



Class: XII

MODEL PAPER EXAMINATION 2026

Time Allowed: 20 minutes

SUBJECT: PHYSICS

Q1:

SECTION "A"

Marks: 16

Note: Attempt **All** questions from this section. Each question carries **ONE** mark.

- A practical application of mutual induction is:
A. AC generator B. Transformer C. Rectifier D. Dynamo
- This particle has no charge, no rest mass, and can interact with all charged and neutral particles:
A. Alpha particles B. Neutron C. Photon D. Positron
- The ratio of molar specific heat at constant pressure to molar specific heat at constant volume is:
A. Less than one B. Greater than one C. Equal to one D. Equal to zero
- In the phenomenon of the photoelectric effect, if the frequency of incident radiation increases, the required stopping potential:
A. Decreases B. Does not change C. Increases D. None of these
- The number of energy levels required for laser production is:
A. 2 B. 3 C. 4 D. 4
- Resistors of 3Ω , 5Ω and 7Ω are connected in parallel. If the P.D. across 5Ω resistor is 6V, the P.D. across the 7Ω resistor is:
A. 3V B. 6V C. 7V D. 8V
- The Balmer series of the hydrogen atom spectrum lies in the:
A. Infrared B. Ultraviolet C. Visible D. Radio wave
- The most suitable material for making the core of an electromagnet is:
A. Air B. Steel C. Copper and nickel alloy D. Soft iron
- A voltmeter is ideal if its internal resistance is:
A. Very large B. Large C. Small D. Infinite
- A transformer steps down:
A. Energy B. AC only C. DC only D. Both AC & DC
- The section of a transistor that supplies charge carriers (electrons or holes) is called the:
A. Collector B. Base C. Emitter D. Junction
- A 2.2 kW electric iron operates at 220 volts; the current it draws is:
A. 20 Ampere B. 22 Ampere C. 10 Ampere D. 5 Ampere
- Lenz's law is a direct consequence of:
A. Ohm's law B. Coulomb's law C. Faraday's law D. Law of conservation of energy
- A frame of reference is called inertial if it is:
A. Rotating B. Accelerating C. Vibrating D. Moving with uniform velocity
- An ammeter is used to measure:
A. Current B. Potential difference C. Resistance D. Capacitance
- If the current passing through a wire in a uniform magnetic field is doubled, the force acting on the wire will become:
A. Half B. Double C. Four times D. Six times
- De Broglie's wavelength is given as:
A. $\lambda = \frac{mv}{h}$ B. $\lambda = \frac{h}{mv^2}$ C. $\lambda = \frac{h}{mv}$ D. $\lambda = \frac{mh}{v}$

(Practical Based Assessment)

Marks: 16

Q2: Attempt **ALL** questions.

- Which instrument is used to measure the pressure of a gas in a laboratory?
A) Barometer B) Manometer C) Thermometer D) Hydrometer
- Which property of gas molecules is directly proportional to the absolute temperature?
A) Average kinetic energy B) Volume
C) Pressure D) Density
- Which of the following best describes entropy in a practical experiment?
A) Measure of heat B) Measure of disorder or randomness
C) Measure of pressure D) Measure of energy
- In a refrigerator, work is done to:
A) Transfer heat from cold region to hot region
B) Transfer heat from hot region to cold region
C) Convert work entirely into heat
D) Increase the temperature of the cold region
- Which law is violated by a device claiming 100% conversion of heat to work in a cycle?
A) First law of thermodynamics B) Second law of thermodynamics
C) Newton's law D) Boyle's law
- Which device is used to measure the magnetic field strength?
A) Ammeter B) Voltmeter C) Gauss meter D) Thermometer
- In an experiment, increasing the current in a wire increases the magnetic field strength. This is an example of:
A) Inverse square law B) Direct proportionality
C) No relation D) Exponential relation
- In a diode circuit, when the diode is forward biased, it:
A) Allows current to flow easily B) Blocks the current
C) Acts as an open circuit D) Emits light

26. Which material is commonly used as the base material in solid state electronics?
A) Copper B) Silicon C) Lead D) Mercury
27. When a magnet is moved towards a coil, the galvanometer shows:
A) Constant deflection B) Deflection only when the magnet is moving
C) No deflection D) Deflection only after the magnet stops
28. In an experiment, if the speed of movement of a magnet is increased, the induced emf:
A) Decreases B) Increases C) Remains constant D) Becomes zero
29. According to special relativity, the speed of light in vacuum is:
A) Variable depending on the observer's speed B) Constant for all observers
C) Zero D) Infinite
30. Which practical device accounts for relativistic effects in its functioning?
A) GPS satellite system B) Simple pendulum
C) Bicycle speedometer D) Analog clock
31. The peak value of current in an AC circuit is 10 A. The RMS value is:
A) 10 A B) 7.07 A C) 14.14 A D) 5 A
32. If heat supplied to a system is 100 J and work done by the system is 40 J, the change in internal energy of the system is:
A) 140 J B) 60 J C) -60 J D) -140 J

END OF SECTION A



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MODEL PAPER EXAMINATION 2026

Time: 2 hours 40 minutes

SUBJECT: PHYSICS SECTION "B" AND SECTION "C"

Total Marks 68

Q3:

SECTION "B" SHORT ANSWER QUESTIONS

36 Marks

NOTE: Attempt any **NINE**-part questions from this section. All questions carry equal marks.

- i. Derive an expression for the force experienced by a current-carrying conductor placed in a uniform magnetic field.
- ii. What is electric flux? Derive an expression for the electric flux produced by a point charge.
- iii. Determine the velocity and momentum of a particle with rest mass m and kinetic energy equal to its rest mass energy.
- iv. Demonstrate that the coefficient of linear expansion is one-third of the coefficient of volume expansion.
- v. How many electrons pass through the cross-section of a wire per second if it carries a current of 0.7 amperes?
- vi. With the help of a diagram, explain the normal working of an NPN transistor.
- vii. What is an equipotential surface? Describe two properties of equipotential surfaces.
- viii. A Carnot engine operates between 800°C and 400°C . If the source temperature is increased by 50°C or the sink temperature is decreased by 50°C , which change will result in greater efficiency? Justify your answer.
- ix. Define electrical potential difference (V) and electric field intensity (E). Derive the relation $V = E \cdot d$.
- x. A coil of 400 turns in an AC generator has an area of 0.1 m^2 and rotates in a magnetic field of 50 T. To generate a maximum voltage of 220 V, how fast should the coil rotate? Express your answer in revolutions per second.
- xi. A sodium surface is illuminated with light of wavelength $3 \times 10^{-7} \text{ m}$. If the work function of sodium is 2.46 eV, find the kinetic energy of the photoelectrons and the cutoff wavelength.
- xii. What is a semiconductor diode? Explain the working of a full-wave rectifier using a semiconductor diode, supported by a circuit diagram.

SECTION "C" DETAILED ANSWER QUESTIONS

32 Marks

Note: Attempt any **TWO** questions from this section. All questions carry equal marks. Draw diagram where necessary.

Your answer should not exceed 30 - 40 lines.

Q4.

- a) State Ampère's Law and apply it to derive the expression for the magnetic field induction inside a solenoid.
- b) Explain the Compton effect and derive the expression for the increase in the wavelength of the scattered photon.

Q5.

- a) Define a Carnot engine and derive the expression for its efficiency.
- b) What is a transformer? Explain the principle on which it operates and derive the mathematical relationship between the induced EMF and the number of turns in the coils.

Q6.

- a) Describe the construction and working of a moving coil galvanometer. Also, prove that the deflection produced in the coil is proportional to the current passing through it.
- b) Define radioactivity. Explain the law of radioactive decay and write the equation for the change in the parent nucleus during alpha, beta, and gamma decay.

END OF PAPER