Hall Ticket Number :

Code: 1G541

II B.Tech. II Semester Supplementary Examinations October 2020
Kinematics of Machinery
(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
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1. What do you mean by inversion of a mechanism? Explain with sketches all inversions of quadric cycle chain.

2. a) What is the function of a Hook's joint?

   b) The angle between the two axes of two shafts joined by Hook's joint is 25°. The driving shaft rotates at uniform speed of 150 rpm. The driven shaft carries a steady load of 7.5 kW. Calculate the mass of the flywheel of the driven shaft, if its radius of gyration is 150 mm and the output torque of the driven shaft does not vary by more than 15% of the input shaft.

3. a) State and prove the 'Kennedy's Theorem' of three instantaneous centers

   b) In a four-bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40mm 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°.

4. Derive an expression for the magnitude and direction of coriolis component of acceleration.

5. A cam is to be designed for a knife edge follower with the following data:
   1. Cam lift = 40 mm during 90° of cam rotation with simple harmonic motion.
   2. Dwell for the next 30°. 3. During the next 60° of cam rotation, the follower returns to its original position with simple harmonic motion. 4. Dwell during the remaining 180°. Draw the profile of the cam when the line of stroke is offset 20 mm from the axis of the cam shaft. The radius of the base circle of the cam is 40 mm. Determine the maximum velocity and acceleration of the follower during its ascent and descent, if the cam rotates at 240 r.p.m.

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

   b) Derive 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.

7. a) Explain the purpose of a idler in a short-centre belt drive

   b) Two pulleys, one 450 mm diameter and the other 200 mm diameter are on parallel shafts 1.95 m apart and are connected by a crossed belt. Find the length of the belt required and the angle of contact between the belt and each pulley. What power can be transmitted by the belt when the larger pulley rotates at 200 rev/min, if the maximum permissible tension in the belt is 1 kN, and the coefficient of friction between the belt and pulley is 0.25?

8. a) What do you understand by 'gear train'? Discuss the various types of gear trains.

   b) Two parallel shafts, about 600 mm apart are to be connected by spur gears. One shaft is to run at 360 r.p.m. and the other at 120 r.p.m. Design the gears, if the circular pitch is to be 25 mm.
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Code: 1G544

II B.Tech. II Semester Supplementary Examinations October 2020
Manufacturing Technology
(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
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1.	a)	Outline the different materials used for patterns?	7M
	b)	Illustrate the functions of a pattern?	7M
2.		Discuss the working principle, advantages and disadvantages of Investment casting process?	14M
3.	a)	Explain briefly the following types of flames: (i) Neutral flame (ii) Carburizing flame (iii) Oxidizing flame	10M
	b)	How do you classify the different weld positions?	4M
4.	a)	What is the purpose of shielding gas in TIG welding? What gases are used as shielding gas?	7M
	b)	Write a short note on friction welding?	7M
5.	a)	Classify the metal forming processes according to the type of stress employed in detail?	7M
	b)	What do you understand by "grain flow"? How is it connected with the strength of machine parts?	7M
6.		With a neat sketch, briefly explain the deep drawing operation, illustrate the concepts of Ironing, Redrawing and Reverse redrawing.	14M
7.	a)	Write a short note on extrusion? Elaborate the classification of extrusion process.	7M
	b)	What are the different methods of forging?	7M
8.		Explain the laser beam machining process with working principle, advantages, disadvantages and applications of laser beam machining.	14M

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