

Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

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Fourth Semester B.E. Degree Examination Kinematics of Machines

TIME: 03 Hours**Max. Marks: 100**

Note: Answer any **FIVE** full questions, choosing at least **ONE** full question from each **MODULE**.

		*Blooms' Taxonomy Level	Marks
Module -1			
Q.01	a. How are Kinematic pairs classified? Explain with neat sketches.	L V	10 Marks
	b. Define the following terms with examples: i) Kinematic chain ii) Mechanism iii) Structure iv) Inversion v) Degree of freedom	L I	10 Marks
OR			
Q.02	a Explain the following with neat sketches: i) Beam engine ii) Gnome engine iii) Lower pair iv) Higher pair	L V	08 Marks
	b Mention the inversion of four bar chain and explain with neat sketches.	L II	12 Marks
Module-2			
Q. 03	a Explain crank and slotted lever quick return motion mechanism with a neat sketch.	L II	10 Marks
	b Explain with neat sketches: i) Ratchet and Pawl Mechanism ii) Toggle Mechanism	L V	10Marks
OR			
Q.04	a Explain Geneva wheel mechanism with a neat sketch.	L II	10 Marks
	b What is meant by quick return mechanism? Sketch and explain drag link mechanism.	L I	10 Marks
Module-3			
Q. 05	a A four bar mechanism ABCD is made up of four links pin jointed to the ends. AD is a fixed link which is 180mm long. The link AB, BC and CD are 90mm, 120mm and 120mm long respectively. At certain instant the link AB makes an angle of 60° with the link AD. If the link AB rotates at a uniform speed of 100 rpm clockwise, determine: i) Angular velocity of the link BC and CD ii) Angular acceleration of the links CD and CB	L V	20 Marks
OR			
Q. 06	a The crank of a slider crank mechanism is 480mm long and rotates at 20 rad/sec in the counter clockwise direction. It has a connecting rod of 1600mm long. Determine the following when the crank is at 60° from the 1 DC. Determine: i) Velocity of slider ii) Angular velocity of connecting rod ii) The position and velocity of a point P on the connecting rod having least		

absolute velocity

L V 20 Marks

Module-4

- Q. 07 a Explain the terminology used in spur gears. L II 10 Marks
- b Calculate: (i) Length of path of contact (ii) Arc of contact (iii) Contact ratio when a pinion having 17 teeth drives a gear having 49 teeth. The profile of the gear is involute with pressure angle 20° . Module 6mm and addendum on pinion and gear wheel equal to one module. L VI 10 Marks

OR

- Q. 08 a In an epicyclic gear train, the internal wheel A, B and the compound wheel C and D rotate independently about the axis 'O'. The wheel E and F rotate on a pin fixed to the arm G. E gears with A and C, and F gears with B and D. all the wheels having same pitch and the number of teeth on E and F are 18, C = 26, D = 26.
- Sketch the arrangement
 - Find the number of teeth on A and B
 - If the arm G makes 150 rpm CW and A is fixed, find speed of B
 - If the arm G makes 150 rpm CW and wheel A makes 15 rpm CCW, find the speed of B
- L I 20 Marks

Module-5

- Q. 09 a Explain the terminology used in radial cam and follower. L II 10 Marks
- b Explain the following types of follower displacement diagrams:
- Uniform velocity
 - Simple Harmonic Motion (SHM)
- L V 10 Marks

OR

- Q. 10 a A cam rotating clockwise at uniform speed of 300rpm operates a reciprocating follower through a roller 1.5 cm diameter. The follower motion is defined as below.
- Outward during 150° with UARM
 - Dwell for next 30°
 - Return during next 120° with SHM
 - Dwell for the remaining period. Stroke of the follower is 3cm. Minimum radius of the cam 3cm Draw the cam profile.
 - Follows axis passes through cam axis
 - Follows axis is offset to the right by 1cm
- L VI 20 Marks