

MODEL QUESTION PAPER
PHYSICS
XII – STANDARD (STATE BOARD)

Time: 3 Hours

Max. Marks: 70

Instructions:


1. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
2. Use Blue (or) Black ink to write and underline use pencil to draw diagrams. Note: Draw diagrams and write questions wherever necessary.

PART – I

Note: 1. Answer all the questions.

15×1=15

2. Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

S.No.	Questions	Marks
1	Two point white dots are 1 mm apart on a black paper. They are viewed by eye of pupil diameter 3 mm approximately. The maximum distance at which these dots can be resolved by the eye is, [take wavelength of light, $\lambda = 500 \text{ nm}$] a) 1 m b) 5 m c) 3 m d) 6m	1
2	An electric bulb of 100W converts 3% of electrical energy into light energy. If the wavelength of light emitted is 6.625 \AA , the number of photons emitted is a) 10^{17} b) 10^{20} c) 10^{19} d) 10^{30}	1
3	The nucleus is approximately spherical in shape. Then the surface area of the nucleus having mass number A varies as a) $A^{2/3}$ b) $A^{4/3}$ c) $A^{1/3}$ d) $A^{5/3}$	1
4	Choose the most appropriate answer from the four given alternatives and write the option code with the corresponding answer.  a) AND gate b) OR gate c) NOR gate d) NOT gate	1

5	A mark at the bottom of the liquid appears to rise by 0.2 m. If the depth of the liquid is 2m then the refractive index of the liquid is: a) 1.80 b) 1.60 c) 1.33 d) 1.11	1
6	Two capacitances 0.5 μF and 0.75 μF are connects in parallel, Calculate the effective capacitance of the capacitor: a)0.8 μF b) 0.7 μF c)0.25 μF d)1.25 μF	1
7	Common base current gain of a NPN transistor is 0.99. The input resistance is 1000 and load resistance is 10,000. The voltage gain in common emitter mode is: a) 9900 b) 9900 c) 99 d) 990	1
8	T.V. tower has a height of 300 m. What is the maximum distance up to which the T.V transmission can be received? a) 62 Km b)32 Km c) 42 Km d) 52 Km	1
9	Nano wires are used in a) Transistors b) Resistors c) Capacitors d) Transducers	1
10	When a point charge of 6 μC is moved between two points in an electric field, the work done is 1.8×10^{-5} J. The potential difference between the two points is: a) 1.08 V b) 1.08 mV c) 3V d) 30 V	1
11	An electron is moving with a velocity of $3 \times 10^6 \text{ ms}^{-1}$ perpendicular to a uniform magnetic field of induction 0.5 T. The force experienced by the electron is a) 2.4×10^{-31} N b) 13.6×10^{-21} N c) 13.6×10^{-11} N d) zero	1
12	In LCR series AC circuit, the phase difference between current and voltage is 30° . The reactance of the circuit is 17.32 Ω . The value of resistance is: a)30 Ω b) 10 Ω c)17.32 Ω d)1.732 Ω	1
13	In an electromagnetic wave: a) Power is equally transferred along the electric and magnetic fields b) Power is transmitted in a direction perpendicular to both the fields c) Power is transmitted along electric field d) Power is transmitted along magnetic field	1

14	A step-down transformer reduces the supply voltage from 220 V to 11 V and increase the current from 6 A to 100 A. Then its efficiency is: a) 1.2 b) 0.83 c) 0.12 d) 0.9	1
15	A graph is drawn taking potential difference across the ends of a conductor along x-axis and current through the conductor along the y-axis the slope of the straight line gives. a) resistance b) conductance c) resistivity d) conductivity	1

PART - II

Answer any six questions. Question No. 24 is Compulsory.

6×2=12

16	The electric field lines never intersect. Justify.	2
17	Repairing the electrical connection with the wet skin is always dangerous. Why?	2
18	State Maxwell's right hand cork screw rule.	2
19	How will you define Q-factor?	2
20	What is meant by Fraunhofer lines?	2
21	An electron and an alpha particle have same kinetic energy. How are the de Broglie wavelengths associated with them related?	2
22	In alpha decay, why the unstable nucleus emits nucleus? Why it does not emit four separate nucleons?	2
23	Distinguish between intrinsic and extrinsic semiconductors.	2
24	The thickness of a glass slab is 0.25 m. it has a refractive index of 1.5. A ray of light is incident on the surface of the slab at an angle of 60°. Find the lateral displacement of the light when it emerges from the other side of the mirror.	2

PART - III

Answer any six questions. Question No. 33 is compulsory.

6×3=18

25	Derive an expression for the torque experienced by a dipole due to a uniform electric field.	3
26	Write the aim of artificial intelligence in robots.	3
27	Establish the fact that the relative motion between the coil and the magnet induces an emf in the coil of a closed circuit.	3
28	Two electric bulbs marked 20 W – 220 V and 100 W – 220 V are connected in series to 440 V supply. Which bulb will be fused?	3
29	Derive the equation for acceptance angle for optical fiber.	3
30	Discuss the spectral series of hydrogen atom.	3

31	Give the applications of ICT in mining and agriculture sectors.	3
32	State and prove De Morgan's First and Second theorems.	3
33	When a 6000\AA light falls on the cathode of a photo cell and produced photoemission. If a stopping potential of 0.8 V is required to stop emission of electron, then determine the (i) frequency of the light (ii) energy of the incident photon (iii) work function of the cathode	3

PART - IV

Answer all the following questions.

5×5=25

34	a) i) Derive the expression for resultant capacitance, when capacitors are connected in parallel. ii) What are the factors on which the capacity of a parallel plate capacitor with dielectric depends?	5
	OR	
	b) Explain the working of a single-phase AC generator with necessary diagram.	5
35	a) i) Explain the equivalent resistance of a series resistor network. ii) How the resistivity of s are related to number density (n) and τ ?	5
	OR	
	a) Obtain the equation for bandwidth in Young's double slit experiment.	5
36	a) i) Obtain an expression for potential energy of a bar magnet placed in an uniform magnetic field. ii) Explain the applications of hysteresis loop	5
	OR	
	b) Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.	5
37	What is emission spectra? Give their types.	5
	OR	
	Elaborate on the basic elements of communication system with the necessary block diagram	5
38	a) Using Bohr postulate derive the expression for total energy of electron in stationary orbits of hydrogen atom. Hence show that total energy in the stationary orbit in the ratio: $1/4: 1/9 \dots\dots\dots$	5
	OR	
	b) Explain the construction and working function of a full wave rectifier.	5