

**SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, JUNE 2010**

ME 04 702 – DESIGN OF MACHINE ELEMENTS

(2004 Admissions)

Time : Three Hours

Maximum : 100 Marks

Approved Design Data book allowed.

Answer all questions.

Part A

- I.
1. Briefly explain the merits and demerits of positive clutches.
 2. State the significance of centrifugal tension on the power transmitted by a belt-drive.
 3. Explain in detail about the gear failures.
 4. Write short notes on service factor.
 5. Define the following terms of journal bearing :
 - (a) Bearing characteristics number.
 - (b) Bearing modulus.
 6. What are the characteristics required for a lubricant?
 7. What are the design recommendations for rolled sections?
 8. What are the difficulties in modification of design?

(8 × 5 = 40 marks)

Part B

- II. (a) A single plate clutch, effective on both sides, is required to transmit 25 kW at 1500 r.p.m. Determine the inner and outer diameter of friction surface if the coefficient of friction is 0.25, ratio of diameter is 1.5 and the maximum pressure is not to exceed 0.2 N/mm². Also, determine the axial thrust to be provided by springs. Assume the theory of uniform wear.

Or

- (b) Design a belt drive to transmit 30 HP at 740 r.p.m. to an aluminium rolling machine, the speed ratio being 3.0. The distance between the pulleys is 3 metre. Diameter of the rolling machine pulley is 1.2 metre.

(15 marks)

Turn over

- III. (a) Design a pair of helical gears to transmit 10 kW at 1000 r.p.m. of the pinion. Reduction ratio of 5 is required. Give details of the drive in a tabular form.

Or

- (b) Explain the Bevel gear design by 'AGMA method'.

(15 marks)

- IV. (a) Design a journal bearing for a generator to the following specifications :

Load on the journal = 1200 kgf

Diameter of the journal = 75 mm

Speed of the journal = 1400 r.p.m.

Or

- (b) Explain in detail about the selection procedure for Rolling bearings.

(15 marks)

- V. (a) A plate 90 mm wide and 15 mm thick is welded on to another plate by a single transverse weld and a double parallel fillet weld. Find the length of the parallel fillet weld if the plate is loaded by a static tensile load. Take the allowable tensile stress of the plates as 70 N/mm^2 and weld shear stress as 55 N/mm^2 .

Or

- (b) Explain the general design procedure of 'turned parts'.

(15 marks)

[4 × 15 = 60 marks]

(8 × 5 = 40 marks)

Part B

- II. (a) A single plate clutch, effective on both sides, is required to transmit 25 kW at 1500 r.p.m. Determine the inner and outer diameter of friction surface if the coefficient of friction is 0.35, ratio of diameter is 1.5 and the maximum pressure is not to exceed 0.2 N/mm^2 . Also, determine the axial thrust to be provided by springs. Assume the theory of uniform wear.

Or

- (b) Design a belt drive to transmit 30 HP at 740 r.p.m. to an aluminium rolling machine, the speed ratio being 3.0. The distance between the pulleys is 3 metre. Diameter of the rolling machine pulley is 1.2 metre.

(18 marks)

Turn over