Roll No.					Total No. of Pages: 0	2
						_

Total No. of Questions: 09

B.Tech.(Automation & Robotics) (2011 & Onward) (Sem.-4)

DESIGN OF MACHINE ELEMENTS
Subject Code: BTPE-401
Paper ID: [A1222]

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

- 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) Define machine design.
- b) What are the ergonomics aspects of a design of machine elements?
- c) Name the different welded joint
- d) Write advantages of welded joints over riveted joint.
- e) Draw different types of keys.
- f) Write the functions of couplings.
- g) What is shaft write its types?
- h) Write the difference between cotter and knuckle joint.
- i) What is a self locking screw?
- i) What is a lever?



SECTION-B

- 2. Discuss the design process and sources of design data.
- 3. Write the design procedure for bushed-pin type flexible coupling.
- 4. Sketch two views of a knuckle joint and write the equations showing the strength of joint for the most probable modes of failure.
- 5. Draw bolt deformation diagram and explain.
- 6. Determine the maximum, minimum and average pressure in a plate clutch when the axial force is 4 kN. The inside radius of the contact surface is 50 mm and the outside radius is 100 mm. Assume uniform wear.

SECTION-C

- 7. Determine the dimensions of a rectangular sunk key made up of mild steel for a 80 mm diameter mild steel shaft to transmit a torque of 135 N-m. Assume shear stress = 50 N/mm² and crushing stress = 120 N/mm².
- 8. Write down the design procedure for longitudinal and transverse fillet weld.
- 9. Fig. 1 shows the arrangement of two brake shoes which act on the internal surface of a cylindrical brake drum. The braking force F1 and F2 are applied as shown and each shoe pivots on its fulcrum O_1 and O_2 . The width of the brake lining is 35 mm. The intensity of pressure at any point A is 0.4 sin θ N/mm², where θ is measured as shown from either pivot. The coefficient of friction is 0.4. Determine the braking torque and the magnitude of the forces F1 and F2.

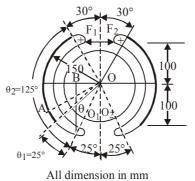


Fig.1

2 M-63017 (S2)-2038