STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086. (For candidates admitted during the academic year 2019-20 and thereafter)

SUBJECT CODE: 19PH/MC/PS14

B.Sc. DEGREE EXAMINATION NOVEMBER 2022 BRANCH III - PHYSICS FIRST SEMESTER

		,	FIRST SEMESTER	
PAPE	RSE: ER:		MATTER AND SOUN SECTION – A	MAX. MARKS : 100
ANSV	VER A	LL QUESTIONS:		(25 MARKS)
	Which	THE CORRECT AN of the following repre	esents Hook's law	$(10 \times 1 = 10)$
	,	$ress = E \times Strain^2$ $ress^2 = E \times Strain$		b) Stress = E x Strain d) $E = \sqrt{\frac{Stress}{Strain}}$
2.	The Pomodulua) 77 c) 12	ıs is GPa		modulus is 200 GPa. Its Rigidity
3.	a) Incr	•	b) Decreases d) None of the	-
4.	a) Les		ably surface tension b) Equal to d) Double than	
5.	Dimens a) M ¹ I c) M ¹ I	L^1T^{-2}	co-efficient of viscosity b) M ¹ L ⁻¹ T ⁻² d) M ¹ L ⁻² T ⁻¹	is
6.	a) Max b) Ter	tical velocity is ximum attainable velo minal velocity ocity when hydraulic	•	

- d) Velocity above which the flow ceases to be streamlined
- 7. The waves in which particle of the medium vibrate at a right angle to the direction of waves motion is known as
 - a) Electromagnetic waves

b) Longitudinal waves

c) Transverse waves

d) Compressional waves

8.	Lissajous figure at a 45° angle means					
	a) Straight line	b) Circle				
	c) Oval	d) None of the above				
9.	9. When is ultrasonic waves produced using piezo electric oscillator?					
	a) At constant temperature	b) At resonance				
	c) At constant pressure	d) At constant voltage				
10	. What happens if the reverberation to	ime is too large?				
	a) The sound becomes inaudible	b) Echoes are produced				
	c) Frequency becomes high	d) The sound becomes infrasonic				
II. FI	LL IN THE BLANKS:		$(5 \times 1 = 5)$			
11	. The SI unit of stress is					
	. The rise of liquid in a capillary tube					
	. Mcleod gauge works on the princip					
14	waves have the same d	lirection of vibration as their direction	of travel.			
15	is the range of frequency fo	r audibility of human ear.				
III. A	NSWER BRIEFLY:		$(5 \times 2 = 10)$			
16	. Define Poisson's ratio.					
17	. What is angle of contact in surface t	tension?				
18	. State Newton's law of viscosity.					
19	. What is standing waves?					
20	. What is absorption co-efficient in ac	coustics?				
	S	ECTION – B				
ANS	WER ANY FIVE QUESTIONS:		$(5 \times 6 = 30)$			
21		on 5 x 10^{-3} sq m is supported at its two eved in the middle is 1.96 x 10^{-3} m whomodulus of the material.				
22	22. The pressure of air in a soap bubble of 7 x 10 ⁻³ m diameter is 8 x 10 ⁻³ m of water above the atmospheric pressure. Calculate the surface tension of the soap solution.					
23	. Calculate Reynolds number, if a flu 900 Kg/m ³ flows through a pipe of 2	id having viscosity of 0.4 Ns/m ² and r 20 mm with a velocity of 2.5 m.	elative density of			
24	adjusted in the parallel position. If t	formed on a string of length 120 cm when the tension in the string is 98 x 10 ⁻³ N arequency of the fork and length of each	and the mass of			

- 25. A hall with dimensions 16 x 10 x 10 cubic meter is found to have reverberation time 4 seconds. What is the total absorbing power of all the surfaces in the hall?
- 26. Derive an expression for bending moment of a beam.
- 27. Explain piezo-electric method of producing ultrasonic waves.

SECTION - C

ANSWER ANY THREE QUESTIONS:

 $(3 \times 15 = 45)$

- 28. Elucidate the theory and experimental method for determining the rigidity modulus of a wire using torsional pendulum.
- 29. Describe Jaegar's method of studying the variation of surface tension of water with temperature and discuss its advantages and disadvantages.
- 30. (a) Derive an expression for critical velocity of a liquid
 - (b) Define viscosity and obtain an expression for Poiseuille's formula for the rate of flow of liquid through a capillary tube.
- 31. Derive the general differential equation of SHM and sketch the graphical representation of SHM for displacement, velocity and acceleration.
- 32. Define reverberation. Deduce Sabine's formula for reverberation time and hence determine the absorption coefficient.
