Roll No: | | | | | | | | | | | |

PRESIDENCY UNIVERSITY

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956
Approved by AICTE, New Delhi | Approved By BCI
Bengaluru

Mid Term Examinations - October 2026

Date: 05/10/2026 **Time:** 09:30 AM - 11:00 AM

Course Code: MEC2508 **Course Name:** Design of Machine Elements

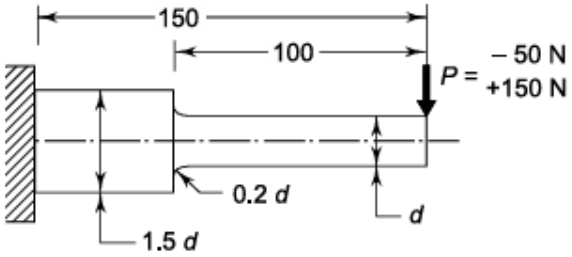
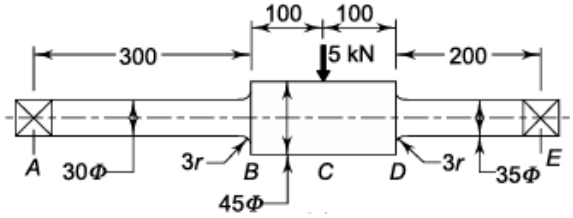
Semester: Fifth Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2
Marks	44	46

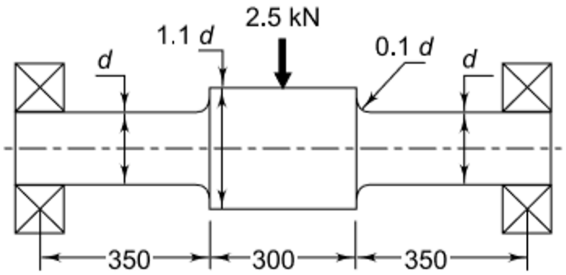
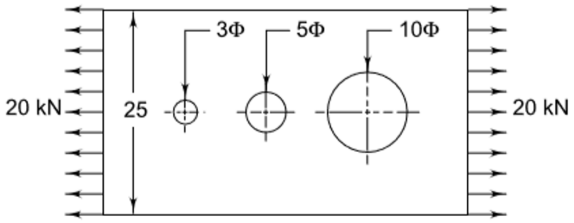
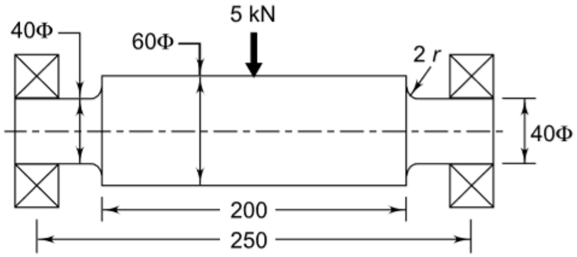
PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	Explain fatigue failure in a structure?	2	CO2	BT2
2	Discuss about notch sensitivity?	2	CO2	BT1
3	Explain briefly about stress concentration?	2	CO1	BT2
4	What is the factor of safety (FOS)?	2	CO1	BT1
5	What is the surface finish factor for a cylindrical component subjected to Tension, having sharp circular grooves & having an ultimate tensile strength of 500 MPa?	2	CO2	BT2

PARTB: Answer Any 1 Following Questions. 20 M

Q.N.	Questions	M	CO	BT
06.A	A cantilever beam made of cold drawn steel 4OC8 (Sut = 600 MPa and Syt = 380 MPa) is shown in Fig. The force P acting at the free end varies from –50 N to +150 N. The expected reliability is 90% and the factor of safety is 2. The notch sensitivity factor at the fi llet is 0.9. Determine the 'e' factors. 	10	CO2	BT3
06.B	A rotating shaft, subjected to a non rotating force of 5 kN and simply supported between two bearings A and E is shown in Fig. The shaft is machined from plain carbon steel 30C8 (Sut = 500 MPa) and the expected reliability is 90%. The equivalent notch radius at the fi llet section can be taken as 3 mm. Determine all the 'e' factors. 	10	CO2	BT3

07.A	A forged steel bar, 50 mm in diameter, is subjected to a reversed bending stress of 250 MPa. The bar is made of steel 40C8 (Sut = 600 MPa). Calculate the life of the bar for a reliability of 90%	10	CO2	BT3
07.B	A rod of a linkage mechanism made of steel 40Cr1 (Sut = 550 MPa) is subjected to a completely reversed axial load of 100 kN. The rod is machined on a lathe and the expected reliability is 95%. There is no stress concentration. Determine the diameter of the rod using a factor of safety of 2 for an infinite life condition	10	CO2	BT3

PARTC: Answer Any 1 Following Questions. 20 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
08.A	A non-rotating shaft supporting a load of 2.5 kN is shown in Fig. The shaft is made of brittle material, with an ultimate tensile strength of 300 MPa. The factor of safety is 3. Determine the dimensions of the shaft. 	10	CO1	BT3
08.B	A rectangular plate, 15 mm thick, made of a brittle material is shown in Fig. Calculate the stresses at each of three holes of 3, 5 and 10 mm diameter. 	10	CO1	BT3
09.A	A shaft carrying a load of 5 kN midway between two bearings is shown in Fig. Determine the maximum bending stress at the fillet section. Assume the shaft material to be brittle. 	10	CO1	BT3
09.B	Construct and explain Rotaing Beam Fatigue Testing along with all points in the S-N Curve.	10	CO1	BT3