Reg.No:

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

A

Time: 1¹ᐟ² Hours   **Maximum Marks: 50**

Answer All Questions

PART - A (5 x 2 = 10 Marks)			
		CO	**Blooms**
1.	List out the application of Knuckle Joint.	CO2	Rem
2.	Write the general procedure in cotter joint design.	CO2	Und
3.	What are the types of key?	CO3	Und
4.	Classify the types of Rigid and Flexible Couplings	CO3	Rem
5.	What types of stresses are induced in shafts?	CO3	Und

PART – B (2 x 13 = 26 Marks) and (1 x 14 = 14 Marks)				
			CO	**Blooms**
6.	(a)	Design a knuckle joint to transmit 150 KN. The design stresses may be taken as 75 MPa in tension, 150 MPa in compression and 60 MPa in shear.	13 CO2	Und
		(or)		
	(b)	The machine component is subjected to a flexural stress which fluctuate between $+300MN/m^2$ and $150MN/m^2$. Determine the value of minimum ultimate strength according to 1.Gerber relation 2.Modified Goodman relation and 3.Soderberg relation. Take yield strength=0.55 Ultimate strength; Endurance limit=0.5 Ultimate strength and F.O.S=2.	13 CO2	App
7.	(a)	A solid circular shaft is subjected to a bending moment of 3000 N-m and a torque of 10 000 N-m. The shaft is made of 45 C 8 steel having ultimate tensile stress of 700 MPa and a ultimate shear stress of 500 MPa. Assuming a factor of safety as 6, determine the diameter of the shaft.	13 CO3	App

		(or)			
	(b)	Its required to design a bushed pin flange coupling to connect two shafts And transmit 37.5kW Power at 180 r.p.m. The maximum torque is 30 percent more than mean torque. Use the following data (i) Allowable shear stress for shaft and key =104.6N/mm^2 (ii) Allowable shear stress for bolt =90N/mm^2(iii) Allowable shear stress for CI Flange=75N/mm^2(iv)Allowable crushing stress for shaft=133.33N/mm^2	13	CO3	App
8.	(a)	Design a cotter joint to resist a tensile load of 60 kN. All parts of the joint are made of the same material with the following allowable stresses σ_t = 60 MPa, τ= 70 MPa, and σ_c = 125 MPa	14	CO2	Und
		(or)			
	(b)	Design a clamp coupling to transmit 30 kW at 100 r.p.m. The allowable shear stress for the shaft and key is 40 MPa and the number of bolts connecting the two halves are six. The permissible tensile stress for the bolts is 70 MPa. The coefficient of friction between the muff and the shaft surface may be taken as 0.3.	14	CO3	App
		**********************			

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

Prepared by   **Verified by**   **HOD/Mech(Academics)**