

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/m³. 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)
