

August/September 2022

B.Tech(ME) VI SEMESTER

DESIGN OF MACHINE ELEMENTS- II (PCC-ME-306)

Time: 3 Hours

Max. Marks: 75

Instructions:

1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
2. Answer any four questions from Part -B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.
4. Use of Design Data Book is allowed in the exam.

PART -A

Q1 (a) Define Endurance Limit. (1.5)
 (b) Differentiate between thick and thin film lubrication. (1.5)
 (c) Define Notch Sensitivity. (1.5)
 (d) Explain Stress Concentration. (1.5)
 (e) Name five different types of gears. (1.5)
 (f) Define Lewis' Form Factor. (1.5)
 (g) Explain Coefficient of Fluctuation of Speed for a Flywheel. (1.5)
 (h) Differentiate between Acme and Buttress Threads. (1.5)
 (i) Which gear has the maximum efficiency among all the types? (1.5)
 (j) In completely reversed loading, the mean stress is equal to _____. (1.5)

PART -B

Q2 (a) Explain the S-N Curve in detail (10)
 (b) Differentiate between Solid Disk and Rimmed Flywheels. (5)

Q3 (a) The torque developed by an engine is given by the following equation: (10)

$$T = 15.25 + 2100 \sin\theta - 1300 \cos\theta$$
 Where T is the torque in N-m and θ is the crank angle from the inner dead centre position. The resisting torque of the machine is constant throughout the work cycle. The coefficient of speed fluctuations is 0.01 & the engine speed is 200 rpm. A solid circular disk 70 mm thick is used as a flywheel. The mass density of steel is 7800 kg/m^3 . Calculate the radius of the flywheel disk.
 (b) Explain the design considerations for castings and forgings. (5)

Q4 Derive the Lewis and Buckingham equation (15)

Q5 (a) Explain the procedure for designing of a crank pin used in a crank shaft. (10)
 (b) Explain the phenomenon of Pitting in gears. (5)

Q6 (a) Explain the phenomenon of Buckling in a Connecting Rod. (10)
 (b) Explain the reasons for presence of dynamic load in a gear system. (5)

Q7 A single-row deep groove ball bearing No. 6002 is subjected to an axial thrust of 1000 N and a radial load of 2200 N. Find the expected life that 50% of the bearings will complete under this condition. (15)
