



Reg. No. :

Name :

**Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)**

08.705 : DESIGN OF MACHINE ELEMENTS – II (M)

Time : 3 Hours

Max. Marks : 100

Instructions : 1) Answer **all** questions from Part – **A** and **one full** question from **each** Module in Part – **B**.

2) **Assume** any missing **data** suitably.

3) **Use** of approved design data Hand Book **Permitted**.

PART – A

1. Explain the reason for gear failures.
2. Explain the classification of Bevel gears with neat sketches.
3. Define the following terms used in worm gearing :
 - a) Lead
 - b) Lead angle
 - c) Normal pitch
 - d) Velocity ratio.
4. Explain wedge film and squeeze film journal bearings.
5. Explain the importance of Bearing characteristic number.
6. Write short note on different types of antifriction bearings.
7. Explain the advantages and disadvantages of taper roller bearings.
8. What are the principal stresses in solid disk flywheel ?





9. Why it is necessary to dissipate the heat generated when clutches operate ?
10. Why an I section is usually preferred to a round section in case of connecting rods ? **(10×4=40 Marks)**

PART – B

Module – I

11. A compressor receives power through a pair of spur gears. The compressor shaft runs at 350 rpm while the motor shaft runs at 1450 rpm, delivering 50 kW power. The power transmission is with moderate shock and operated 10 hours per day. Pinion is steel C-45 and gear is steel C-30. Design the gear set.
12. Design a 20° involute worm and gear to transmit 12 kW with worm rotating at 1500 rpm and to obtain a speed reduction of 10 : 1. The distance between the shafts is 220 mm.

Module – II

13. Design a journal bearing to support a load of 500 kgf at 600 rpm. Assume the oil to be supplied is SAE 40 and the material is bronze backed babbitt. Also calculate the minimum oil film thickness, amount of artificial cooling required and rise in temperature.
14. A ball bearing operates on the following work cycle.

Element No.	Radial load (N)	Speed (rpm)	Element time (%)
1	3000	720	30
2	7000	1440	50
3	5000	900	20

The dynamic load capacity of the bearing is 16.6 kN. Calculate

- The average speed of rotation
- The equivalent radial load and
- The bearing life.



Module – III

15. Design a cast iron piston for single acting four stroke engine for the following specifications. Cylinder bore = 100 mm, stroke = 120 mm, maximum gas pressure = 5 N/mm², Brake mean effective pressure = 0.65 N/mm², Fuel consumption = 0.23 kg/kW/hr. Speed = 2200 rpm.
16. A centrifugal clutch is to be designed to transmit 18 kW at 900 rpm. The shoes are four in number. The speed at which the engagement begins is $\frac{3}{4}$ of running speed. The inside radius of pulley rim is 150 mm. The shoes are lined with ferrodo with coefficient of friction taken as 0.25. Determine
- i) Mass of shoes
 - ii) Size of shoes.

(3×20=60 Marks)
