

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER-III EXAMINATION – WINTER 2015

Subject Code: X31903**Date: 23/12/2015****Subject Name: Machine Design & Industrial Drafting****Time: 10:30pm to 01:00pm****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)** Explain the following terms: **07**
- (i) Elasticity;
 - (ii) Creep;
 - (iii) Fatigue;
 - (iv) Resilience;
 - (v) Bearing stress;
 - (vi) Hardness;
 - (vii) Toughness;
- (b)** What is a stress concentration? Explain various stress relieving methods. **07**
- Q.2 (a)** Explain different modes the failures of a riveted joint with neat sketch. **07**
- (b)** What is an eccentric loaded welded joint? Discuss the procedure for designing such a joint. **07**

OR

- (b)** Design a double riveted butt joint with two cover plates for the longitudinal seam of a boiler shell 1.5 m 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**
- Q.3 (a)** Explain the following terms: **07**
1. Lever
 2. Mechanical advantage
 3. Fulcrum
 4. Leverage
 5. Deviation
 6. Tolerance
 7. Allowance
- (b)** A foot lever is 1 m from the centre of shaft to the point of application of 800 N load. Find : **07**
1. Diameter of the shaft;
 2. Dimensions of the key, and
 3. Dimensions of rectangular arm of the foot lever at 60 mm from the centre of shaft assuming width of the arm as 3 times thickness.
- The allowable tensile stress may be taken as 73 MPa and allowable shear stress as 70 MPa.

OR

- Q.3 (a)** Discuss the design procedure of a rocker arm for operating the exhaust valve. **07**

- (b) A line shaft is driven by means of a motor placed vertically below it. The pulley on the line shaft is 1.5 metre in diameter and has belt tensions 5.4 kN and 1.8 kN on the tight side and slack side of the belt respectively. Both these tensions may be assumed to be vertical. If the pulley be overhang from the shaft, the distance of the centre line of the pulley from the centre line of the bearing being 400 mm, find the diameter of the shaft. Assuming maximum allowable shear stress of 42 MPa. **07**
- Q.4** (a) Explain Oldham Coupling with the help of neat sketch. **07**
 (b) Explain the design procedure of socket and spigot cotter joint. **07**
- OR**
- Q.4** (a) Give detailed classification of keys. Draw sketches of different types of keys and state their application. **07**
 (b) Explain basic procedure for design of muff coupling with neat sketch. **07**
- Q.5** (a) Explain the design of screw jack with neat sketch. **07**
 (b) Design a knuckle joint to transmit 150 kN. The working stresses may be taken as 75 MPa in tension, 60 MPa in shear and 150 MPa in compression. **07**
- OR**
- Q.5** (a) Explain following AutoCAD command with example. **07**
 1. Rotate
 2. Trim.
 3. Base line diameter.
 4. Offset.
- (b) List and explain the various co-ordinate systems in AutoCAD **07**
