Hall Ticket No | | | | | | | | | | |

Question Paper Code: AMEB10

INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

B.Tech IV Semester End Examinations (Regular), November – 2020

Regulation: IARE–R18

KINEMATICS OF MACHINES

Time: 2 Hours **(ME)** **Max Marks: 70**

Answer any Four Questions from Part A
Answer any Five Questions from Part B

PART – A

1. Classify the kinematic pair with neat sketches. **[5M]**
2. What are the properties of instantaneous centre? How instantaneous centres are located? **[5M]**
3. List the two main types of steering gears and discuss their relative advantages. **[5M]**
4. Draw the nomenclature of Cam and explain briefly. **[5M]**
5. Show that involute profile satisfies the conditions for correct gearing. **[5M]**
6. Differentiate between a machine and a structure.List the different kinematic pairs. **[5M]**
7. Explain the working of pantograph and show that it can be used to reproduce to an enlarged scale of a given figure. **[5M]**
8. Evaluate the condition for generating a straight line in Watt's mechanism. **[5M]**

PART – B

9. Describe various inversions of a single slider–crank chain with neat sketches. **[10M]**
10. A crank and slotted lever mechanism used in a shaper has a centre distance of 300 mm between the centre of oscillation of the slotted lever and the centre of rotation of the crank. The radius of the crank is 120mm. Find the ratio of the time of cutting to the time of return stroke. **[10M]**
11. What is Klein's construction? Explain the procedure to determine the velocity and acceleration for a single slider-crank mechanism. **[10M]**
12. Evaluate the expressions for velocity and acceleration of piston in reciprocating steam engine mechanism with a neat sketch. **[10M]**
13. With neat sketch explain how approximate straight line mechanism is obtained by Scott Russell mechanism and Grasshopper mechanism. **[10M]**
14. A universal joint is used to connect two shafts which are inclined at 20° and the speed of the driving shaft is 1000 rpm. Find the extreme angular velocities of the driven shaft and its maximum acceleration. **[10M]**
15. Classify the different types of followers with neat sketch based on various applications. **[10M]**
16. A symmetrical Cam with convex flanks operates a flat-footed follower. The lift is 8 mm, base circle radius 25 mm and the nose radius 12 mm. The total angle of the cam action is 120°. Determine i)The radius of convex flanks ii)The maximum velocity and the maximum acceleration when the cam shaft rotates at 500rpm **[10M]**
17. Determine an expression for the minimum number of teeth required on the pinion in order to avoid interference in involute gear teeth when it meshes with wheel. **[10M]**
18. In an epicyclic gear train, an arm carries two gears 1 and 2 having 40 and 50 teeth respectively. The arm rotates at 160 rpm CCW about the centre of gear 1, which is fixed. Determine the speed of the gear 2. **[10M]**

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