PRN:		Course Code:	USS111R

First Year B.Sc. End Semester Winter 2023
Physics-I

Day and Date: Monday, 11/12/2023 Max Marks: 100

Time: 2.00 to 5.00 PM Duration: 03 hrs

Instructions: 1) All questions are compulsory

			Marks	Bloom level	CO
Q.1		**Attempt the following:**	25		
	a)	State difference between Vector and Scaler.	8	L2	CO1
	b)	Two forces act $\overline{F1} = 2i + 3j - 4k$ and $\overline{F2} = i - j - 2k$ simultaneously on a particle. Determine their resultant force and Also, calculate its magnitude.	8	L4	CO1
	c)	State & explain Newton's 3rd law of motion.	9	L4	CO1
		OR			
	d)	Explain the concept of a first-order homogeneous differential equation, and discuss the process of utilizing the variable separation method to obtain its solution.	9	L4	CO1
Q.2		**Attempt the following:**	25		
	a)	State and prove the work-energy theorem.	8	L4	CO2
	b)	A light meter rod has two point masses each of 2 kg fixed at its ends. If the system rotates about its center of mass with angular speed of 0.5 rad/s. find its rotational K.E.	8	L4	CO2
	c)	Write a brief note on the concepts of momentum and inertia.	9	L3	CO2
		OR			
	d)	Write brief note on angular momentum for particles, derive expression for angular momentum in the case of a rotating body.	9	L3	CO2
Q.3		**Attempt the following:**	25		
	a)	State the applications of satellites in various fields and industries.	8	L2	CO3

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	b)	What would be the duration of year if the distance between the earth and sun gets double?	8	L4	CO3
	c)	Define and derive expression for simple harmonic motion.	9	L2	CO3
		OR			
	d)	Derive the differential equation that describes simple harmonic motion.	9	L3	CO3
Q.4		**Attempt the following:**	25		
	a)	Define the Bernoulli principle and derive the expression for Bernoulli's theorem.	8	L2	CO4
	b)	A rod of circular cross—section having length 70 cm and diameter 1.26 cm. is supported at its ends. When a mass of 900 gm is attached at its center, the depression is 0.025 cm. calculate the Young's modulus of the material of the rod.	8	L3	CO4
	c)	Derive the expression for the excess pressure in a soap bubble.	9	L4	CO4
		OR			
	d)	Explain the Jaeger's method for measuring the surface tension of a liquid.	9	L3	CO4

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