

AMITY UNIVERSITY DUBAI, UAE
SCHOOL OF ENGINEERING ARCHITECTURE INTERIOR DESIGN
AMITY PLACEMENT TEST | SAMPLE – 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 carries 1 mark.
2. Fill in all required details using ink or a ballpoint pen only.
3. Electronic devices such as mobile phones or electronic diaries are not allowed in the examination room.
4. Strict disciplinary action will be taken against any student found using unfair means.
5. Once the allotted time is over, students must stop writing immediately and hand over their answer booklets to the invigilator.

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Q1 If you neglect air resistance, what factors affect the horizontal range of a projectile launched from a certain height?

- a) Initial speed and launch angle only.
- b) Initial speed, launch angle, and mass.
- c) Launch angle and wind speed only.
- d) All of the above.

Q2. In a series circuit, the total current is:

- a) Equal to the sum of currents in each component.
- b) Equal to the current in the largest resistor.
- c) The same throughout the circuit
- d) Dependent on the voltage source.

Q3. A car accelerates uniformly from rest to a speed of 15 m/s in 3 seconds. What is the acceleration of the car?

- a) 5 m/s
- b) 3 m/s^2
- c) 45 m/s^2
- d) 15 m/s

Q.4 Pressure (P) is defined as force (F) acting perpendicular to an area (A). What is the formula for pressure?

- a. $P = F / A$
- b. $P = F \times A$
- c. $P = A / F$
- d. $P = M \times A$ (where M is mass)

Q5. Pick the most common example of interference in everyday life?

- a) The sound of two cars honking their horns at the same time.
- b) The way light bends around corners.
- c) The way sound waves travel through walls.
- d) The colors you see when you look at a soap bubble.

Q6. The direction of the force exerted by a magnetic field on a moving charged particle is determined by:

- a) Ampere's Law.
- b) Lenz's Law.
- c) Fleming's right-hand rule.
- d) Gauss's law for magnetism.

Q7. If a force is applied perpendicular to the direction of motion, does it do any work?

- a) Yes, it always does work
- b) No, it never does work.
- c) It depends on the magnitude of the force.
- d) It depends on the mass of the object.

Q8. Periodic waves are characterized by a repeating pattern and can be classified as either transverse or longitudinal. In a longitudinal wave, the particles of the medium vibrate:

- a) Parallel to the direction of wave propagation.
- b) Perpendicular to the direction of wave propagation.

- c) In a circular motion.
- d) Randomly.

Q9. What is the dimensional formula for work done?

- a) MLT^{-2}
- b) ML^2T^{-3}
- c) MLT
- d) ML^2T^{-2}

Q10. In uniform circular motion, the object's velocity is constantly changing in direction, even though its speed may remain constant. This is because:

- a) The object is accelerating away from the center.
- b) The object is not truly in motion.
- c) The object experiences a centripetal force directed towards the center.
- d) The object is defying Newton's laws.

Q11. What is the work function of a material?

- a) The minimum energy required to ionize an atom in the material
- b) The minimum energy required to eject an electron from the material
- c) The maximum energy an electron can absorb from the light
- d) The average energy of the electrons in the material

Q12. An object is considered to be in equilibrium if:

- a) It is moving at a constant speed in a straight line.
- b) It is accelerating.
- c) The net force acting on it is zero.
- d) It is at rest on a rough surface.

Q13. What is the main application of adiabatic processes in real-world scenarios?

- (a) Refrigeration
- (b) Rocket propulsion
- (c) Power generation
- (d) All of the above

Q14. Which law states that an object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force?

- a) Newton's First Law of Motion (Law of Inertia)
- b) Newton's Second Law of Motion (Law of Acceleration)
- c) Newton's Third Law of Motion (Law of Action and Reaction)

Q15. The second law of thermodynamics states that

- a) energy can neither be created nor destroyed
- b) the entropy of an isolated system always increases over time
- c) the temperature of a system is a measure of its internal energy
- d) the work done on a system is equal to the change in its internal energy

Q16. What is nuclear fission?

- a) Nuclear fission is the splitting of a nucleus into two or more smaller nuclei.
- b) Nuclear fission releases a large amount of energy.
- c) Nuclear fission can be used to generate electricity in nuclear power plants.
- d) All of the above.

Q17. Which material has the highest refractive index among the following?

- a) Air
- b) Water
- c) Diamond
- d) Glass

Q18. What happens to the current if a transformer is used to step up the voltage from 120 V to 240 V?

- a) It will increase proportionally.
- b) It will remain constant.
- c) It will decrease proportionally.
- d) It cannot be determined without knowing the power.

Q19. Like charges:

- a) Attract each other.
- b) Repel each other.
- c) Have no effect on each other.
- d) Can be both attractive and repulsive.

Q20. Ohm's Law relates:

- a) Current, voltage, and resistance.

- b) Voltage, power, and time.
- c) Resistance, length, and area.
- d) Current, magnetic field, and force.

Q21. The speed of sound in a medium depends on the properties of the medium, such as its density and elasticity. Sound waves can travel through:

- a) Vacuum only.
- b) Solids and liquids only.
- c) Solids, liquids, and gases.
- d) None of the above.

Q22. Induced emf is produced when:

- a) A steady current flows through a conductor.
- b) A conductor moves through a magnetic field.
- c) A strong magnetic field is near a conductor.
- d) The material of the conductor changes.

Q23. Compared to the object, the image formed by a concave lens is:

- a) Larger
- b) Smaller
- c) The same size
- d) It depends on the distance between the object and the lens

Q24. If a car travels 120 km in 2 hours, what is its average speed?

- a) 30 km/h
- b) 60 km/h
- c) 90 km/h
- d) 100 km/h

Q25. Two objects with different masses are acted upon by the same force. Which object will experience a greater acceleration?

- a) The object with the smaller mass
- b) The object with the larger mass
- c) Both objects will experience the same acceleration
- d) It depends on the direction of the force

Q26. Calculate the work required to overcome gravity and lift a 20 kilogram crate vertically upwards by 5 meters. We know the acceleration due to gravity is 9.8 m/s^2 .

- a) 380 Nm
- b) 980 Nm
- c) 650 Nm
- d) 890 Nm

Q27. A sound wave has a frequency of 440 Hz and a wavelength of 0.8 m. What is the speed of sound?

- a) 352 m/s.
- b) 652 m/s.
- c) 323 m/s.
- d) 539 m/s.

Q28. According to the uncertainty principle, which of the following statements is true?

- a) The more precisely you know a particle's position, the less precisely you can know its momentum, and vice versa.
- b) Knowing a particle's position has no effect on knowing its momentum.
- c) The uncertainty principle only applies to very large objects.
- d) The uncertainty principle is not a fundamental principle in physics.

Q29. A cyclist with a mass of 60 kg is moving at 5 m/s. What is the momentum of the cyclist?

- a) 300 kgm/s
- b) 10 kgm/s
- c) 65 kgm/s
- d) 50 kgm/s

Q30. What is its efficiency of a heat engine if it absorbs 600 J of heat and rejects 400 J to the environment.

- a) 20%
- b) 33.3%
- c) 50%
- d) 66.7%