STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI- 86

END SEMESTER EXAMINATION (ONLINE)- NOVEMBER 2021

PROPERTIES OF MATTER AND SOUND

CLASS: I B.SC. PHYSICS TIME: 3 Hrs

SUBJECT CODE: 19PH/MC/PS14 MAX. MARKS: 100

SECTION-A

CH

		ANSWER ALL T	THE QUESTIONS				
00	OSE THE CORR	ECT ANSWER		(8x1=8)			
1.		at is the value of youn 0 N/m ² 1 2 2 2 2		$1.87 \times 10^{10} \text{ N/m}^2$ and 0.379 atterial of the wire.			
2.	. The height of water in a capillary tube of radius 2 cm is 4 cm. What should be the ratio of the capillary tube, if water should rise 8 cm in the tube?						
	a) 1 cm	b) 0.1 cm	c) 2 cm	d) 4 cm			
3.		and glass, we get a connd glass are		se the adhesive force esive forces between water			
	c) Same		d) All the above	•			
4.	stress? a) Increase the len b) Apply small for	gth of the rope ce ss sectional area of the r		owing is useful to reduce the			
5.	For an individual atom or molecule, the Doppler shifted absorption frequency is given by						
	a) $v = v_0 \left(1 \pm \frac{v}{c} \right)$		$b) \upsilon = \frac{1}{2\pi\tau}$				
	c) $v = 2v_0 \left(1 \pm \frac{1}{c}\right)$	$\left(\frac{y}{c}\right)$	d) $v = \frac{1}{v_0} \left(1 \pm \frac{v_0}{c} \right)$				

	6.	Sound produced from equally spaced steps in a staircase at regular intervals is due to				
		a) Reverberation effect		b) Noise effect		
		b) Absorption effect		d) Echelon effect		
	7.	The viscosity of oil deci	reases when tempera	ature		
		a) Decreases b) Increases	c) is constant	d) 373 K	
	8.	One of the important ad	lvantage of Jaeger's	method is that		
		a) It measures the surface	ce tension accurately	y		
		b) The angle of contact	need not be measur	red		
		c) It captures the bubbl	e radius accurately			
		d) It deals with the dyn	amics of formation	of bubble		
FII	L	IN THE BLANKS:			(5x1=5)	
	9.	When the beam is in	equilibrium, the m	noment of the elastic	couple in it is equal	
		to				
		Reynold's number of To	urbulent flow is			
	11.	Reynold's number of To The persistence of sour	urbulent flow is nd in an enclosure du	ue to multiple reflection		
	11.	Reynold's number of To	urbulent flow is nd in an enclosure du	ue to multiple reflection		
	11. 12.	Reynold's number of To The persistence of sour By counting the number	urbulent flow is nd in an enclosure du r of vibrations of a to	ue to multiple reflection uning fork per second		
AN	11.12.13.	Reynold's number of To The persistence of sour By counting the number be found.	urbulent flow is nd in an enclosure du r of vibrations of a to	ue to multiple reflection uning fork per second		
AN	11. 12. 13.	Reynold's number of To The persistence of sour By counting the number be found. In a stationary wave stra	urbulent flow is nd in an enclosure du r of vibrations of a to ain is	ue to multiple reflection uning fork per second	can	
	11. 12. 13. SW 14.	Reynold's number of To The persistence of sour By counting the number be found. In a stationary wave stra /ER BRIEFLY:	urbulent flow is nd in an enclosure du r of vibrations of a to ain is Elastic limit?	ue to multiple reflection uning fork per second	can	
	11. 12. 13. SW 14.	Reynold's number of To The persistence of sour By counting the number be found. In a stationary wave stra ER BRIEFLY: What do you mean by E	urbulent flow is nd in an enclosure du r of vibrations of a to ain is Elastic limit? al axis' in a bar.	ue to multiple reflection uning fork per second at antinodes.	can	
	11. 12. 13. SW 14. 15.	Reynold's number of To The persistence of sour By counting the number be found. In a stationary wave stra ER BRIEFLY: What do you mean by E Explain the term 'neutra	urbulent flow is nd in an enclosure du r of vibrations of a tr ain is Elastic limit? al axis' in a bar. hesive and adhesive 0.1mm is situated ju	ue to multiple reflection uning fork per second at antinodes. forces. ast below the surface of	can (7x3=21)	
	11. 12. 13. SW 14. 15. 16.	Reynold's number of To The persistence of sour By counting the number be found. In a stationary wave strate. YER BRIEFLY: What do you mean by Explain the term 'neutral Distinguish between column.	urbulent flow is nd in an enclosure du r of vibrations of a tr ain is Elastic limit? al axis' in a bar. hesive and adhesive 0.1mm is situated ju he bubble. S.T. of w	the to multiple reflection uning fork per second at antinodes. forces. In the surface of a term is 0.072 Nm ⁻¹ .	can (7x3=21)	
	11. 12. 13. SW 14. 15. 16.	Reynold's number of To The persistence of sour By counting the number be found. In a stationary wave strate. FER BRIEFLY: What do you mean by Explain the term 'neutral Distinguish between cold An air bubble of radius excess pressure inside the source of the property of the persistence of the per	urbulent flow is nd in an enclosure du r of vibrations of a tr ain is Elastic limit? al axis' in a bar. hesive and adhesive 0.1mm is situated ju he bubble. S.T. of w essure on the viscosi	to multiple reflection uning fork per second at antinodes. forces. ast below the surface of ater is 0.072 Nm ⁻¹ . ty of a liquid?	can (7x3=21)	

SECTION B

ANSWER ANY FOUR QUESTIONS

(4x9=36)

- 21. A solid cylinder of 2 cm radius weighing 200 g is rigidly connected with its axis vertical to the lower end of the fine wire. The period of oscillation of the cylinder under the influence of the torsion of the wire is 2 sec. calculate the couple necessary to twist it through 4 complete turns.
- 22. Water is flowing in a capillary tube 40 cm long and of 1 mm internal radius under a constant pressure head of 15 cm of water. Calculate the maximum velocity of water in the tube and verify that the flow is streamlined. Given for water viscosity 0.0098 pose, Reynold's number = 100 and g = 9.8 m/s².
- 23. Calculate the difference of pressure across an element of the curved surface of a liquid in terms of surface tension and the principal radii of curvature of the element.
- 24. (i) Two tuning forks A and B give 5 beats/second. The frequency of A =612. When B is filled, 5bets/second are gain produced. Find the frequency of B before and after filling.(ii) Calculate the velocity of sound in a gas in which two waves of length 50 cm and 50.4 cm produce 6 beats/second.
- 25. Explain the production of ultrasonic waves by piezoelectric method.

SECTION C

ANSWER ANY ONE QUESTION

(1x30=30)

- 26. A. What is a cantilever? Derive an expression for the depression at the free end of a cantilever due to load.(15)
 - B. what is reverberation time? Derive Sabine's formula for reverberation time. (15)
- 27. A. Explain Doppler effect. Find an expression for the change in frequency of a note when both the source of sound and the observer are in relative motion.(15)
 - B. Derive the Poiseuille's formula for the rate of flow of liquid through a capillary tube.(15)