S.B. Roll. No……..

**MACHINE DESIGN**
**6th Exam/Mech./5336/Jun'2022**
**(For 2018 Batch Onwards)**

**Duration: 3Hrs.** **M.Marks:75**

**SECTION-A**

**Q1. Fill in the blanks.** **15x1=15**

a. The Property of material to be drawn into wires is called _____.
b. Energy stored in a body within _____limits is known as resilience.
c. The objective of Caulking in a riveted joint is to make the joint _____.
d. The Maximum normal stress Theory is used for_____ material.
e. The largest diameter of an external or internal screw thread is known as _____.
f. Center to center distance between two consecutive rivet rows is called _____.
g. A Rivet is identified by _____ .
h. The ability of a metal to be converted into sheet is called _____.
i. The transverse fillet weld is designed for _____.
j. When a shaft is subjected to a bending moment M and a twisting moment T, then the equivalent twisting moment is equal to _____.
k. The property of a material which enables it to resist fracture due to high impact loads is known as _____.
l. If a material fails bellow its yield point, failure would be due to _____.
m. Resilience of material is important when it is subjected to _____.
n. The function of a washer is to provide _____.
o. In a riveted joint design, diameter of rivet d in term of plate thickness t is equal to_____.

**SECTION-B**

**Q2. Attempt any six questions.** **6x5=30**

i. Explain fillet weld joint with diagram.
ii. What are the essential considerations of a good product design?
iii. What are the causes of shaft failure and what is the effect of Keyway of the strength of a shaft.
iv. Explain different failures of Rivted joint.
v. Define following property
(a) Brittleness (b) Ductility (c) Toughness (d) Hardness
vi. An eye bolt is used to lift a load of 60 KN. Find the diameter of the bolt, if the tensile stress is not to exceed 100MPa.
vii. What is maximum principal stress theory?

**SECTION-C**

**Q3. Attempt any three questions.** **3x10=30**

a. A steel shaft is required to transmit 75 KW at 100 r.p.m and maximum twisting moment is 30% greater than the mean. Find the diameter of the shaft, if the maximum stress is 70 $N/mm^{2.}$ Find the angle of twist in a length of 3 m of the shaft .G=90$KN/mm^2$.
b. Design a double Riveted butt joint with two cover plates for the longitudinal steam of a boiler shell, 750 mm diameter, to carry a maximum steam pressure of 1.05 $N/mm^2$ .The allowable stresses are $f_t$ =35 N/mm , $f_s$=28 $N/mm^2$ , $f_c$ =52.5 $N/mm^2$. Assume the efficiency of joint is 75 %.
c. A plate 50 mm wide 12.5 mm thick carries a static load of 36 KN and is to be welded to plate by parallel fillet weld. Determine length of each weld when Allowale shear stress for static loading is 75$N/mm^2$.
d. Design a Knuckle joint to connect two mild steel bars under a tensile load of 25 KN. The allowable stresses are 65 MPa in tension, 50MPa in shear and 83 MPa in crushing.