Q.P. Code: **19ME0304** **R19**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Regular Examinations Feb-2021

KINEMATICS OF MACHINERY

(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 **a** What is constrained motion and what are the different types of constrained motions? Give one example for each with suitable sketch. **6M**

b Explain the working of beam engine with neat sketch. **6M**

OR

2 Explain the practical applications of inversions of the 4 – bar linkage? Explain all with neat sketch. **12M**

UNIT-II

3 **a** Give a neat sketch of the straight line motion Hart mechanism. **8M**

b Sketch and Describe the working of Peaucellier mechanism. **4M**

OR

4 With neat sketch, explain the Davis steering gear of an automobile. **12M**

UNIT-III

5 In Fig.1 the angular velocity of the crank OA is 600 r.p.m. Determine the linear velocity of the slider D and the angular velocity of the link BD, when the crank is inclined at an angle of 75° to the vertical. The dimensions of various links are: OA = 28 mm; AB = 44 mm; BC 49 mm; and BD = 46 mm. The center distance between the centres of rotation O and C is 65 mm. The path of travel of the slider is 11 mm below the fixed point C. **12M**

The slider moves along a horizontal path and OC is vertical

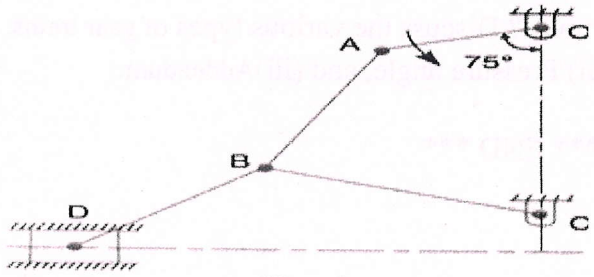

Fig 1

OR

6 In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°. **12M**

UNIT-IV

7 A cam is to give the following motion to a knife-edged follower : 12M

i. Outstroke 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 the outstroke and return strokes. Draw the profile of the cam when the axis of the follower is offset by 20 mm from the axis of the cam shaft.

OR

8 Define the following terms 12M

i. Cam
ii. Follower
iii. Offset follower
iv. Radial follower

UNIT-V

9 In an epicyclic gear train, an arm carries two gears A and B having 36 and 45 teeth respectively shown in Fig 2. If the arm rotates at 150 r.p.m. In the anticlockwise direction about the center of the gear A which is fixed, determine the speed of gear B. If the gear A instead of being fixed, makes 300 r.p.m. In the clockwise direction, what will be the speed of gear B? 12M

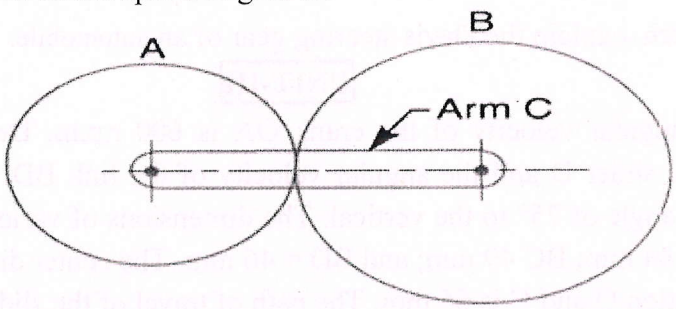

Fig-2

OR

10 **a** What do you understand by 'gear train'? Discuss the various types of gear trains. 6M

b Explain the terms :(i) Module, (ii) Pressure angle, and (iii)Addendum. 6M

*** END ***