ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END-SEMESTER EXAMINATION : JANUARY 2021** (Academic Session: 2020 – 21)		
Name of the Program:	**B.Tech. in Mechanical Engineering**	**Semester:**	VII
Paper Title :	Design of Machine Elements	**Paper Code:**	EME44103
Maximum Marks :	40	**Time duration:**	3 Hours
Total No of questions:	Eight	**Total No of Pages:**	02

Answer all the Groups

Group A

Answer all the questions of the following $5 \times 1 = 5$

1. **a)** What is stress concentration factor?
b) Define the term "Adaptive Design.
c) Which joint is stronger riveted or welded? Give reasons.
d) What do you mean by uniform strength riveted joints?
e) Differentiate between crushing and bearing stress.

GROUP –B

Answer *any three* of the following $3 \times 5 = 15$

2. Explain how the strength of transverse & parallel fillet weld joints is determined?

3. Find the diameter of a solid steel shaft to transmit 20 kW at 200 r.p.m. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 8. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter when the ratio of inside to outside diameters is 0.5.

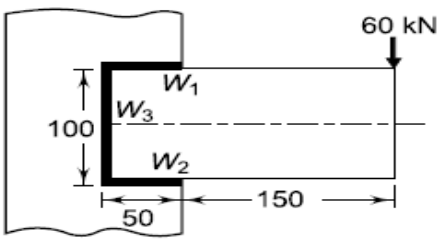
4. Derive the expression the required torque for a power screw for lifting a load (m kg).

5. Show that the efficiency of a power screw is dependent upon lead, mean diameter of screw, helix angle and angle of friction.

GROUP –C

Answer *any two* of the following $2 \times 10 = 20$

6. Find the size of the weld of the following structure if permissible shear stress is 100 N/mm^2.



7. A solid shaft is transmitting 1 MW at 240 r.p.m. Determine the diameter of the shaft if the maximum torque transmitted exceeds the mean torque by 20%. Take the maximum allowable shear stress as 60 MPa.

8. A pair of wheels of a railway wagon carries a load of 50 kN on each axle box, acting at a distance of 100 mm outside the wheel base. The gauge of the rails is 1.4 m. Find the diameter of the axle between the wheels, if the stress is not to exceed 100 MPa.