Code No: 154BF **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, September/October - 2023
KINEMATICS OF MACHINERY
(Common to ME, MCT)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Differentiate the machine and structure.	[2]
b)	What is grubler's criterion?	[3]
c)	Define Coriolis component of acceleration.	[2]
d)	State three centres in line theorem.	[3]
e)	Define double Hooke's joint.	[2]
f)	What are the conditions for correct steering in Ackermann steering gear?	[3]
g)	Define base circle and pitch curve in cams.	[2]
h)	Define pressure angle in cams.	[3]
i)	Differentiate friction wheels and toothed gears.	[2]
j)	Sketch cycloid and involute profiles.	[3]

PART – B

(50 Marks)

2.a) What are the three types of constrained motion between two elements.
b) Give the classification of the links. [5+5]

OR

3. Describe the constructional features of three inversion of double slider crank chain. [10]

4. For the mechanism shown in figure 1, determine the angular velocity of link AB. [10]

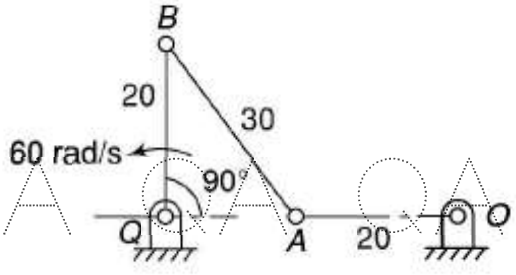

Figure 1

OR

5.a) Give the procedure to determine the velocity of points and links by instantaneous centre method.

b) Give the procedure to determine the velocity and acceleration using relative velocity method. [5+5]

6.a) Explain the constructional functionality of Scott russel mechanism and its applications.

b) How does the watt mechanism works? [5+5]

OR

7.a) Derive the expression for the angular velocity ratio of the Hooke's joint.

b) Explain the Tchebicheff mechanism and its application. [5+5]

8. Draw the profile of a cam which is to give oscillatory motion to the follower with uniform angular velocity about its pivot. The base circle diameter is 50 mm, angle of oscillation of the follower is 30^0 and the distance between the cam centre and the picot of the follower is 60 mm. The oscillating lever is 60 mm long with a roller of 8 mm diameter at the end. One oscillation of the follower is completed in one revolution of the cam. [10]

OR

9.a) Explain the functionality of the circular arc cam with concave flanks.

b) Give the procedure to construct the constant velocity motion of the follower. [5+5]

10. Write short notes on the following:
a) Law of gearing
b) Expression for arc of contact and path of contact of pinion and gear. [5+5]

OR

11. A gear train in which gears B & C constitute a compound gear is as shown in figure. The number of teeth are shown along with each wheel in the figure 2. Determine the speed and direction of rotation of wheels A & E if the arm revolves at 210 rpm clockwise and the gear D is fixed. [10]

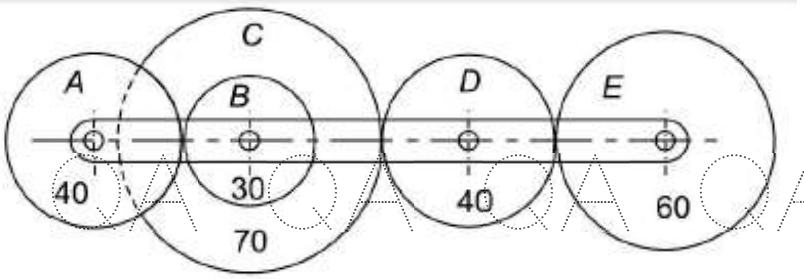

Figure 2

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