S.B. Roll. No……

MACHINE DESIGN
6th Exam/Mech./5336/Dec'22
(For 2018 Batch Onwards)

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

SECTION-A

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

a. Factor of safety is the ratio of maximum stress to_____
b. The property of material to retain deformation is called _____
c. Maximum shear strain energy theory also known as_____
d. The most suitable theory of failure for brittle materials is _____
e. _____is a rotating machine member used to transmit power from one point to another.
f. Two shafts are connected by _____
g. A key made from a cylindrical disc having segmental cross-section is called _____
h. The usual proportion for the width of key is _____
i. Cylindrical pin is the main part of _____joint.
j. A cotter joint is used to transmit _____
k. Rivets are _____joint.
l. _____coupling used to couple two shafts whose axes are parallel but not in alignment.
m. Muff coupling is also called _____
n. Top surface of thread is known as _____
o. The included angle in Acme thread is _____

SECTION-B

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

i. Differentiate between designed and un-designed work.
ii. Describe the maximum shear strain energy theory.
iii. Write the desirable properties of shaft materials.
iv. Differentiate between key and splines.
v. A steel plate 75mm wide and 10mm thick is welded to a plate with a lap joint having transverse welding. Find size of weld if the load is 55kN and allowable stress in tension is 110MPa.
vi. Discuss the tearing of the plate across a row of rivets.
vii. Differentiate between clutch and coupling.
viii. Write a note on bushed pin type flexible coupling.
ix. Discuss the types of failure of nuts and bolts.

SECTION-C

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

a. Explain the design procedure in detail.
b. Find the diameter of a solid shaft to transmit 20kW at 200RPM, the ultimate shear stress for steel may be taken as 360MPa and factor of safety as 8. If a hollow shaft is to be needed in place of solid shaft, find the inside and outside diameter when the ratio of inside and outside diameter is 0.5.
c. Design a knuckle joint to transmit a load, which varies from 150kN tensile to 150kN compression. The permissible stresses are 75MPa in tension, 60MPa in shear and 150MPa in compression.
d. Design a flange coupling required to transmit 2900kW at 100RPM. Flanges are connected by 8 bolts having an allowable shear stress of 60MPa. The material of the shaft and bolt is same.
e. Explain the advantages and disadvantages of screw joints.