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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (Automation & Robotics) (2018 Batch) (Sem.-3)

KINEMATICS AND THEORY OF MACHINES

Subject Code : BTAR-305-18

M.Code : 76504

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Write briefly :**

- a) What do you understand by resistant bodies?
- b) Define kinematic pair.
- c) Explain types of joints in a chain.
- d) Write Grubler's criterion equation for plane mechanisms with constrained motion.
- e) What do you understand by the instantaneous centre of rotation (centro) in kinematic of machines?
- f) Define Centrode.
- g) What are the different types of motion with which a follower can move?
- h) Explain the terms :
 - i) Circular pitch and
 - ii) Backlash.
- i) Differentiate between Involute and Cycloidal Gears.
- j) What do you understand by limiting angle of friction?

8. A cam is to be designed for a knife edge follower with the following data :
- a) Cam lift = 40 mm during 90° of cam rotation with simple harmonic motion.
 - b) Dwell for the next 30° .
 - c) During the next 60° of cam rotation, the follower returns to its original position with Simple harmonic motion.
 - d) Dwell during the remaining 180° . Draw the profile of the cam when
 - i) The line of stroke of the follower passes through the axis of the cam shaft,
 - ii) The line of stroke is offset 20 mm from the axis of the cam shaft.

The radius of the base circle of the cam is 40 mm. Determine the maximum velocity and acceleration of the follower during its ascent and descent, if the cam rotates at 240 r.p.m.

9. An epicyclic gear train, as shown in Fig.2, is composed of a fixed annular wheel A having 150 teeth. The wheel A is meshing with wheel B which drives wheel D through an idle wheel C, D being concentric with A. The wheels B and C are carried on an arm which revolves clockwise at 100 r.p.m. about the axis of A and D. If the wheels B and D have 25 teeth and 40 teeth respectively, find the number of teeth on C and the speed and sense of rotation of C.

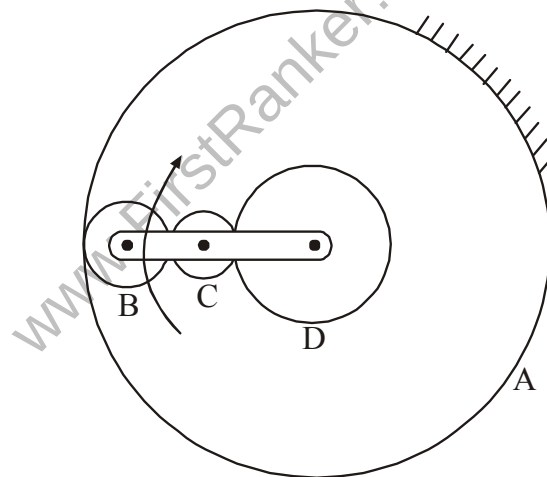


Fig.2

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.