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

Total No. of Questions : 09

B.Tech.(Automation & Robotics) (2012 & Onward) (Sem.–4)

DESIGN OF MACHINE ELEMENTS

Subject Code : BTPE-401

M.Code : 63017

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 FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a. What is a conceptual design?

b. List the basic traits of a good designer.

c. Write the basic requirements of rivet materials.

d. Define a cotter. Why is it tapered?

e. What do you mean by bolt of uniform strength?

f. What are the requirements of shaft material?

g. What is the use of register in flange coupling?

h. Write the different types of breaks.

i. Define Mechanical advantage.

j. Define a lever.

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SECTION-B

2. What human needs require consideration in a design problem?

3. Discuss the different criteria of designing a shaft.

4. What is function of coupling and clutches? How does a coupling differ from the clutch?

5. Explain the procedure of designing a fulcrum pin.

6. What is uniform strength concept used in design of cotter joint?

SECTION-C

7. Show by neat sketches the various modes of failure of riveted joints.

8. The shaft of a rolling machine is driven by means of a motor placed horizontally. The flywheel which also acts as pulley is of 1.5 m diameter and has belt tensions 5.4 kN and 1.8 kN on tight side and slack side, respectively. The weight of the flywheel is 15 kN. Determine the shaft diameter if the maximum allowable shear strength is 50 N/mm^2. The overhang of the flywheel is 250 mm.

9. Design a muff coupling for a shaft transmitting 25 kW at 250 rpm. The safe shear stress for the carbon steel shaft is 50 N/mm^2 and for the cast iron muff it is 12 N/mm^2. The allowable shear and crushing stress for the key's material are 40 N/mm^2 and 80 N/mm^2, respectively. Design torque may be taken as 1.15 times the average torque.

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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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