Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Tech. (ME) (2011 Onwards) (Sem.–5)

DESIGN OF MACHINE ELEMENTS-I

Subject Code : BTME-501

M.Code : 70602

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. Answer briefly :

a) What are the factors considered for selection of materials?

b) Name most commonly used engineering material.

c) What is meant by shaft basis system?

d) Define factor of safety.

e) How the stress concentration in a component can be reduced?

f) What is an eccentric riveted joint?

g) What are flexible coupling?

h) What do you understand by torsional rigidity?

i) Write the principle on which lever work.

j) What are the functions of gaskets?

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SECTION-B

2. A double riveted double cover butt joint in plates 20 mm thick is made with 25 mm diameter at 100 mm pitch. The permissible stresses are:

   σ_t = 120 MPa; τ = 100MPa; σ_c =150MPa

   Find the efficiency of joint, taking the strength of the rivet in double shear as twice than that of single shear.

3. Write the procedure for designing an axially loaded unsymmetrical welded section.

4. A 100 mm shaft rotating at 100 rev/min transmits 224 kW. Power is taken off through a gear whose hub is 200 mm long. The key is made of steel having an ultimate shearing stress of 350 N/mm^2. Using a factor of safety of 5, determine the key desired.

5. Design a cottor joint to connect two mild steel rods for a pull of 30 kN. The maximum permissible stresses are 55 MPa in tension, 40 MPa in shear and 70 MPa in crushing.

6. A solid circular shaft is subjected to a bending moment of 3000 N-m and a torque of 10000 N-m. The shaft is made of 45 C8 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 shaft.

7. A foot lever is 1 m from the centre of shaft to the point of application of 800 N load. Find :

   a) Diameter of the shaft.

   b) Dimensions of the key and

   c) Dimensions of rectangular arm of the foot lever at 60 mm from the centre of the shaft assuming width of the arm as 3 times thickness. The allowable tensile stress may be taken as 73 MPa and allowable shear stress as 70 MPa.

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NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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