	ADAMAS UNIVERSITY			
	END (EVEN) SEMESTER EXAMINATION: MAY 2021			
	(Academic Session: 2020 – 21)			
Name of the Program:	B. Tech	**Semester:**		IV
Paper Title:	Design of Machine Elements	**Paper Code:**		EME42118
Maximum Marks:	40	**Time duration:**		03 HRS.
Total No of questions:	08	**Total No of Pages:**		02

Answer all the Groups

Group A

(Answer all the questions)

1×5=5

1.

    a. What do you mean by mechanical drives?
    b. Distinguish between design synthesis and design analysis.
    c. Define fatigue.
    d. Briefly discuss maximum shear stress theory of failure.
    e. What is the basic function of bearings?

Group B

(Answer any three questions)

5×3=15

2. A gas tank consists of a cylindrical shell of 2.5 m inner diameter. It is enclosed by hemispherical shells by means of butt welded joint as shown in Figure below. The thickness of the cylindrical shell as well as the hemispherical cover is 12 mm. Determine the allowable internal pressure to which the tank may be subjected, if the permissible tensile stress in the weld is 85 N/mm^2. Assume efficiency of the welded joint as 0.85.
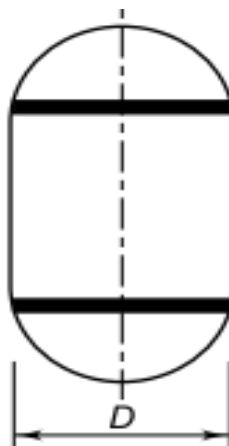
3. What is the difference between rolling contact bearing and sliding contact bearing?

4. A hydrodynamic journal bearing is subject to 4000 N load at a rotational speed of 2000 rpm. Both bearing bore diameter and length are 40 mm. If radial clearance is 20 µm and bearing is lubricated with an oil having viscosity 0.03 Pa.s, Calculate the Sommerfeld number of the bearing.

5. Define circular pitch, diametral pitch, module and centre distances with typical mathematical relation in context to gear.

Group C

(Answer any two questions)

10×2=20

6. Develop the relation of Soderberg's Criteria with necessary explanation and plot.
7. Explain maximum distortion energy theory of failure and develop the standard relationship for this theory for a triaxial.
8. (a) The dynamic load capacity of 6306 bearing is 20KN. Calculate the maximum radial load it can sustain to operate at 600 rpm for 3000 hr.
   (b) A small element at the critical section of a component in biaxial state of stress with the two principal stresses being 360MPa and 140MPa. Calculate the maximum working stress as per von-Mises energy theory.