## SAMPLE PAPER-2013

CLASS-XII

SUBJECT : PHYSICS

1. Please check that this question paper contains 03 printed pages.
2. Code number given on the right hand side of the question paper should be written on the title page of the answer –book by the candidate.
3. Please check that this question paper contains30 questions. Please write down the serial no of the question before attempting it.
4. 15 minutes time has been allotted to read this question paper.

**Max. Marks: 70 PHYSICS– XII SCI. Time allowed: 3 hours**

**General Instructions:-**

1. All questions are compulsory.
2. There are 30 questions in total. Questions 1to 8 carry one marks each., questions 9 to18 carry two marks each, questions19 to27 carry three marks each and questions 28 to 30 carry five marks each..
3. There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all three questions of five marks each. You have to attempt only one of the choices in such questions. Questions No. 6-10 and 22-26 are short- answer questions carrying ‘3’ marks each. Answers to them should normally not exceed 60 words each.
4. Use of calculators is not permitted.
5. You may use the following values of physical constants wherever necessary:

 c = 3 x108 ms-1

 h = 6.626 x10-34 Js

 e = 1.602 x 10-19 C

 µ0 = 4π x10-7 TmA-1

 $\frac{1}{4πЄ0}$ = 9 x 109 Nm2C-2

Masses of electron me = 9.1 x10-31 kg

Mass of electron mn = 1.675 x10-27 kg

Boltzmann’s constant k = 1.381 x 10-23 JK-1

Avogadro’s number NA= 6.022 x 1023 mol-1

Radius of earth =6400 km

**QUESTION**

Q.1 An electron moving through a magnetic field does not experiences a force. Under what condition is this possible?

Q.2 The instantaneous value of voltage from an a.c. Source is given by E=300 Sin 314t. What is the r.m.s. voltage of the source?

Q.3 A bulb and a capacitor are connected in series to an a.c. source of variable frequency. How will the brightness of the bulb change on increasing the frequency of the a.c. source.

Q.4 Name the part of electromagnetic spectrum that has largest penetrating power.

Q.5 When light undergoes refraction. What happens to its frequency.

Q.6 Two nuclei have mass number in the ratio 1:2. What is the ratio of their nuclear density.

Q.7 In the given diagram, is the diode D forward or reversed biased?

**-10**

Q.8 Write the truth table for the gate shown below.

A

C

B

Q.9 Two point charges 4µc and —2µc are separated by a distance of 1m in air. At what point on the line joining the two charges is the electric potential is zero.

Q.10 Four resistors of resistance each of 10Ω is connected as given below.

 

 Calculate the equivalent resistance between points X and Y.

Q.11 A battery of emf 10V and internal resistance 3 Ω connected to a resistor R.

 (i) If the current in the circuit is 0.5A. Calculate the value of R.

 (ii) What is the terminal voltage of the battery when the circuit is closed.

Q.12 The electric field of e.m wave in vacuum is given:-

 $\vec{E }=\{3.1 \frac{N}{C}[(\cos(1.8 rad/m) y+(5.4 X 10^{6}rad/sec )t]\} \hat{i })$

1. What is the direction of propagation of the wave.
2. What is its wave length?
3. What is the frequency?
4. What is the direction of magnetic field?

Q.13 A concave lens has the same radii of curvature for both sides and has a refractive index 1.6 in air. In the second case it is immersed inside a liquid of refractive index 1.4. Calculate the ratio of focal length of the lens in the two cases.

Q.14 In the photo electric experiment, the graph between the stopping potential and frequency of incident radiations on two metal plates P and Q are shown in figure.

Q

P

Stopping potential (v)

Frequency ( ν )

1. Which has greater work function?
2. What does the shape of the line depict?

Q.15 Explain the laws of photo electric emission on the basis of Einstein’s photo electric equation.

Q.16 The height of a TV tower is 400m. Calculate the range upto which signal can be received from the tower.

Q.17 The values of ground state energy of hydrogen atom is -13.6 eV.

 a) What does the negative sign signify?

 b) How much energy required to take an electron in this atom from the ground state to the first excited

 state?

OR

 Write any two properties of Nuclear force.

Q.18 Define magnetic susceptibility of a material. Name two elements one having positive susceptibility and other having negative susceptibility.

Q.19 Define capacitance of a capacitor. Prove that the total electrostatic energy stored in a parallel plate capacitor is ½ CV2.

Q.20 Using Gauss theorem, deduce an expression for the electric field intensity at any point due to a thin infinity long wire of charge per unit length is λ c/m.

Q.21 With the help of circuit diagram explain in brief the use of potentiometer for comparision of emf of two cells.

Q.22 A metallic rod of length ‘l’ and resistance ‘R’ is moving normal to a uniform magnetic field ‘B’ with a velocity ‘V’ . Deduce expressions for (i) the emf induced (n) the induced current in the metallic rod.

Q.23 Explain with help of a neat and labeled diagram, the principle and working of a transformer.

Q.24 Draw a labeled ray diagram shown the formation of image of a distant object using as astronomical telescope in normal adjustment position. Also write the expression for magnifying power of telescope for normal adjustment.

Q.25 Define polarizing angle. Derive the relation connecting polarising angle and the refractive index of a medium.

Q.26 (a) The activity of a radioactive element drops to 1/16th of its initial value in 32 years. Find the mean life

 of the sample.

 (b) Write the nuclear equations for α decay of $$.

Q.27 What is modulation. Explain why modulation is necessary in communication.

OR

 A message signal of frequency 10KHz and peak voltage of 10 volts is used to modulate a carrier of frequency 1MHz and peak voltage of 20 volts. Determine (a) nodulation index (b) the side bands produced.

Q.28 Draw a neat and labelled diagram of a cyclotron. State the underlying principle and explain how a positively charged particle gets accelerated in a cyclotron. Show mathematically that the cyclotron frequency does not depend on speed of the particle.

OR

 State the Biot-savart law for the magnetic field due to a current carrying element. Using this law obtain a formula for magnetic field at the centre of circular loop of radius R carrying a steady current I.

Q.29 What is interference of light? In Young’s double slit experiment deduce the conditions for (i) constructive and (ii) destructive interference.

 Draw a graph showing the variation of resultant intensity in the intereference pattern against position ‘x’ on the screen.

OR

1. Explain the phenomenon of diffraction of light at a single slit to show the formation of diffraction fringes.
2. A slit of width ‘d’ is illuminated by light of wave length 6500A0. For what value of ‘d’ will the first minimum fall at an angle of diffraction of 300.

Q.30 (a) With the help of a circuit diagram explain the working of transistor as oscillation.

(b) If a change of 100µA in the base current of an n-p-n transistor causes a change of 10mA in its collector current. What is it’s a.c. current gain.

OR

With the help of circuit diagram, explain the working of a p-n junction diode as full wave rectifier. Show the input and output wave forms.