NAVRACHANA UNIVERSITY
a UGC recognized University

School: School of Engineering and Technology
Program/s: BTech Mechanical
Year: 3rd **Semester:** 6th
Examination: End Semester Examination
Examination year: May 2023

Course Code: ME 318 **Course Name:** Machine Design II
Date: 17/05/2023
Time: 2: 00 to 4:00 pm

Total Marks: 40
Total Pages: 02

Instructions:

→ Write each answer on a new page.
→ Use of a calculator is permitted/not permitted.
→ Use of design data handbook is permitted
→ * COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping

Q. No.	Attempt Any Five Questions (All carry Equal Marks)	Marks	COs*	BTL#
Q.1	A journal of bush bearing rotates at 1200 rpm and supports a radial load of 850 N. the viscosity of lubricating oil is 40 centipoises. The effective co efficient of friction in bearing is 0.02. The length to diameter ratio is 1.0 while the radial clearance between journal and the bush is 100 microns. Assuming that the journal runs concentric to the bush calculate 1. The dimensions of the journal and bush 2. The power lost in bearing.	8	CO1	BT1, BT2
Q.2	Design a close coiled helical compression spring of circular wire with the following data: Maximum load 400N, Minimum load 250 N, Spring Index 8, Lift of the spring is 10mm, permissible shear stress for the spring material id 400 MPa. And modulus of rigidity is 80*1000 MPa.	8	CO1, CO2	BT1, BT3,
Q.3	A multi plate clutch has three driving plates and two driven plates. The outer and inner diameters of the friction lining are 240 mm and 120 mm respectively. The coefficient of friction is 0.28. assuming uniform pressure condition, find the total spring force pressing the plates together to transmit 30 kw at 1500 rpm.	8	CO2	BT3, BT4
Q.4	A high pressure compound cylinder consists of an inner steel cylinder with inner and outer diameters of 100 mm and 150 mm respectively. It is reinforced by shrinking a steel cylinder of outer diameter 200 mm. the difference between the outer diameter of the inner cylinder and the inner diameter of outer cylinder before assembly is 0.15 mm. if the modulus of elasticity of the steel used for cylinders is 207000 MPa. Calculate 1. The shrinkage pressure 2. The maximum residual tensile stresses induced in any of the cylinders.	8	CO3, CO4	BT2, BT4
Q.5	A ball bearing operates on a work cycle consisting of three parts: a radial load of 3000 N at 720 rpm for 30 percentage of the cycle, a radial load of 7000 N at	8	CO4	BT1, BT2

	1440 rpm for 40 percentage of the cycle, and a radial load of 5000 N at 900 rpm for remaining part of the cycle. The basic dynamic capacity of the bearing is 30700N calculate: 1. The rating life of bearing in hours 2. The average speed of rotation			
Q-6	A double block brake with an identical pivoted shoes is to be used for the braking torque capacity of 1 KN-m. the diameter of the brake drum is 400 mm and the angle of wrap for each shoe is 120°. The coefficient of friction is 0.3 and the permissible intensity of pressure is 0.8 MPa. The pivot of each shoe is located in such a way that the moment of friction force on the shoe about the pivot is zero. Calculate: 1. The distance of pivot from the axis of brake drum and 2. The width of friction lining parallel to the axis of drum	8	CO3, CO4	BT2, BT4
Q-7	Define the following terms: 1. basic static capacity 2. basic dynamic capacity 3. Rating life of bearing 4. Median life of bearing	8	CO4	BT1, BT2

************End of Question Paper************