

GUJARAT TECHNOLOGICAL UNIVERSITY

P.D.D.C Sem-III Examination May 2011

Subject code: X31903**Subject Name: Machine Design & Industrial Drafting****Date: 25/05/2011****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What is a stress concentration? Explain various stress relieving methods. **04**
- (b) State the main mechanical properties of materials. **02**
- (c) Explain following with figure. **08**
1. Bearing stress.
 2. Crushing stress.
 3. Eccentric axial stress.
 4. Principle stress.
- Q.2** (a) What is riveted joint? Show by neat sketch the various ways in which a riveted may fail. **07**
- (b) Design a double riveted butt joint with two covers plates for the longitudinal seam of a boiler shell 1.5m in diameter subjected to a steam pressure of 0.95 N/mm². assume joint efficiency as 75 %, allowable tensile stress in the plate 90 MPa, compressive stress 140 MPa and shear stress in the rivet 56 MPa. **07**

OR

- (b) Explain following AutoCAD command with example. **07**
1. Rotate
 2. Trim.
 3. Offset.
 4. Base line diameter.
- Q.3** (a) What is lever? Explain term leverage. **03**
- (b) A lever is to be designed for a housing winch. Write the procedure for designing a hand or foot lever. **04**
- (c) Discuss the design procedure of a rocker arm for operating the exhaust valve. **07**

OR

- Q.3** (a) Distinguish between shaft and axle. How the shaft is designed when it is subjected to twisting moment only. **07**

- (b) Describe with the help of neat sketches the types of various shaft couplings mentioning the use of each type. 07

Q.4 (a) State the different types of power screws threads with nomenclature. 07

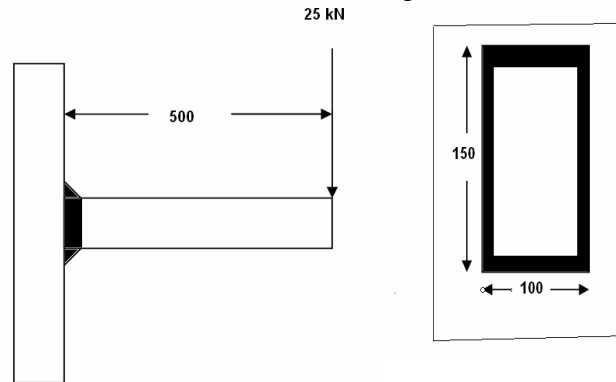
- (b) A jack screw having capacity 100kN and having triple start square thread, having root diameter 60mm. and pitch 10mm. coefficient of friction 0.15. Find following parameters. 07

1. Compressive stress.
2. shear stress in thread (14 threads in nut)
3. Efficiency.
4. Whether it is safe locking or not?

OR

Q.4 (a) State and explain discuss the various types of welded joints used in pressure vessels. What are the considerations involved. 07

Q.4 (b) a rectangular cross section bar is welded to a support by means of fillet welds as shown below. Determine the size of the welds, in the permissible shear stress in the weld is limited to 75 Mpa. 07



Q.5 (a) What is fit? State different types of fits with example. 07

- (b) Draw the assembly drawing of steam stop valve or tailstock indicating main parts and name and usual material for them. 07

OR

Q.5 (a) Explain the importance of following in manufacturing 07

1. Tolerance.
2. Surface roughness.

(b) Explain creating and modifying 3D objects using AutoCAD. 07
