AW-1621

B.Sc. (Part-I) Semester-I Examination

1S : PHYSICS

			(Mechanics, Properties of Matter Waves	and Oscillation)	
Tim	e : 1	hree	Hours]	[Maximum Marks : 80)
Note	e :—	-(1)	All questions are compulsory.		
			Draw neat diagrams wherever necessary.		
1.	(a)		in the blanks :		
	. /		The acceleration due to gravity at the poles i	s .	
			The fundamental frequency is also called as		
			Coefficient of viscosity with increase		
			Young's modulus of elasticity is related with		2
			ose correct answer :		
22			The angle of contact of water with glass is _		
			(a) 90° (b) 0°		
				eater than 90°	
		(ii)	Kepler's second law of planetary motion is al		
			(a) Elliptical orbit (b) Per		
			(c) Areal velocity (d) Vol	lume	
		(iii)	The moment of linear momentum is		
			(a) Couple (b) Tor	rque	
				gular momentum	
		(iv)	In compound pendulum, centre of suspension	· · · · · · · · · · · · · · · · · · ·	
			(a) Interchangeable (b) No	t Interchangeable	5
			(c) At equal distance from C.G. (d) No	ne of the above	2
	(c)	Ans	wer in one sentence :		
		(i)	What is cantilever ?		
		(ii)	Define streamline flow.		
		(iii)	Define cohesive force.		
		(iv)	Define moment of inertia.	4	4
	EIT	HER			
2.	(a)	Defi	ne acceleration due to gravity. Explain variati	on of 'g' with :	
	8.8	(i) ·	Height (ii) De	pth	5
	(b)	State	e and prove Gauss's Theorem.	4	1
	(c)	Defi	ne :		
		(i)	Gravitational field (ii) -Gra	avitational potential	2
	OR				
3.	(p)	Deri	ve an expression for gravitational potential due	to spherical shell at a point outsid	ę
			shell.		5
	(q)		e and prove Kepler's Third law of planetary m	notion.	5
	EIT	HER			
4.	(a)		e and prove theorem of parallel axes, for mon		5
	(b)		niform rod of length 'L' and mass 'm' rotates at		
			nds. Calculate moment of inertia about this a		1
	(c)		disc has mass 5kg and radius 0.5m, calcula		
		perp	endicular to its plane.		3

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5.		State and prove law of conservation of angular momentum.	4
	(q)	Derive an expression for M.I. of circular disc about an axis passing through its cent	er
		and perpendicular to its plane.	5
	(r)	Calculate M.I. of a disc of mass 1 kg and radius 10cm about an axis passing through	gh
		its center and perpendicular to its plane.	3
		HER	
6.	(a)	What is compound pendulum ? Obtain an expression for the periodic time of compound pendulum.	nd 6
	(b)	Define linear S.H.M. and obtain differential equation of S.H.M.	4
		A mass of 50 gm is attached to a spring having spring constant 0.2. Determine tir	ne
		period of oscillation.	2
	OR		
7.	(p)	Define the angular S.H.M. show that the vibration of bar magnet in uniform magnet	tic
		field is angular S.H.M.	6
	(q)	Solve the differential equation of damped harmonic motion and show that velocity	of
		particle decreases exponentially.	4
	(r)	What are bifilar oscillations ?	2
	EIT	HER	
8.	(a)	Find the resultant displacement for the superposition of two mutually perpendicul	ar
		S.H.M's of same period.	6
	(b)	What is piezoelectric effect ? Explain the production of ultrasonic waves of piezoelectric	
		oscillation.	6
	OR		
9.	(p)	Describe construction and working of Kundt's tube.	4
	(q)	Derive Newton's formula for velocity of sound in medium.	5
	(r)	State applications of Ultrasonic wave.	3
	EIT	HER	
10.	(a)	Find the expression for twisting couple per unit twist for cylindrical wire.	6
	(b)	Explain how modulus of rigidity of wire can be determined by Maxwell Needle.	6
	OR		
11.	(p)	What are torsional oscillations? Derive an expression for the periodic time of torsion pendulum.	na (
	(q)	Derive an expression for depression at the loaded end of light beam clamped horizonta	lly
		at the other end.	6
	EIT	HER	
12.	(a)	State and prove Bernoulli's theorem.	6
	(b)	State and prove Stoke's law.	4
	(c)	What is the significance of Reynold's number ?	2
	OR		
13.	(p)	Explain Jaeger's method to determine surface tension of a liquid.	6
	(q)	Explain :	
		(i) Streamline flow	
		(ii) Turbulent flow.	4
	(r)	What is surface tension ? Give its unit and dimensions.	2

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			(Mechanics,	Properties o	f Matter	r Wa	aves and Oscillation	on)		
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Note	e :	-(1)	All	questions an	e compulsory						
		(2)	Dra	w neat diag	ams whereve	r necess	ary.				
1.	(a)	Fill	in th	he blanks :							
	1072-0122	(i)	The	acceleration	due to gravi	ity at the	pol	les is			
					I frequency is						
								ase in temperature.			
								vith change in			2
	(b)										
	• •	1.	(i) The angle of contact of water with glass is .								
		•		90°		-	(b)				
				Less than 9	00°			Greater than 90°			
		(ii)	Ker	oler's second	law of plane		10	is about		1.5	
				Elliptical o	2787	T-1		Period			
			2.5	Areal veloc				Volume			
		(iii)			linear mome						
				Couple				Torque			
				Impulse				Angular momentu	m		
		(iv)	13 I.S.		ndulum, cent			sion and centre of		are	
				Interchange			-	Not Interchangeab			
			22102				1. C. L.	None of the above			2
	(c)	Ans	12.00	in one sente							
	(-)			at is cantile							
3				ine streamlin							
				ine cohesive					20		
				ine moment							4
	EIT	HEF									
2.	(a)	Defi	ine a	acceleration	due to gravity	. Explain	n va	riation of 'g' with :			12
	()	(i)			ε.		1.	Depth			6
	(b)			-	ss's Theorem.		. /	1			4
	(c)		ine :								
	(-)	(i)		vitational fie	eld		(ii)	Gravitational pote	ntial		2
	OR						()	r			
3.	(p)	Deri	erive an expression for gravitational potential due to spherical shell at a point outside								
	d'		shell	27.	e e e e e e e e e e e e e e e e e e e	1		19 19 19 19 19 19 19 19 19 19 19 19 19 1			6
	(q)				ler's Third la	w of pla	neta	ry motion.			6
	· •	HEF									
4.	(a)	State	e and	d prove theo	rem of parall	el axes.	for	moment of Inertia.			5
	(b)			-	-			es about an axis pas		igh one	oſ
					noment of ine			See a second fill a second			4
	(c)							culate M.I. of a d	isc about	a tango	ent
				cular to its							3
		Prop									6.578

	OR		
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