(Please write your Enrollment Number) Enrollment No. 03301020023

End-Term Examination
(CBCS)(SUBJECTIVE TYPE)(OffLine)
Course Name:< Engineering Mechanics >, Semester:<2nd>
(May, 2024)

Subject Code: BMA 110	Subject: Engineering Mechanics
Time :3 Hours	Maximum Marks :60

Note:Q. 1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1			(2.5*8=20)	
	(a)	Enlist static equilibrium equations of a rigid body moving at constant speed		
	(b)	State laws of friction		
	(c)	Write the condition for a plane truss to be perfect		
	(d)	What is polar moment of inertia?		
	(e)	Differentiate "Kinematics" and "Kinetics"		
	(f)	Discuss the role of coefficient of restitution, limits, and formula		
	(g)	What is D' Alembert Principle?		
	(h)	Describe the significant of mechanics in daily life		
		UNIT-I		
Q2		Two cylindrical rollers of same radii are in static contact with an inclined plane of angle 30^0 from horizontal and lower roller additional contact with vertical wall. The upper and lower rollers weights are 400 N & 500 N respectively determine reactions at four points of contact	(10)	
Q3		Determine the maximum angle 'θ' at which a uniform ladder can be placed against a vertical wall without slipping under its own weight (Assume μ is coefficient of friction at point of contacts)	(10)	
		UNIT-II		
Q4		The rectilinear motion of a transport vehicle from rest is given by the relation $a = 12/(3V+4)$, where 'a' is acceleration in m/s^2, 'V' is velocity in m/s. Calculate the time taken and the distance travelled to attain a velocity of 20 m/s	(10)	
Q5		A vehicle is driven at 60 km/hr on a curved highway of 300 m radius. Driver suddenly applied brakes that reduces speed to 20 km/hr at a constant deceleration in 10 seconds. Determine the tangential and normal components of acceleration at $t = 0$ and $t = 2$ seconds	(10)	
		UNIT-III		
Q6		Determine the centroid location of triangular lamina of height 'h' and base 'b' additionally work out for determination of area moment of inertia about centroidal axis and bas axis	(10)	
Q7		Determine center of gravity of a solid hemisphere of radius 'R' using fundamental principle of mechanics	(10)	
		UNIT-IV		
Q8		Show that the total distance travelled by a ball initially dropped from height 'h' on horizontal floor up to rest is $S=h/(1-e^2)$, Where 'e' is coefficient of restitution	(10)	
Q9		Calculate sliding velocity of piston of slider crank mechanism using Instantaneous Centre method if Crank rotation (N) = 300 rpm, crank length (r) = 100 mm, connecting rod length (l) = 300 mm, and angular displacement of crank (0) = 30^0 from inner dead center (IDC)	(10)	