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SNS College of Technology, Coimbatore-35.
(Autonomous)
B.E/B.Tech- Internal Assessment -II
Academic Year 2023-2024 (ODD)
Fifth Semester
Mechanical Engineering
19MET301 – Design of Machine Elements

B

Time: 1^{1/2} Hours

Maximum Marks: 50

Answer All Questions

PART - A (5 x 2 = 10 Marks)					
			CO	Blooms	
1.	Define Factor of safety.		CO2	Und	
2.	List out the application of cotter Joint.		CO2	Rem	
3.	Distinguish between Transmission shaft and Machine shaft.		CO3	Und	
4.	Define the term critical speed.		CO3	Und	
5.	List some factors that influence coupling design.		CO3	Rem	
PART – B (2 x 13 = 26 Marks) and (1 x 14 = 14 Marks)					
			CO	Blooms	
6.	(a)	Design a cotter joint to connect the two rod material consist tensile load of 75 kN. All parts of the joint are made of the mild steel with the following allowable tensile stress is 80 MPa, Shear stress value is 95 MPa and crushing stress value is 145 MPa.	13	CO2	App
		(or)			
	(b)	Design a knuckle joint to connect two rods under the action of tensile load of 55 KN. The design stresses may be taken as 60 MPa in tension, 30 MPa in shear and 70 MPa in compression.	13	CO2	Und
7.	(a)	Design a bushed-pin type of flexible coupling to connect a pump shaft to a motor shaft transmitting 32kw at 960rpm. The maximum torque is 20 percent more than mean torque. The material properties are as follow: a. The allowable shear and crushing stress for shaft and key material is 40Mpa and 80Mpa respectively. b. The allowable shear stress for C.I is 15Mpa.	13	CO3	App

		c. The allowable bearing pressure for rubber bush is 0.8N/mm^2 . The material of the pin is same as that of shaft and key.			
		(or)			
	(b)	A shaft is to transmit 50kW at 1200rpm. It is also subjected to a bending moment of 275 N-m. Allowable shear stress is 60 N/mm^2 . The shaft is not to twist more than 2° in a length of 2m. Design the shaft. Take $G = 80 \times 10^3\text{ N/mm}^2$.	13	CO3	App
8.	(a)	The component is subjected to a flexural stress which fluctuate between $+400\text{MN/m}^2$ and 200MN/m^2 . Determine the value of ultimate strength according to 1.Gerber relation 2.Modified Goodman relation and 3.Soderberg relation. Take yield strength=0.65 Ultimate strength; Endurance limit=0.6 Ultimate strength and F.O.S=2.5.	14	CO2	App
		(or)			
	(b)	Design a muff coupling to connect two mild steel shaft and transmit 35 kW at 1440 r.p.m. The maximum torque transmitted is 25% greater than mean torque. The allowable shear stress for the shaft is 15 MPa. The allowable shear stress for the key is 65 MPa. The permissible crushing stress is 160 MPa.	14	CO3	App

CO – Course Outcome, Und- Understanding, Rem- Remembering, App-Apply, Ana-Analyze, Eva-Evaluate

Prepared by

Verified by

HOD/Mech(Academics)