

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2023****Subject Code:3132505****Date:25-01-2024****Subject Name:Kinematics and Dynamics of Machines****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.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) What is the rationale of learning the subject Kinematics and Dynamics of Machine?	03
	(b) With suitable example explain kinematic link.	04
	(c) Explain four bar chain mechanism and its inversion with sketch.	07
Q.2	(a) What is quick return mechanism?	03
	(b) List properties of instantaneous center of rotation.	04
	(c) In a slider crank mechanism, the stroke of the slider is 200 mm and the obliquity ratio is 4.5. The crank rotates uniformly at 400 rpm clockwise, while the crank is approaching the I.D.C. and the connecting rod is normal to the crank, find the velocity of piston and the angular velocity of the connecting rod using graphical method.	07
	OR	
	(c) How many components of accelerations are there in angular system? With figure write equation for finding out them. Also discuss two special cases of acceleration.	07
Q.3	(a) Give application of cam and follower.	03
	(b) Draw the displacement diagram when follower moves with simple harmonic motion.	04
	(c) Explain different types of follower with neat sketch.	07
	OR	
Q.3	(a) List various materials used in belt drives.	03
	(b) Give a brief classification of chain.	04
	(c) With the usual notations deduce the expression for finding ratio of driving tensions for flat belt drives.	07
Q.4	(a) Differentiate between spur gear and helical gear	03
	(b) Draw schematic diagram of reverted gear train and give expression of velocity ratio.	04
	(c) The number of teeth on each of the two equal spur gears in mesh are 40. Module is 6 mm and teeth have 20° involute profile. If the arc of contact is 1.75 times the circular pitch, find the addendum.	07
	OR	
Q.4	(a) What is the effect of gyroscopic couple on a naval ship during steering?	03
	(b) Differentiate between static balancing and dynamic balancing.	04

- (c) Explain the effect of (i) swaying couple (ii) hammer blow (iii) variation in tractive force in balancing of reciprocating masses. **07**
- Q.5** (a) Explain (i) plane of shipping (ii) plane of precession and (iii) axis of precession in gyroscopic couple. **03**
- (b) Differentiate between free and forced vibrations. **04**
- (c) Discuss (i) magnification factor (ii) vibration isolation and transmissibility in detail. **07**
- OR**
- Q.5** (a) State applications where vibrations are necessary. **03**
- (b) What is critical speed of the shaft? Explain **04**
- (c) Explain epicyclic gear train with schematic diagram and find velocity ratio using tabular method. **07**
