

University of Mumbai

Examinations summer 2022

T01424 // S.E (Mechanical Engineering) (SEM-IV)(Choice Base Credit
Grading System) (R2016)

41205 // Kinematics of Machinery

Time: 2 hour 30 minutes

Max. Marks: 80

Q1. (20 Marks)	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks 02 Marks each
1.	For low and moderate speed engines, the cam follower should move with
Option A:	Uniform velocity
Option B:	Simple harmonic motion
Option C:	Uniform acceleration and retardation
Option D:	Cycloidal motion
2.	In Ackerman's steering gear mechanism the pairs are
Option A:	Turning pairs
Option B:	Sliding pairs
Option C:	Spherical pairs
Option D:	Turning and Sliding
3.	Peaucellier mechanism has got _____ no of links
Option A:	2
Option B:	4
Option C:	6
Option D:	8
4.	The component of the acceleration, parallel to the velocity of the particle, at the given instant is called
Option A:	Radial component
Option B:	Tangential component
Option C:	Coriolis component
Option D:	Axial component
5.	The types of gears used to connect two non-parallel non intersecting shafts are
Option A:	Spur Gear
Option B:	Bevel Gear
Option C:	Spiral Gear
Option D:	Helical Gear
6.	Which of the following drive is positive
Option A:	Flat belt
Option B:	V belt
Option C:	Rope
Option D:	Gear
7.	The velocity ratio of two pulleys connected by an open belt or crossed belt is
Option A:	Directly proportional to their diameters
Option B:	Inversely proportional to their diameters
Option C:	Directly proportional to the square of their diameters
Option D:	Inversely proportional to the square of their diameters

8.	The brake used in railway coaches is
Option A:	Shoe brake
Option B:	Block brake
Option C:	Band brake
Option D:	Disc brake
9.	Two shafts having an included angle of 150° are connected by a Hooke's joint. The driving shaft runs at a uniform speed of 1500 r.p.m. The driven shaft carries a flywheel of mass 12 kg and 100 mm radius of gyration. calculate the maximum angular acceleration of the driven shaft in rad/s^2 .
Option A:	6853
Option B:	6090
Option C:	6100
Option D:	6500
10.	The moment of inertia of a uniform circular disc about a tangent in its own plane is
Option A:	mr^2
Option B:	$\frac{5}{4} (mr^2)$
Option C:	$0.5 mr^2$
Option D:	$\frac{3}{4} (mr^2)$

Q2.	Solve any Four out of Six	5 marks each
A	Explain elliptical trammel with neat sketch.	
B	Explain Harts Mechanism	
C	Derive the equation for centrifugal tension.	
D	Classify various Cams and followers	
E	Explain Epi-cyclic gear train	
F	Explain various types of ICR	
Q3	Solve any Two Questions out of Three	10 marks each
A	Two mating gear wheels have 20 and 40 involute teeth of 10 mm module and 20° pressure angle. The addendum on each wheel is to be made of such length that the line of contact on each side of the pitch point is half the maximum possible length. Determine the addendum height for each gear wheel and the length of the line of contact. If smaller wheel rotates at 250 rpm find the velocity of point of contact along the surface of each tooth at the instant with the tip of tooth on a smaller wheel is in contact.	
B	The center to center distance between the two sprockets of a chain drive is 600mm. The chain drive is used to reduce the speed from 180 rpm to 90 rpm. The driving sprocket has 18 teeth and pitch circle of 480mm. Determine the number of teeth on the driven sprocket, pitch and length of chain.	
C	Use the following data of cam in knife edge follower is raised lowered with Uniform acceleration and retardation , Least radius of cam is 40 mm, Lift of follower is 30 mm, Angle of ascent is 72° , Dwell 48° , angle of descent is 60° . Plot displacement, velocity and acceleration diagram.	

Q4.	Solve any any Four	5 marks each
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(20 Marks)	
A	Explain Kennedy's theorem
B	Explain D'Alembert's Principle
C	Explain Coriolis component of acceleration.
D	Explain Davis steering Mechanism
E	Differentiate between cycloid and
F	Explain chordal action in chain drive