Amity University Dubai

Amity Placement Test

PHYSICS

Marks: 30 **Time: 90 min**

Name: ……

Date of Exam: …… …….. **Signature of Invigilator:……**

Marks Obtained: ……. **Signature of Evaluator:……**

General Instructions for students

1. Attempt all questions. Each question carry 1 mark.
2. Fill all the details with ink /ball point pen only.
3. Do not keep electronic Diary / mobile phone in examination room.
4. Strict disciplinary action will be initiated against any student found using unfair means.
5. When the allotted time gets over, student should stop further writing and handover the answer books to the invigilator.

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1. A body is thrown vertically upwards with an initial velocity u. At the highest point of its trajectory, what is the velocity?

   (a) u

   (b) -u

   (c) $\frac{u}{2}$

   (d) 0

2. Which of the following is a scalar quantity?
   (a) Velocity
   (b) Force
   (c) Speed
   (d) Acceleration

3. The work done by a force is maximum when the angle between force and displacement is:
   (a) 0^0
   (b) 90^0
   (c) 45^0
   (d) 180^0

4. What is the SI unit of energy?
   (a) Newton
   (b) Joule
   (c) Pascal
   (d) Watt

5. If a car travels 60 km in 2 hours, what is its average speed?
   (a) 30 km/h
   (b) 60 km/h
   (c) 120 km/h
   (d) 15 km/h

6. A stone is dropped from a height. Neglecting air resistance, what is the acceleration of the stone?
   (a) Zero
   (b) $9.8\, m/s^2$
   (c) $-9.8\ m/s^2$
   (d) Depends on the mass of the stone

7. What happens to the momentum of an object if its velocity doubles while the mass remains constant?
   (a) Remains the same
   (b) Doubles
   (c) Triples
   (d) Quadruples

8. Which physical quantity is represented by the slope of a velocity-time graph?
   (a) Velocity
   (b) Acceleration
   (c) Displacement
   (d) Force

9. A particle moves along a straight line with uniform acceleration. If its initial velocity is u and acceleration is a, what is its velocity after time t?
   (a) $u + at$

(b) $u - at$
(c) $u + 2at$
(d) $u + \frac{a}{t}$

10. What is the shape of the trajectory of a projectile in the absence of air resistance?
    (a) Circle
    (b) Parabola
    (c) Ellipse
    (d) Hyperbola

11. According to Newton's second law, the force acting on a body is equal to:
    (a) $m\frac{v^2}{2}$
    (b) ma
    (c) m/a
    (d) $2ma$

12. What is an adiabatic process?
    (a) A process where heat is exchanged with the surroundings
    (b) A process where no heat is exchanged with the surroundings
    (c) A process where pressure remains constant
    (d) A process where volume remains constant

13. Heat capacity is defined as:
    (a) The amount of heat required to raise the temperature of 1 kg of a substance by 1 K
    (b) The amount of heat required to raise the temperature of a system by 1 K
    (c) The amount of heat required to change the phase of a substance
    (d) The energy required to break molecular bonds

14. The second law of thermodynamics states that:
    (a) Heat flows from a colder body to a hotter body without external work
    (b) The total entropy of an isolated system can only increase over time
    (c) Energy can neither be created nor destroyed
    (d) Work can be done without any loss of energy

15. What is the equivalent resistance of three resistors, $R1 = 3\Omega, R2 = 6\Omega$, and $R3 = 9\Omega$ connected in series?
    (a) 3Ω
    (b) 6 Ω
    (c) 18 Ω
    (d) 9 Ω

16. If two resistors, $R1 = 4\Omega$ and $R2 = 12\Omega$ are connected in parallel, what is the equivalent resistance?
    (a) 3Ω
    (b) 4Ω
    (c) 8Ω
    (d) 16Ω

17. If a current of 2 A2A flows through a wire for 5 s5s, what is the total charge transferred?
    (a) 2 C
    (b) 5 C
    (c) 10 C
    (d) 0.4 C

18. A 5 V battery supplies a current of 1 A for 10 seconds. How much charge flows through the circuit during this time?
    (a) 5 C
    (b) 10 C
    (c) 50 C
    (d) 1 C

19. A point charge q is placed at the center of a spherical surface. The electric flux through the surface is:
    (a) Zero
    (b) $\frac{q}{\epsilon_0}$
    (c) $\frac{q}{4\pi\epsilon_0}$
    (d) $\frac{4\pi q}{\epsilon_0}$

20. Gauss's law for electrostatics states that:
    (a) The net electric flux through a closed surface is proportional to the charge enclosed
    (b) The electric field is zero inside a conductor
    (c) The electric flux is proportional to the area of the surface
    (d) The electric field lines are always closed loops

21. The bending of light as it passes from one medium to another is called:
    (a) Reflection
    (b) Refraction
    (c) Diffraction
    (d) Scattering

22. The condition for constructive interference in a diffraction grating is given by:
    (a) $d \sin\theta = n\lambda$

(b) $d \sin\theta = \frac{n\lambda}{2}$
(c) $\lambda = 2d \sin\theta$
(d) $n \sin\theta = d\lambda$

23. Total internal reflection occurs when:
    (a) The angle of incidence is greater than the critical angle
    (b) Light travels from a denser medium to a rarer medium
    (c) The refractive index of the first medium is greater than the second medium
    (d) All of the above
24. What does the Heisenberg Uncertainty Principle state?
    (a) The energy of a system cannot be measured precisely.
    (b) The position and momentum of a particle cannot be simultaneously measured with absolute precision.
    (c) The charge of an electron cannot be determined accurately.
    (d) The time and energy of a particle cannot be measured at all.

25. The Pauli Exclusion Principle explains why:
    (a) Electrons do not collide in an atom.
    (b) Two electrons in the same orbital must have opposite spins.
    (c) Protons and neutrons bind together in the nucleus.
    (d) Electrons cannot escape an atom.

26. According to Planck's Principle, energy is quantized and exists in discrete packets called:
    (a) Electrons
    (b) Quarks
    (c) Photons
    (d) Nucleons

27. The photoelectric effect demonstrates that light behaves as:
    (a) A particle
    (b) A wave
    (c) A longitudinal wave
    (d) Both a wave and a particle

28. In the photoelectric effect, the kinetic energy of emitted electrons depends on:
    (a) The intensity of light
    (b) The frequency of light
    (c) The speed of light
    (d) The direction of light

29. Nuclear fusion occurs when:
    (a) A heavy nucleus splits into two smaller nuclei.
    (b) Two light nuclei combine to form a heavier nucleus.

(c) An atom loses an electron.
(d) An electron is captured by the nucleus.

30. What happens to the atomic number of an element during alpha decay?
(a) Increases by 2
(b) Decreases by 2
(c) Increases by 1
(d) Remains the same
