Exam. Code: 0942
Sub. Code: 33872

2055

B.E. (Mechanical Engineering)

Sixth Semester

MEC-601: Design of Machines Elements – II

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt five questions in all, including Question No. 1 (Part-A) which is compulsory and selecting two questions each from Part B - C. Assume any suitable data, wherever not given. Supplement your answer with suitable sketches wherever required. Use of design data book is allowed.***

x-x-x

Part-A

1. (i) Define "spring rate" and explain its importance in the design of helical compression springs.
(ii) What is the difference between full-film lubrication and boundary lubrication?
(iii) Describe the forces acting on bevel gears and how they influence the gear design.
(iv) What are the primary differences between rolling contact bearings and sliding bearings?
(v) How does heat dissipation affect the design and performance of brakes?

(2 x 5 = 10 Marks)

Part-B

2. Explain the difference between flat belts, V-belts, and roller chains in terms of their applications, efficiency, and load-carrying capacity. How does the choice of material affect the performance of each type?

(10 Marks)

3. Design a spur gear system with the following data:

Number of teeth on the driving gear (N_1) = 40
Number of teeth on the driven gear (N_2) = 80
Torque on the driving gear (T_1) = 25 Nm.

(10 Marks)

4. Discuss the design considerations for leaf springs. How does the material selection and spring configuration affect the performance of leaf springs in vehicles?

(10 Marks)

P.T.O.

Part-C

5. Given the following data for a journal bearing:
Load on the bearing = 5000 N
Bearing radius = 30 mm
Viscosity of lubricant = 0.02 Pa.s
Operating speed = 1000 rpm
Calculate the oil film thickness using the Reynolds equation. Discuss how changes in load and speed affect the oil film thickness and bearing performance.

(10 Marks)

6. A rolling element bearing is subjected to a radial load of 2500 N and a thrust load of 1500 N. Calculate the basic dynamic load rating of the bearing, assuming the bearing material is steel, and use the formula for load rating based on standard values. Also, calculate the bearing life under these loads.

(10 Marks)

7. Discuss the design considerations for disk brakes and their operation under varying load conditions. Calculate the braking force for a disk brake system given the input torque and radius of the brake disk. How would the design change for a system requiring high thermal resistance?

(10 Marks)

x-x-x