PRN: | Backlog | Course Code : MET 401

Final Year **B. Tech** End Semester Examination Summer 2023

Design of Power Transmission Elements

Day and Date: Monday 12/6/23 Max Marks: **100**

Time : 2:00 pm - 5:00 PM Duration: **03** hrs

Instructions: All questions are compulsory..

Q.1	**Attempt the following**				
	a)	State the causes of stress concentration. What are the methods to reduce stress concentration? Explain with sketch	08	02	401.1
	b)	A forged steel bar 50 mm diameter is subjected to a reversed bending stress of 250 N/mm2. The bar is made up of 40C8 (Sut 600 N/mm^2). Calculate the life of the bar. Take Ka=0.44, Kb=0.85, Kc=0.897	08	03	401.1
		OR			
	b)	How endurance limit is determined by approximate method? Explain in brief	08	02	401.1
Q.2	**Attempt the following**				
	a)	Explain with neat sketches design considerations for Maintenance/servicing	08	02	401.2
	b)	What do you mean by Design for Manufacturing and Assembly (DFMA). Explain in brief its various guidelines	08	02	401.2
		OR			
	b)	Explain with neat sketches design considerations for manufacturing plastic parts	08	02	401.2
Q.3	**Attempt any two from the following**				
	a)	Draw neat sketch of deep groove ball bearing and taper roller bearing	08	03	401.3
	b)	Explain designation of bearing with one example	08	02	401.3
	c)	Explain step by step basic procedure for selection of rolling contact bearings from manufacturer's catalogue	08	02	401.3
Q.4	**Attempt any two from the following**				
	a)	Differentiate between sliding contact and rolling contact bearings. State the applications of each	08	03	401.4
	b)	Explain with neat sketches working principle of hydrodynamic bearings	08	02	401.4
	c)	Explain following parameters in the design of sliding contact bearings a) length to diameter ratio b) unit bearing pressure c) start-up load d) minimum oil film thickness	08	02	401.4

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Q.5 **Attempt any Two of the following**

a)	Derive the equation for Beam strength of spur gear with assumptions.	09	03	401.5
b)	What are failure criterions for spur gears? Explain briefly the types of gear tooth wear failure	09	02	401.5
c)	It is required to design a spur gear speed reducer for compressor running at 250 rpm driven by 7.5 kW, 1000 rpm electric motor. the centre distance is 250mm. the gears are made of 50C8 ($Sut=700N/mm^2$) pressure angle 20^0, factor of safety 2, service factor is 1.5, take Y = 0.32. Determine a) gear dimensions b) beam strength c) effective load on gear teeth	09	03	401.5

Q.6 **Attempt any Two of the following**

a)	Explain the nomenclature of bevel gear with neat diagram showing pair of bevel gear	09	02	401.6
b)	What is Worm and worm wheel gear? Compare its advantages and drawbacks with other gears	09	02	401.6
c)	Explain in brief thermal considerations of worm gears	09	03	401.6

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