

Code: 9A03401

R09

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2016

KINEMATICS OF MACHINERY

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) What is a machine? Giving example, differentiate between a machine and structure.
(b) Sketch and describe the working of two different types of quick return mechanisms. Give examples of their applications. Derive an expression for the ratio of times taken in forward and return stroke for one of these mechanisms
- 2 (a) What do you mean by a pantograph and what are its uses? Describe with a neat sketch the principal and working of the pantograph.
(b) Explain with the help of a line diagram the working of Tchebicheff mechanism. What should be the proportion of different links of the mechanism in order to generate an approximate straight line motion?
- 3 What do you mean by Coriolis component of acceleration? When it will exist? Derive an expression for its magnitude by drawing a line diagram of Crank and Slotted lever quick return motion mechanism.
- 4 Two inclined shafts are connected by means of a universal joint. The speed of the driving shaft is 1000 r.p.m. If the total fluctuation of speed of the driven shaft is not to exceed 12.5% of this, what is the maximum possible inclination between the two shafts? With this angle, what will be the maximum acceleration to which the driven shaft is subjected and when this will occur?
- 5 (a) Write short notes on cams.
(b) A roller follower cam with a roller diameter of 10 mm is rotating clockwise. The lift of the cam is 30 mm and the axis of the follower is offset to the right by a distance of 5 mm. the follower completes the lift with SHM during 120° of cam rotation. The dwell at lift is 60° of cam rotation. First half of the fall takes place with constant velocity and second half with constant acceleration and retardation during 120° of the cam rotation. The rest is the dwell at fall. Draw the cam profile giving details of construction and dimensions.
- 6 (a) Derive an expression for the centre distance of a pair of spiral gears.
(b) The pitch circle diameter of the smaller of the two spur wheels which mesh externally and have involute teeth is 100 mm. The numbers of teeth are 16 and 32. The pressure angle is 20° and the addendum is 0.32 of the circular pitch. Find the length of the path of contact of the pair of teeth.
- 7 (a) Discuss briefly the various types of belts used for the transmission of power.
(b) Obtain an expression for the length of a belt in an open belt drive.
- 8 (a) Explain the term, Sun and planet gears. With a neat sketch explain the working of an epicyclic gear train with a sun and planet gear.
(b) Two parallel shafts are to be connected by spur gearing. The approximate distance between the shafts is 600 mm. If one shaft runs at 120 r. p. m. and other at 360 r.p.m. Find number of teeth on each wheel if module is 8 mm. Also determine the exact distance apart of the shafts.
