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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Regular & Supplementary Examinations Nov/Dec 2019

DESIGN OF MACHINE ELEMENTS-I
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

- 1 a Explain the general design procedure while designing a machine element. 7M
b What is meant by factor of safety? Explain how it can be used in design applications. 5M
- OR**
- 2 a Derive an expression for the impact stress induced due to a falling load. 6M
b How do you classify materials for engineering use? 6M

UNIT-II

- 3 a Discuss the factors affecting endurance limit. 6M
b Define the terms: (a) Notch sensitivity (b) fatigue stress concentration factor. 6M
- OR**
- 4 a Determine the diameter of a circular rod made of ductile material with a fatigue strength (complete reversal), $\sigma_e=265$ MPa and tensile yield strength of 350 MPa. The member is subjected to a varying axial load from $W_{\min} = -300$ KN to $W_{\max} = 700$ KN and has a stress concentration factor is 1.8. Use factor of safety as 2. 8M
b Theoretical stress concentration factor. 4M

UNIT-III

- 5 a Explain briefly the method of riveting. 6M
b What is the difference between caulking and fullering? Explain with the help of neat sketches. 6M
- OR**
- 6 a Write advantages and disadvantages of welded joint over riveted joints. 4M
b Discuss the standard location of elements of a welding symbol. 8M

UNIT-IV

- 7 a How the shaft is designed when it is subjected to twisting moment only? 8M
b What are the applications of a cotter joint? 4M
- OR**
- 8 a What type of stresses is induced in shafts? 6M
b A solid shaft is transmitting 1 MW at 240 r.p.m. Determine the diameter of the shaft if the maximum torque transmitted exceeds the mean torque by 20%. Take the maximum allowable shear stress as 60 MPa. 6M

UNIT-V

- 9 a What is a key? State its function with neat sketch. 6M
b Draw the neat sketch of Sunk key, Saddle key and its applications. 6M
- OR**
- 10 a Draw neat sketch of sleeve coupling and its application. 6M
b State the function of key way and splines. 6M

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