Course Code: 1950320 Roll No: **MLRS- R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

III B.Tech I Sem Supply End Examination, December 2022

Design of Machine Members – I

(Mechanical)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

1.	a)	Define Factor of safety.	2M	CO1	BL1
	b)	List any four types of fits.	2M	CO1	BL1
	c)	How the stress concentration in a component can be reduced?	2M	CO2	BL2
	d)	Write the significance of modified Goodman's line.	2M	CO2	BL2
	e)	List any two advantages of bolted joints over welded joints.	2M	CO3	BL1
	f)	State any two ways in which a riveted joint may fail.	2M	CO3	BL1
	g)	Recall the applications of spigot and socket joint?	2M	CO4	BL2
	h)	Draw any two keys with neat sketches.	2M	CO4	BL1
	i)	Tell the difference between Shaft and Spindle.	2M	CO5	BL2
	j)	Mention the advantages of hollow shafts over solid shafts.	2M	CO5	BL2

PART- B

(10*5 Marks = 50 Marks)

2	a)	What are the general considerations in the design of machine elements?	5M	CO1	BL2
	b)	How do you understand failure? Explain the various theories of failure?	5M	CO1	BL2
		OR			
3	a)	Distinguish between ductile and brittle materials with the help of a stress- strain diagram?	5M	CO1	BL3
	b)	Differentiate between 'Tolerance' and 'Allowance'.	5M	CO1	BL3
4		A leaf spring in an automobile is subjected to cyclical stresses. The average stress = 150 MPa, variable stress = 50 MPa, Ultimate stress = 630 MPa, Yield point stress = 350 MPa and endurance limit = 150 MPa. Estimate under what factor of safety the spring is working, by Goodman and Soderberg formulae.	10M	CO2	BL4
		OR			

5	a)	Explain the modified Goodman diagram for bending stresses.	5M	CO2	BL3
	b)	Describe the estimation of endurance strength?	5M	CO2	BL4
6	a)	How the strength of transverse fillet weld is evaluated?	5M	CO3	BL3
	b)	Elaborate the design procedure for the eccentrically loaded bolted joint.	5M	CO3	BL2
		OR			
7	a)	How is the allowable stress calculated for a riveted joint subjected to alternating type of load?	5M	CO3	BL4
	b)	Explain briefly the design of welded joints subjected to twisting moment and the bending moment.	5M	CO3	BL3
8		Design a cotter joint to support a load varying from 30KN in compression to 30KN in tension. The material used is carbon steel for which the following allowable stresses may be used. The load is applied statically. Tensile stress = compressive stress = 50MPa; shear stress = 35MPa and crushing shear stress = 90MPa.	10M	CO4	BL4
		OR			
9	a)	Write the importance and applications of jib and cotter joints?	5M	CO4	BL3
	b)	Illustrate the design procedure for the socket and spigot joint.	5M	CO4	BL3
10		Design and draw a muff coupling to transmit 50 HP at 120 rpm. The shaft and key are made of the same material having allowable shear stress of $30N/mm^2$and compressor stress of $80N/mm^2$. The flange is made, as cast Iron with allowable shear stress is $15N/mm^2$.	10M	CO5	BL4
		OR			
11	a)	Summarize in detail various types of couplings.	5M	CO5	BL2
	b)	Outline the design procedure for flexible coupling.	5M	CO5	BL3

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