TME-603 61 Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | |

# B. Tech. (ME)

## UTU (SEM.-VI) Examination-2015

## Machine Design II

*Time : 3 Hrs.* *Max. Marks :100*

**Note: Attempt all the questions, the marks assign to each question is indicated at question itself.**

Attempt any four questions. (4×5=20)

(a) Explain the terms interference and backlash in gears.

b) Explain beam strengths and wear strength for spur gears.

c) Why the helical gears are preferred for high speed application over spur gears?

d) How you will classify bevel gears on the basis of pitch angle?

e) What are the four important parameters that are required to specify the worm gear drive?

hydrodynamic bearing?

d) State the two dimensionless performance parameters in Petroff's equation that govern the coefficient of friction.

e) Which type of cross-section do you prefer for the main body of the connecting rod and why?

f.) What do you mean by $L_{10}$ and $L_{50}$ life in ball bearings?

3. Attempt any **Two** questions. (10×2=20)

a) Discuss various causes and remedies of gear tooth failures.

b) Define formative number of teeth on a helical gear. Derive the expression to obtain its value.

c) Explain the advantages and disadvantages of rolling element bearings and sliding contact bearings.

4. Attempt any **two** questions :

a) The pitch circles of the pinion and gear are 100 mm and 300 mm respectively. The pinion is made of plain carbon steel 40C8 ($S_{ut}$=600N/mm$^2$) while the gear is made of grey cast-iron FG300($S_{ut}$=300N/mm$^2$). The pinion receives 5kW power at 500 rpm through its shaft. The service factor and factor of safety can be taken as 1.5 each. The face width of the gear can be taken as ten times that of the module. Assume that the velocity factor accounts for the dynamic load. Calculate:

(i) Module

(ii) The number of teeth on pinion and gear.

(b) A pair of straight bevel gears consists of a 30 teeth pinion meshing with a 45 teeth gear. The module and the face width are 6 mm and 50 mm respectively. The pinion as well as gear is made of steel($S_{ut}$=600N/mm$^2$).Calculate the beam strength of the tooth.

(c) A single row deep groove ball bearing number 6002 is subjected to an axial thrust of 1000 N and a radial load of 2200 N. Find the expected life that 50% of bearing will complete under this condition.

5. Attempt any **two** question : (2×10=20)

(a) Following data is given for a 360° hydrodynamic bearing: journal diameter=100 mm, bearing length=100mm, radial load=50KN, journal speed 1440 rpm, radial clearance=0.12mm, viscosity of lubricant=16cP. Calculate(i)minimum film thickness;(ii)coefficient of friction;(iii)power lost in friction.

(b) Design a connecting rod for the petrol engine from the following data: diameter of the piston=120mm, weight of the reciprocating part=2kg, length of the connecting rod=300 mm, stroke length=140mm, speed=2000rpm maximum explosion pressure=2.25MPa.

(c) Write down the steps involved in the design of helical gears.

—x—