

G 1675

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Eighth Semester

Branch : Automobile Engineering/Mechanical Engineering

AU 010 801 }
ME 010 801 } DESIGN OF TRANSMISSION ELEMENTS (AU, ME)

(New Scheme—2010 Admissions)

[Supplementary]



Time : Three Hours

Maximum : 100 Marks

*Answer one full question from each module.
Use of standard design data book is permitted.
Assume missing data suitably if any.*

Module 1

1. A cone clutch with a semi cone angle of 15° transmits 10 kW at 600 r.p.m. The normal pressure between the surfaces in contact is not to exceed 100 kN/mm^2 . The width of the friction surfaces is half of the mean diameter. Take coefficient of friction as 0.2.

Determine :

- (i) The outer and inner diameters of the plate, and
(ii) The axial force to engage the clutch.

Or

2. A simple band brake is operated by a lever of length 500 mm. The brake band dia is 500 mm. and the brake band embraces $\frac{5}{8}$ of the circumference. One end of the band is attached to the fulcrum of the lever while the other end is attached to the pin on the lever 100 mm. from the fulcrum. If the effort applied to the end of the lever is 2 kN and the coefficient of friction is 0.25, find the maximum braking torque on the drum.

(25 marks)

Module 2

3. The following data is given for a 360° hydrodynamic bearing :

Journal diameter	= 100 mm.
Radial clearance	= 0.12 mm.
Radial load	= 50 kN.
Bearing length	= 100 mm.
Journal speed	= 1440 r.p.m.
Viscosity of lubricant	= 16 CP

Calculate (i) Minimum film thickness ; (ii) Co-efficient if friction ; and (iii) Power lost in friction.

Or

Turn over

4. Select a suitable ball bearing for an axial flow compressor to carry a radial load of 250 kg. and a thrust of 150 kg. The bearing will be in use for 40 hrs/week for five years. The speed of the shaft is 100 r.p.m. The diameter of the shaft is 50 mm.

(25 marks)

Module 3

5. (a) How do you specify the gear tooth profile to satisfy the law of gearing? (5 marks)
 (b) Design a pair of helical gears is to be designed to transmit 15 kW at a pinion speed of 1400 r.p.m. The speed reduction ratio is 3 ; pressure angle 20° , allowable static stress 180 N/mm^2 and surface endurance limit is 800 N/mm^2 . Selecting suitable materials, determine the dimensions of the gears.

(20 marks)

Or

6. (a) What are the various forces acting on a bevel gear? Deduce the expression of it? (5 marks)
 (b) A pair of straight bevel gears is mounted on shafts, which are intersecting at right angles. The pinion shaft is connected to an electric motor developing 16.5 kW at 500 r.p.m.. The gear should run at 200 r.p.m. Design the drive.

(20 marks)

Module 4

7. Design a suitable connecting rod for the following :—

Piston diameter	= 68 mm.
Stroke	= 75 mm.
Length of connecting rod	= 150 mm.
Compression ratio	= 8 : 1.
Maximum explosion pressure	= 3.5 N/mm^2
Engine speed	= 4400 r.p.m.
Weight of reciprocating parts/cylinder	= 25 N.

Or

8. A single cylinder double acting develops 190 kW at 100 r.p.m. The maximum fluctuation of energy for revolution is 15% of the energy developed per revolution. The speed variation is limited to 1 % either way. The mean diameter of the rim is 2.4 m. Design and sketch the flywheel.

(25 marks)

[4 × 25 = 50 marks]

