Roll No…….. **Total No. of Printed Pages: 1**

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B. Tech (Mechanical Engg.) (Semester – 6th)
DESIGN OF MACHINE ELEMENTS - II
Subject Code: BTME601
Paper ID: [6112301]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 6 questions of 10 marks each. The student has to attempt any 4 questions out of it.

Section – A **(2 marks each)**

Q1. Attempt the following:
a) Define the gear module.
b) What do you understand by the modes of lubrication?
c) Distinguish between 'Hydro-dynamic bearings' and 'Hydro-static bearings'.
d) Why the arms of a flywheel tapered?
e) What is the offset link of roller chain?
f) Explain the main purpose of using a clutch?
g) What is belt slip and creep?
h) What is the condition for self-locking block brake?
i) What is a positive clutch?
j) Write the application of slider bearing.

Section – B **(10 marks each)**

Q2. Design a helical compression spring, which is subjected to a static load of 5 kN and a fluctuating load of ± 2 kN. The mean diameter of the spring is 100 mm, and the stiffness of the spring is 50 N/mm. Use a factor of safety of 2. Take τ_y =700 MPa and τ_e =300 MPa.

Q3. Select a suitable chain drive to transmit 50 kW from an electric motor to a line shaft. The motor shaft r.p.m. are 1200, line shaft r.p.m. are 250 and approximate center distance is 600 mm. Assume service is 10hr/day, 6 days per week.

Q4. Explain the steps involved in slider bearing design.

Q5. A multiple disk clutch, steel or bronze, is to transmit 3.68 kW at 750 rev/min. The inner radius of contacts is 38 mm and the outer radius of contact is 70 mm. The clutch operates in oil with an expected co-efficient of friction 0.10. The average pressure is 0.35 N/mm^2. Determine:
a) Total disks of steel and bronze required.
b) Axial force required.

Q6. A single cylinder 4-stroke IC engine develops 20 kW at 240 rpm. The work done by the gases during expansion stroke is 2.5 times the work done on the gases during the compression stroke; the work done during the suction and exhaust strokes being negligible. If the total fluctuation of speed is not to exceed ±2% of the mean speed, and the turning moment diagram during compression and expansion is assumed to be triangular in shape. Determine the moment of inertia of the flywheel.

Q7. Discuss the disc and band brake equation in detail with neat sketches.