

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV (OLD) EXAMINATION – WINTER 2018

Subject Code:142001

Date: 05/12/2018

Subject Name: Kinematics And Dynamics Of Machines

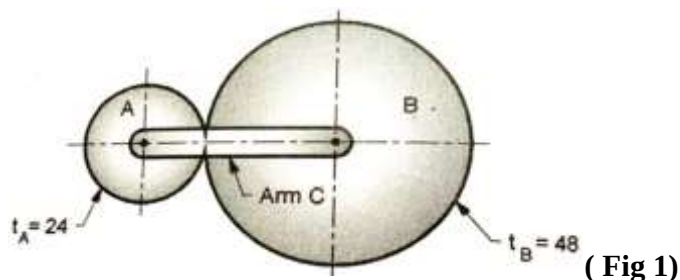
Time: 02:30 PM TO 05:00 PM

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)** Define Grashof's law. How is it helpful in classifying the four-link mechanisms into different types? **07**
- (b)** Explain different types of gear trains with suitable sketches. **07**
- Q.2 (a)** Distinguish Completely constrained, Incompletely constrained and Successfully constrained motion with neat sketch. **07**
- (b)** Differentiate the following with suitable example & neat sketches. (I) Lower & Higher Pairs (II) Closed & unclosed pairs (III) Machine & Structure **07**
- OR**
- (b)** Describe with a neat sketch the principle and working of pantograph. **07**
- Q.3 (a)** Explain different types of flat belt drives with neat sketches. **07**
- (b)** Find the power transmitted by a belt running over a pulley of 600 mm diameter at 200 r.p.m. The Coefficient of friction between the belt and the pulley is 0.25. angle of lap 160° and maximum in the belt is 2500 N. **07**
- OR**
- Q.3 (a)** How do the effect of gyroscopic couple and centrifugal force make the rider of a two wheeler to tilt on one side? Derive a relation for the limiting speed of vehicle. **07**
- (b)** Define Vibrations. Explain Types of vibratory motion. **07**
- Q.4 (a)** Define the following gear terminologies with suitable sketch. **07**
- (i) Pitch circle (ii) Module (iii) Addendum (iv) Pressure angle
- (b)** A pair of 20° involute gears has module of 5 mm the pinion has 20 teeth and gear has 60 teeth. Addenda of pinion and gear wheel in terms of module are one. Find the following: **07**
- (i) Number of pair in contact.
- (ii) Angle turned through by the pinion and gear wheel for one pair in contact.
- OR**
- Q.4 (a)** State and prove the Law of gearing with neat sketch. **07**
- (b)** In the epicyclic gear train shown in **Fig 1**, an arm carries two wheels (gears) A and B having 24 and 48 teeth respectively. If the arm C rotates at 200 r.p.m. in the clockwise direction about the axis of gear A and the wheel A is fixed, Find the speed of gear B. If the wheel A rotates 300 r.p.m. in clockwise direction instead of being fixed, What will be the speed of gear B? **07**



- Q.5 (a) Classify cam and explain any two with neat sketch. www.FirstRanker.com 04
- (b) A cam is to give the following motion to a knife-edged follower : 10
- (i) Outside during 60° of cam rotation.
 - (ii) Dwell for the next 30° of cam rotation.
 - (iii) Return stroke during next 60° of cam rotation and
 - (iv) Dwell for the remaining 210° of cam rotation.

The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both outstroke and return strokes. Draw the profile of the cam when the axis of the follower passes through the axis of the cam shaft.

OR

- Q.5 (a) Explain why only a part of the unbalanced force due to reciprocating masses is balanced by revolving mass. 07
- (b) What are quick return motion mechanisms? Where they are used? Discuss the functioning of any one of them. 07

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