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

Total No. of Questions : 07

B.Tech (ME) (2011 Onwards) (Sem.–6)

# DESIGN OF MACHINE ELEMENTS-II

Subject Code : BTME-601

Paper ID : [A2361]

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

**Q1 Answer briefly :**

a) What is belt slip and creep?

b) What do you understand by simplex, duplex and triplex chains?

c) What do you understand by virtual number of teeth in the context of helical gear?

d) What is meant by hydrodynamic lubrication?

e) Name the factors on which selection of bearing for a particular application depends.

f) Why cross-section of the flywheel arms is usually elliptical?

g) What is curvature effect in helical springs?

h) What is the use of nipping of leaf spring?

i) Why it is necessary to dissipate the heat generated when clutches operate?

j) What is the condition for self-locking block brake?

## SECTION-B

Q2 Select a suitable chain drive to transmit 50 kW from an electric motor to a line shaft. The motor shaft *r.p.m.* are 1200, line shaft *r.p.m.* are 250 and approximate center distance is 600 mm. Assume service is 10hr/day, 6 days per week.

Q3 A 20° full depth spur pinion is to transmit 2 kW at a speed of 950 rev/min. If the pinion has 18 teeth, determine suitable values for module and face width. The bending stress should not exceed 80 MPa.

Q4 Design a journal bearing for a centrifugal pump. The load on the bearing is 3.5kN and the journal diameter is 75mm. The shaft runs at 900 *r.p.m.* and the heat of friction is to be dissipated from the bearing housing. The ambient temperature may be taken as 25°C.

Q5 a) Discuss the various stresses induced in a flywheel rim.

b) Explain the procedure for determining the size and mass of a flywheel with the help of a turning moment diagram.

Q6 Design a leaf spring for the following specifications :

Total load is 150 kN, Number of spring supporting the load is 4, Maximum number of leaves is 10, Span of spring is lm, Permissible deflection is 85 mm. Take young's Modulus to be 200 kN/mm$^2$ and the allowable stress in the spring material is 600 MPa.

Q7 A centrifugal clutch is to be designed to transmit 15 kW at 900 *r.p.m*. The shoes are four in number. The speed at which the engagement begins is 3/4th of the running speed. The inside radius of the pulley rim is 150 mm. The coefficient of friction may be taken as 0.25. Determine: 1. mass of the shoes, and 2. size of the shoes.