B.Tech 6th Semester (ME) F-Scheme

Examination, May–2017

MECHANICAL MACHINE DESIGN-II

Paper-ME-304-F

Time allowed : 4 hours]   *[Maximum marks : 100*

Note : Question No.1 is compulsory and attempt one question from each section.

1. Describe Ergonomic and value engineering considerations in design; role of processing in design ; different types of fluctuating or variable stresses.   20

Section-A

2. Describe selection of materials for engineering purposes and also describe the Fits and tolerance ; Hole base system ; Shaft base system.   20

3. Describe mechanical properties of metals ; fatigue strength considering stress concentration factor ; surface factor ; size factor ; reliability factor.   20

Section-B

4. A line shaft is driven by means of a motor placed vertically below it. The pulley on the line shaft is 1.5 metre in diameter and has belt tensions 5.4 Kn and

1.8 Kn on the tight side and slack side of the belt. Both these tensions may be assumed to be vertical. If the pulley be overloading from the shaft, the distance of the centre line of the pulley from the centre line of the bearing being 400 mm. Find the diameter of the shaft assuming maximum allowable shear stress of 42 MPa. 20

5. A solid shaft is transmitting 1 MW at 240 r.p.m. Determine the diameter of the shaft if the maximum torque transmitted exceeds the mean torque by 20%. Take the maximum allowable shear stress as 60 MPa. 20

Section-C

6. Classifications of bearings ; types of sliding contact bearings ; hydrodynamic lubricated bearings ; properties of sliding contact bearing materials. 20

7. A 150 mm diameter shaft supporting a load of 10 kn. has a speed of 1500 rpm. The shaft runs in a bearing whose length is 1.5 times the shaft diameter. If the diametral clearance of the bearing is 0.15 mm and absolute viscosity of the oil at the operating temperature is 0.011 Kg/m-s; find the power wasted in friction. 20

Section-D

8. Describe the terms used in gears and also discuss (a) Cycloidal teeth (b) Involute teeth ; Advantages and disadvantages of gear drives ; Interference in involute gears. 20

9. A bronze spur pinion rotating at 600 rpm drives a cost iron spur gear at a transmission ratio of 4:1. The allowable static stresses for the bronze pinion and cast iron gear are 84 MPa and 105 MPa. The pinion has 16 standard 20° full depth involute teeth of module 8 mm. The face width of both the gears is 90 mm. Find the power that can be transmitted from the standpoint of strength.