid Semester Examination – Sept./Oct. 2019

Course: B. Tech in _MECHANICAL ENGINEERING **Sem: I**

Subject Name: MACHINE DESIGN-I **Subject Code: BTMEC 503**

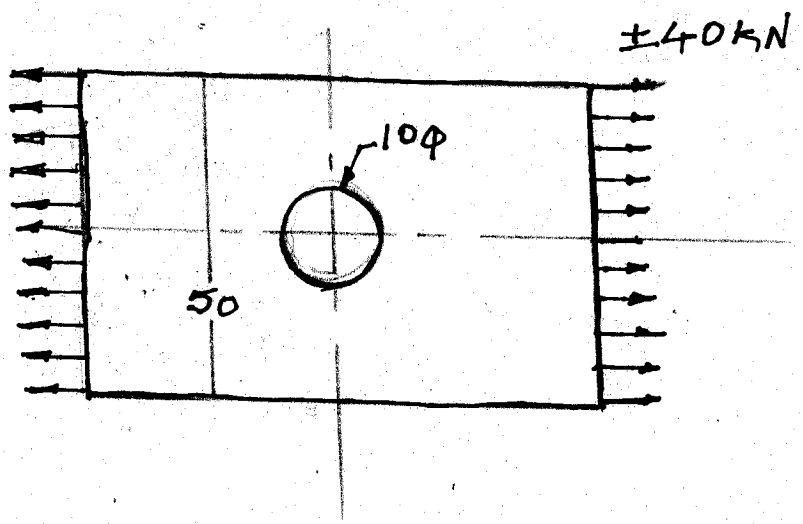
Max Marks: 20 **Date:-25.9.19** **Duration:- 1 Hr.**

Instructions to the Students:

1. Assume the suitable data where ever necessary
2. Draw appropriate figures where ever necessary

		(Level/CO)	Marks
Q. 1	**State True or False**		**6**
1.	Standards are obligatory norms	CO1	1
2.	Ergonomics design is relation between man and machine	CO1	1
3.	Brittle material shows negligible deformation before fracture	CO1	1
4.	Factor of safety indicates strength of the material	CO1	1
5.	Endurance limit is criteria of failure for components subjected to external fluctuating load.	CO1	1
6.	Maximum principal stress theory is the most suitable theory for ductile materials	CO4	1
Q.2	**Solve Any Two of the following.**		3 X 8
(A)	In a Knuckle joint, force acting is 25kN.Material for the pin and the rod is 45C8, Syt=380N/mm^2. FOS is 2.5. The yield strength in shear 57.7% of Syt. Calculate diameter of rod and Pin. Neglect bending of pin.	CO2 and CO3	
(B)	An axial pull of 12kN and a transverse shear force of 6kN acts on a bolt. The bolt is made of 45C8, Sut=310N/mm^2. Fos=2.5.Determine diameter of the bolt by using maximum shear stress theory.	CO4	
(C)	Discuss aesthetic factors in design.	CO1	
Q. 3	**Solve Any One of the following.**		**8**
(A)	The work cycle of a mechanical components subjected to a completely reversed bending stresses consists of the following three elements, ±350N/mm2 for 85% of time, ±500N/mm2 for 3% of life and ±400 for remaining part of the life. The component is made of 50C4 (S_{ut}=660N/mm^2),If the endurance limit of the component is 280N/mm^2. Determine its life	CO5	
(B)	A plate made up of 40C8,(Sut=580N/mm^2) as shown is subjected to	CO5	

completely reversed axial force of 40 kN. The theoretical stress concentration factor at the change in the cross section is 2.27 and notch sensitivity is 0.8. The surface finish factor and the size factor are 0.75 and 0.85 respectively. The load factor is 0.923. The expected reliability is 90%, for which reliability factor if 0.897. If the required factor of safety is 2, determine the plate thickness for infinite life.



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