**Pratice Paper 3**

**Class – XII**

**Subject – Physics**

**Time: 3 Hrs MM: 70**

**General Instructions:**

All questions are compulsory.

There are 26 questions in total. Questions 1 to 5 carry 1 mark each, questions 6 to 10 carry 2 marks each, question11to 22 carry 3 marks each and question 23 carry 4 marks, questions 24 to 26 carry 5 marks each.

There is no overall choice.

Use of calculators is not permitted.

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. You may use the following values of physical constants wherever necessary:

c = 3 x 108 ms–1

h = 6.626 x 10–34 Js

e = 1.602 x 10–19 C

μ0 = 4 π x 10–7 T m A–1

Mass of neutron mn ≅ 1.675 x 10–27 kg

Boltzmann’s constant k = 1.381 x 10–23 J K–1

Avogadro’s number NA = 6.022 x 1023 / mol –1

Q.1 The distance of the field point, on the axis of a small electric dipole is doubled. By what factor will the electric field due to a dipole change?

Q.2 How does the drift velocity of electrons in a metallic conductor vary with increase of temperature?

Q.3 A charged particle enters in to a uniform magnetic field ,Which type of path will it follow?

Q.4Experimental observations have shown that X-rays:   
(i) travel in vacuum with a speed of 3x108m/s.

(ii)exhibit the phenomenon of diffraction and can be polarized. What conclusion can be drawn about the

nature of the X-rays from each of these observations?

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Q.5 The photoelectric cut-off the voltage in a certain photoelectric experiment is 1.5V. What is the maximum kinetic energy of the photoelectrons emitted?

Q.6 What do you mean by modulation? Explain the need of modulation.

Q.7 Why Nor gate is called building block?

Q.8 How will the angular separation and visibility of fringes in Young’s double slit experiment change when (i) screen is moved away from the plane of the slits. (ii)width of source slit is increased.

**OR**

The value of Brewster’s angle for a transparent medium is different for lights of different colours, why?

Q.9 Calculate the work done to dissociate the system of three charges placed on the vertices of a triangle as shown in fig. given q = 1.6 x 10-10C.

Q.10What are E.M. Waves?Write down their characteristics[4].

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Q.11Give 2 differences between Kirchhoff law.

Under what condition wheatstone bridge is said to be balanced?

Q.12 Explain how does the width of the depletion layer in a p-n junction diode change when the junction is(i) forward biased (ii) reverse biased.

Q.13 What is Lenz law?Show that it is in accordance with energy conservation.

Q.14 Draw ray diagram to show how a right angled isosceles prism can be used to deviate a ray thru 90 and 180 degree.

Q.15 Calculate the binding energy per nucleon in 20Ca nucleus. Given m ( 20Ca ) = 39.962589u, mn = 1.008665u, mp = 1.007825u, 1u = 931MeV/c2.

Q.16 What do you mean by self induction and self inductance? Derive an expression for the self inductance of a long air cored solenoid of length (l) and radius(r) and number of turns N.

**OR**

What are eddy currents? How are they produced? Give two applications of eddy currents.

Q.17 With the help of a labeled diagram explain the construction and working if an AC generator. Deduce the expression for emf generated in the coil in terms of its speed of rotation.

Q.18 Draw the graph, showing variation of binding energy per nucleon with mass number. Explain using the graph, why heavy nuclei can undergo fission.

Q.19 Deduce the condition for balance in a Wheatstone bridge. Using the principle of Wheatstone bridge describe the method to determine the resistance of a wire in the laboratory. Draw the circuit diagram and write the formula used.

Q.20 With the help of a circuit diagram, explain how an n-p-n transistor can be used as an amplifier in common emitter configuration. Explain how the input and output voltages are out of phase by1800 for a common emitter transistor amplifier.

Q.21 Draw a ray diagram to show the formation of image by a refracting type astronomical telescope for normal adjustment position. Obtain expression for its magnifying power.

Q.22 A convex lens made up of glass of refractive index 1.5 is dipped, in turn, in:

(i) medium A of refractive index 1.65.

(ii) medium B of refractive index 1.66.

Explain giving reasons, whether it will behave as converging lens or a diverging lens in each of these two media.

Q.23 A little boy saw a street light transmitting current in day time.Thinking it to be wastage of current he switched off it.

i)What words do you frame for the boy and his thinking

ii)What is basic principle and working of transformer?

24 (i) Explain the principle, construction and working of moving coil galvanometer with the help of a labeled diagram.

(ii) A parallel plate capacitor with air between the plates has a capacitance of 8pF. What will be the capacitance if the distance between the plates is reduced by half and the space between them is filled with a substance of dielectric constant 6?

**OR**

(i) Derive an expression for the capacitance of a parallel plate capacitor, whose plates are separated by a dielectric medium?

(ii) The area of each plate of a parallel plate capacitor is 100cm2 and the electric field strength

between the plates is 100N/C. Calculate the charge on each plate.

Q.25 Draw a neat and labeled diagram of a cyclotron. State the underlying principle and explain how a positively charged particle gets accelerated in this machine. Show mathematically that the cyclotron frequency does not depend upon the speed of the particle.

**OR**

Derive an expression for the torque acting on a loop of N-turns, area A, carrying current I, when held in a uniform magnetic field B. With the help of a circuit, show how a moving coil galvanometer can be converted into an ammeter of given range. Write the necessary mathematical formula.

Q.26 (i) Derive an expression for the distance of any bright fringe and dark fringe from the central fringe, in Young’s double slit experiment. Hence find the expression for fringe- width.

(ii) Laser light of wavelength 630nm incident on a pair of slits produces an interference pattern in which the bright fringes are separated by 8.3 mm. A second light produces an interference pattern in which bright fringes are separated by 7.6 mm. Find the wavelength of the second light.

OR

(i) What is diffraction of light? Describe diffraction of light due to a single slit and write the

expression for secondary maxima and minima. Draw a graph showing the variation of ntensity with angle in a single slit diffraction experiment. Write one feature which distinguishes the observed pattern from the double slit interference pattern.

**(ii)** What do you mean by the resolving power of an optical instrument? Write the formula for the resolving power of a microscope. How can the resolving power of microscope be increased?

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