(6 pages) **Reg. No. :** .....

Code No. : 30315 E **Sub. Code : JAPH 11/ SAPH 11**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2020.

First Semester

Physics — Allied

PHYSICS — I

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The expression for stress is ———— (F-Force, A-Area of cross-section)
   (a) F/A (b) A/F
   (c) FA (d) None

2. The work done is twisting a wire is ———— (C-twisting couple)
   (a) $2C\theta^2$ (b) $\frac{1}{2}C\theta^2$
   (c) $\frac{1}{2}C\theta$ (d) None

3. Soap bubble is spherical in shape due to ————————.

(a) viscosity (b) surface tension

(c) elasticity (d) none

4. The unit for viscosity is ————————.

(a) Nsm^2 (b) Nsm^{-2}

(c) $Ns^{-1}m^2$ (d) None

5. Simple pendulum is an example for ———————— motion.

(a) unharmonic (b) forced vibrations

(c) simple harmonic (d) none

6. The distance between two successive nodes is ————————.

(a) λ (b) $\lambda / 4$

(c) $\lambda / 2$ (d) 0

7. Newton's law of cooling method is used to find the thermal conductivity of ————————.

(a) good conductor (b) bad conductor

(c) liquid (d) none

8. Land breeze and see breeze are formed due to thermal ————————.

(a) conduction (b) convection

(c) radiation (d) none

9. In Fresnel diffraction the shape of the incident wave front is ————————.

(a) plane (b) spherical

(c) elliptical (d) none

10. The path difference for destructive interference between two beams is ————————.

(a) $n\lambda$ (b) $(n+1)\lambda/2$

(c) $(2n-1)\lambda/2$ (d) none

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Derive the expression for work done in stretching a wire.

Or

(b) Derive the expression for the bending moment of beam.

12. (a) Derive the expression for excess pressure in a soap bubble.

Or

(b) Discuss the analogy between liquid flow and current flow.

13. (a) Define simple harmonic motion. What re the characteristics of simple harmonic motion?

Or

(b) What are Lissajou's figures? How they are produced?

14. (a) Derive the expression for thermal conductivity of a solid.

Or

(b) What are the important features of black body radiation?

15. (a) Obtain the conditions for constructive and destructive interference.

Or

(b) Explain the principle of air-wedge.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Derive the relation between three elastic modulii.

Or

(b) Explain the determination of young's modulus of a beam by uniform bending method.

17. (a) Derive the Poiseulle's formula for the coefficient of viscosity.

Or

(b) Discuss the experimental determination of coefficient of viscosity of highly viscous liquid.

18. (a) Discuss the resultant motion of a particle acted upon by two simple harmonic motions perpendicular to one another.

Or

(b) Explain Melde's string method of determining the frequency of a tuning fork by longitudinal model.

19. (a) Discuss the Lee's disc method of determining the thermal conductivity of a bad conductor.

Or

(b) Explain in detail the experimental verification of Newton's law of cooling.

20. (a) Discuss the determination of thickness of thin wire using air-wedge arrangement.

Or

(b) Explain in detail the production and detection of plane polarized light.

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