

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) - EXAMINATION – SUMMER 2017****Subject Code: 2130103****Date: 31/05/2017****Subject Name: Analysis Of Mechanisms & Machine Elements****Time: 10:30 AM to 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.

		MARKS
Q.1	Short Questions	14
	1 What is Degree of freedom?	
	2 What is Rigid body?	
	3 What is Linkage?	
	4 Write Poisson Ratio.	
	5 What is Longitudinal stress?	
	6 What is Mechanism?	
	7 What is Caulking?	
	8 Rivet is used for Permanent fastening between plates. True or False?	
	9 What is Fullering?	
	10 Strength of the Welded joint is higher than Rivet joint. True or False?	
	11 Gas welding is a type of Fusion welding. True or False?	
	12 What should be criteria for the Thin shell type pressure vessels?	
	13 What are the two main types of failures can occur in thin cylindrical shell type pressure vessel?	
	14 What is Maximum shear stress theory?	
Q.2	(a) What are centripetal and tangential components of acceleration? When do they occur? How are they determined?	03
	(b) Define Coriolis component of acceleration. When it occurs?	04
	(c) A steel rod ABC firmly held at A and C has a cross sectional area of 1000 mm ² for 400 mm length and 1500 mm ² for 600 mm length as shown in fig. (a). If the rod is heated through 10 K, find the stresses developed in part AB and BC. Take $\alpha = 12 \times 10^{-6}/K$.	07
	OR	
	(c) A square bar of 20 mm side is held between two rigid plates and loaded by an axial force $P = 450$ kN as shown in fig. (b). Find the reactions at the ends A and C and extension of the portion AB. Take $E = 200$ GPa.	07
Q.3	(a) What is principle of virtual work? Explain.	03
	(b) What do you mean by centre of mass of the body? What are its types?	04
	(c) With help of neat sketches explain inversions of four-bar chain mechanism.	07
	OR	
Q.3	(a) Define following terms:	03

- (i) Spindle (ii) Axle (iii) Shaft
- (b) With help of sketch explain Kennedy's theorem. **04**
- (c) With help of neat sketch explain Whitworth quick return mechanism. **07**
- Q.4** (a) What are the methods of Riveting? **03**
- (b) Define following terms of riveted joints: **04**
- (i) Pitch (ii) Back Pitch and (iii) Margin (iv) Diagonal pitch
- (c) Explain Failures of the riveted joints. **07**
- OR**
- Q.4** (a) What is the Strength and Efficiency of the riveted joint? **03**
- (b) Write short note on Electric arc welding with labeled diagram. **04**
- (c) Two plates of 16mm thick are joined by a double riveted lap joint. The pitch of each row of rivet is 90mm. The rivets are 25mm in diameter. The permissible Tensile, Compressive and Shear stresses are 140, 240 and 110 MPa respectively. **07**
- Q.5** (a) Classify Pressure vessels. **03**
- (b) A plate 1m long, 60mm thick is welded to another plate at right angles to each other by 15mm fillet weld as shown in fig. (c). Find the maximum torque that the welded joint can sustain if the permissible shear stress intensity in the weld material is not to exceed 80MPa. **04**
- (c) Explain the Longitudinal stresses acting in cylindrical pressure vessels. **07**
- OR**
- Q.5** (a) Write difference between Welded joints and Riveted joints. **03**
- (b) Explain Thermit welding with labeled diagram. **04**
- (c) Derive equation for Thin cylindrical shell subjected to an internal pressure. **07**

