

KAMARAJ COLLEGE (Autonomous)

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

THOOTHUKUDI – 628 003

(5 Pages)

Reg. No:

Question. Code No : 25E03305

Sub Code : 24PSPH21

PG Degree - End Semester Examinations, April 2025

Second Semester

M.Sc. PHYSICS

SEC - Physics for Competitive Examinations

(For those who joined in July 2024 onwards)

Time : 3 Hours

Maximum : 75 Marks

PART - A ($10 \times 1 = 10$ Marks)

Answer ALL Questions

Choose the correct answer :

1. The dimensional formula for coefficient of viscosity is

(a) $M^1L^{-1}T^{-1}$

(b) $M^{-2}L^3T^{-2}$

(c) $M^1L^{-2}T^{-3}$

(d) $M^2L^{-1}T^{-1}$

2. The Escape velocity from the Earth is

- (a) 9.8 km/s (b) 11.2 km/s
(c) 10.3 km/s (d) 15.2 km/s
3. Mayer's relation is
(a) $C_p - C_v = R$ (b) $C_p/C_v = R$
(c) $C_v - C_p = R$ (d) $C_v/C_p = R$
4. Melting point of pure ice is
(a) 273 K (b) 0 K
(c) -273 K (d) 373 K
5. Above_____, the noise becomes physically painful to human ears.
(a) 50 dB (b) 80 dB
(c) 30 dB (d) 100 dB
6. Which of the following colours of the rainbow has the longest wavelength?
(a) Violet (b) Blue
(c) Red (d) Yellow
7. If symmetry is present, then ____ is the easiest method to find the electric field.
(a) Coulomb's law (b) Gauss's law
(c) Lorentz law (d) Faraday's law.
8. Which of the following quantity is a scalar?
(a) Displacement (b) Electric force

- (c) Electric field (d) Electric potential
9. If the binding energy per nucleon is more than the nucleus will be
- (a) More stable (b) Less stable
- (c) BE does not nuclear stability (d) Highly radioactive
10. According to the special theory of relativity, the laws of physics are same in
- (a) Each inertial frame of reference
- (b) Each Non-inertial frame of reference
- (c) All frame of reference
- (d) Never been same.

PART – B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) State and prove the law of conservation of linear momentum.

(OR)

- (b) State and explain the Kepler's laws of planetary motion.

12. (a) State and explain Boyle's law and Charles's law.

(OR)

- (b) Write short notes on the law of equipartition of energy.

13. (a) Explain about the total internal reflection.

(OR)

(b) Write short notes on resonance.

14. (a) State and explain Biot-Savart law.

(OR)

(b) Obtain an expression for electric field due to an infinitely long charged wire using the Gauss law.

15. (a) Obtain an expression for the de-Broglie wavelength of a particle.

(OR)

(b) What is meant by radioactive dating? Explain its uses.

PART – C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 600 words.

16. (a) Derive an expression for the co-efficient of viscosity of a liquid.

(OR)

(b) State and explain the Newton's law of gravitational force. Derive an expression for it.

17. (a) State and explain Stefan Boltzmann law and derive the Stefan's constant.

(OR)

(b) State and explain Wien's displacement law.

18. (a) Obtain an expression for bandwidth by Young's double slit interference method.

(OR)

(b) Explain about opened closed organ pipes.

19. (a) Discuss any two applications of Gauss's law.

(OR)

(b) Describe the magnetic field due to a current in a long straight wire.

20. (a) Explain about the Compton scattering and obtain the expression for Compton shift.

(OR)

(b) List out the properties of alpha, beta and gamma rays.