Code No: RT22031 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, April-2018
KINEMATICS OF MACHINERY
(Com. to ME, AME, MM)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) In what way a mechanism differ from a machine? (4M)
   b) Explain about Hart straight line mechanism. (3M)
   c) Define coriolis component of acceleration and explain. (4M)
   d) Define the following terms as applied to cam with a neat sketch i) Base circle, ii) Pitch circle. (3M)
   e) Explain the terms : i) Module, ii) Pressure angle, and iii) Addendum (4M)
   f) What are the different materials used for belt and rope drives? (4M)

PART –B

2. a) Explain Grubler's criterion for determining degree of freedom for mechanisms (8M)
   b) In a crank and slotted lever quick return motion mechanism, the distance between the fixed centres is 240 mm and the length of the driving crank is 120 mm. Find the inclination of the slotted bar with the vertical in the extreme position and the time ratio of cutting stroke to the return stroke. If the length of the slotted bar is 450 mm, find the length of the stroke if the line of stroke passes through the extreme positions of the free end of the lever. (8M)

3. a) What is the condition for correct steering? Sketch and show the two main types of steering gears and discuss their relative advantages. (8M)
   b) Design a pantograph for an indicator to obtain the indicator diagram of an engine. The distance from the tracing point of the indicator is 100 mm. The indicator diagram should represent four times the gas pressure inside the cylinder of an engine. (8M)

4. a) Explain with sketch the instantaneous centre method for determination of velocities of links and mechanisms (8M)
   b) Draw the acceleration diagram of a slider crank mechanism. (8M)

5. Draw the displacement, velocity and acceleration diagrams for a follower when it moves with uni-form acceleration and retardation. Derive the expression for velocity and acceleration during out-stroke and return stroke of the follower. (16M)
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6. Two mating gears have 20 and 40 involute teeth of module 10 mm and 20° pressure angle. The addendum on each wheel is to be made of such a length that the line of contact on each side of the pitch point has half the maximum possible length. Determine the addendum height for each gear wheel, length of the path of contact, arc of contact and contact ratio. (16M)

7. a) Explain briefly the differences between simple, compound, and epicyclic gear trains. What are the special advantages of epicyclic gear trains? (8M)

b) The speed ratio of the reverted gear train, as shown in Figure 1, is to be 12. The module pitch of gears A and B is 3.125 mm and of gears C and D is 2.5 mm. Calculate the suitable numbers of teeth for the gears. No gear is to have less than 24 teeth. (8M)

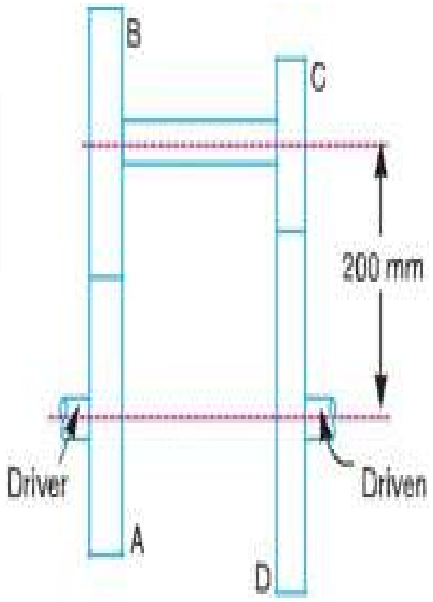

Figure 1