



Reg. No. :

Name :

**Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)**

08.705 : DESIGN OF MACHINE ELEMENTS – II (M)

Time: 3 Hours

Max. Marks: 100

- Instructions :** 1) Answer **all** questions from Part – A.
2) Answer **one full** question from **each** Module of Part – B.
3) **Missing** data can be assumed.
4) **Design** data book can be **consulted**.



PART – A

1. How are dynamic effects accounted for in Gear design ?
2. Explain 'Pitting' in Gears.
3. What are the advantages of bevel gears ?
4. Classify the difference between hydrodynamic lubrication and hydrostatic lubrication.
5. Explain Wedge-film lubrication.
6. What is the significance of bearing modulus in bearing design ?
7. Explain rating life of bearings.
8. Compare Ball and Roller bearings.
9. What are the functions of a lubricant in ball and roller bearings ?
10. What are the two most usual causes of crankshaft failures ? **(4x10=40 Marks)**

**PART – B****Module – I**

11. Design completely a pair of spur gears of 20° involute full depth. The pinion, running at 750 rev./min. transmits 110 kW to a gear running at 140 rev/min. Check for strength and surface durability. 20

OR

12. Design a worm drive for a speed reducer to transmit 30 kW at a worm speed of 600 rev/min. The desired velocity ratio is 25 : 1 and an efficiency of at least 87 per cent is desired. The worm is made of hardened steel, and select the material of the gear. 20

Module – II

13. Design a journal bearing to support a load of 7500 N while the shaft runs at 700 rev/min using a hardened steel journal and bronze backed babbit bearing. The oil used as a viscosity of 0.0087 kg/ms at 82°C . Clearance may be assumed as 0.0025 cm per cm diameter and ambient temperature 29°C . If the heat radiating capacity of the bearing is 150 W per $(\text{m})^2$ of projected area of bearing per $^\circ\text{C}$, is artificial cooling necessary? 20

OR

14. A bearing is to be selected for a shaft of diameter 35 mm. It carries a stationary load of 2250 N at a speed of 1500 rev/min. The shaft is to be operate for 8 hours per day, 5 days per week, for 5 years. The inner ring rotates and there is a possibility of light shock. 20

Module – III

15. The cylinder of an SI engine is to be designed. Select the material for the cylinder prior to designing completely the cylinder. The diameter is to be 300 mm. The maximum gas pressure is 3.5 N/mm^2 . 20

OR

16. A fly wheel for a four cylinder petrol engine develops 22.5 kW at 1000 rev/min. The fluctuation of energy is 25% of that of one revolution, fluctuation of speed is 2% and the radius of gyration is 0.18 m. Design a steel flywheel. The density of steel is 7830 kg/m^3 . 20