S.B. Roll No.....

MACHINE DESIGN

6th Exam/5522/Mech/May'17

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

SECTION -A

Q1.Fill in the blanks: **1.5x10=15**

a. The member subjected to compressive stress is known as _____.
b. Elasticity is opposite to _____ .
c. In mechanical parts ,two types of possible failure are _____ and _____ .
d. An axle is like a shaft which does not _____ .
e. Width of gib head key is generally taken as _____ .
f. Two examples of permanent joints are _____ .
g. The symbol of single v butt form of weld is _____ .
h. _____ is the diameter of the cylinder on which the threads are cut.
i. The flange coupling is _____ type of coupling.
j. A rivet is described by _____ .

SECTION -B

Q2. Attempt any five questions: **6x5=30**

i. Explain the necessity of design.
ii. Explain various types of loads.
iii. What is equivalent twisting moment and equivalent bending moment?
iv. What are the advantages of welded joints over riveted joints?
v. Describe protected type flange coupling with a neat sketch.
vi. Write screw thread nomenclature.

SECTION -C

Attempt any three questions: **3x10=30**

Q3. A solid steel circular shaft have tensile stress and ultimate shear stress of 800 MPa and 620 MPa respectively, is subjected to combined torsion moment of 130000 N-m and bending moment of 4000 N-m .Assume factor of safety 5 ,find the diameter of the shaft.

Q4. A double riveted lap joint with chain riveting is made for joining two plates having thickness of 12 mm. if allowable tensile stress, allowable shear stress and allowable compressive stress are 65 MPa, 55MPa and 80MPa respectively, find the rivet diameter, pitch of rivets, distance between rows of rivets and efficiency of the joint.

Q5. Design a cast iron flange coupling to connect two shafts of 100 mm diameter running at 250 rpm and transmitting 4000 Nm torque. Take permissible shear stress for shafts, bolts and key as 50 MPa, crushing stress for bolt and key as 150 MPa and shear stress for C.I. as 8 MPa.

Q6. Write short note on:

a. Effect of keyway on shaft strength
b. Failure of knuckle pin in shear