Total No. of Questions : 4]

SEAT No. :

PB-67

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[6268]-262

S.E. (Automobile & Mechanical / Mechanical Sandwich / Automation & Robotics) (Insem)

KINEMATICS OF MACHINERY

(2019 Pattern) (Semester - IV) (202047)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data wherever necessary.***

Q1) a) Define Kinematic pair and explain its types. **[6]**

b) For Kinematic linkage shown in Figure 1, calculate the following : **[9]**

i) The number of Binary links

ii) The number of Ternary links

iii) The number of Quaternary links

iv) The number of Binary, Ternary Quaternary joints

v) Number of lower pairs

vi) Number of higher pairs

vii) Degree of freedom.

Also comment on the degree of freedom.

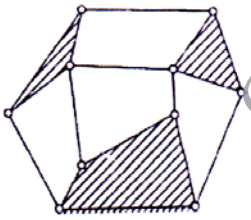

Figure.1

OR

P.T.O.

Q2) a) Define higher pair. Explain with the help of neat sketch any two examples of mechanisms with higher pair. **[6]**

b) Define 'Inversion'. List the various inversions of a single slider crank chain and explain any two inversions with neat sketches, giving their practical applications. **[9]**

Q3) a) What is loop closure equation? Derive the same for Single Slider Crank mechanism. **[6]**

b) The crank and connecting rod of a steam engine are 0.3 m and 1.5 m in length. The crank rotates at 180 r.p.m. clockwise. Determine the velocity and acceleration of the piston when the crank is at 40 degrees from the inner dead center position. Also determine the position of the crank for zero acceleration of the piston. **[9]**

OR

Q4) a) Explain Vector algebra method, of velocity and acceleration analysis of Binary link. **[6]**

b) Two shafts are connected by a universal joint. The driving shaft rotates at a uniform speed of 1200 r.p.m. Determine the greatest permissible angle between the shaft axes so that the total fluctuation of speed does not exceed 100 r.p.m. Also calculate the maximum and minimum speeds of the driven shaft. **[9]**

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