PHYSICS Intermediate Part-II , Class 12th (1stA 424- IV) Paper II Group – I

Time: 20 Minutes   OBJECTIVE ..... Code: 8477 GUJ-1-24   Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1.

1. Which of the following circuit is called electrical oscillator?
   (A) R.L circuit   (B) R.C circuit   (C) R.L.C circuit   (D) L.C circuit

2. A charged particle enters in a strong magnetic field, then its K.E
   (A) remains constant   (B) increases
   (C) decreases   (D) first increases then decreases

3. Turn ratio of a transformer is 50. If 220 volt A.C is applied to its primary coil, voltage in the secondary coil will be
   (A) 440 V   (B) 4.4 V   (C) 220 V   (D) 11000 V

4. The physical quantity related to photon, that does not change in Compton scattering is
   (A) energy   (B) speed   (C) frequency   (D) wavelength

5. In photoelectric effect, the number of photoelectrons depends upon
   (A) wavelength of light   (B) intensity of light
   (C) threshold frequency   (D) work function

6. Glass is also known as
   (A) solid   (B) liquid   (C) solid liquid   (D) gas

7. The unit of electric intensity other than NC^{-1} is
   (A) V/A   (B) V/m   (C) V/C   (D) N/V

8. The unit of $\vec{E}$ is NC^{-1} and that of $\vec{B}$ is $NA^{-1}m^{-1}$, then the unit of E/B is
   (A) ms^{-2} (B) ms   (C) $m^{-1}s^{-1}$ (D) ms^{-1}

9. The binding energy per nucleon is maximum for
   (A) Helium   (B) Iron   (C) Polonium   (D) Radium

10. For holography, we use a beam of
    (A) r – rays   (B) x – rays   (C) β – rays   (D) Laser

11. The colour of light emitted by LED depends on
    (A) its forward biasing   (B) the reverse biasing
    (C) amount of forward current   (D) type of semi-conductor material used

12. When current flowing through an inductor is doubled, the energy stored in it becomes
    (A) half   (B) four times   (C) one fourth   (D) double

13. The half-life of Radon gas is
    (A) 3.8 days   (B) 38 days   (C) 3.8 months   (D) 38 months

14. An ideal voltmeter would have
    (A) zero resistance   (B) high resistance   (C) infinite resistance   (D) low resistance

15. A parallel plate capacitor with oil having $\varepsilon_r = 2$ has a capacitance C. If the oil is removed between the plates, then capacitance of capacitor becomes
    (A) C   (B) C/2   (C) $C/\sqrt{2}$ (D) 2C

16. The voltage gain of an amplifier having $r_{ie} = 1\,\Omega$, $\beta = 100$ and $R_c = 20\,\Omega$ is
    (A) 2000   (B) 1000   (C) 500   (D) 5

17. When we accelerate the charge, which type of waves are produced?
    (A) Mechanical waves   (B) Travelling waves
    (C) Stationary waves   (D) Electromagnetic waves

Note: Section I is compulsory. Attempt any three (3) questions from Section II.

SECTION – I

2. Write short answers to any EIGHT questions.   (2 x 8 = 16)

i.   Define electric field intensity. Also give its mathematical form.

ii. Define electron volt? Relate electron volt with Joule.

iii. The time constant of a series RC circuit is, t=RC. Verify that an Ohm times Farad is equal to Second.

iv. Why the resistance of an ammeter should be very low?

v.   Electric lines of force never cross. Why?

vi. How can you use a magnetic field to separate isotopes of chemical elements?

vii. What do you mean by lamp-scale arrangement?

viii. What is Lorentz force?

ix. A particle which produces more ionization is less penetrating. Why?

x.   How can radioactivity help in the treatment of Cancer?

xi. Differentiate between nuclear fission and nuclear fusion.

xii. Define isotopes. Write down isotopes of Hydrogen atom.

3. Write short answers to any EIGHT questions.   (2 x 8 = 16)

i.   Describe a circuit which will give a continuously varying potential.

ii. What is the difference between the emf and potential difference?

iii. What is the temperature co-efficient of resistance?

iv. How the reception of a particular radio station is selected on your radio set?

v.   What is the principle of metal detector?

vi. Why power loss in a pure capacitance circuit is zero?

vii. What is meant by hysteresis loss? How it is used in the construction of a transformer?

viii. What is meant by Retantivity and Coercivity?

ix. How can you identify tumors and inflamed tissues using 'MRI'?

x.   Why is the base current in a transistor very small?

xi. Explain OP-AMP as a comparator.

xii. What is the voltage gain of transistor?

4. Write short answers to any SIX questions.   (2 x 6 = 12)

i.   Name the factors upon which the self-inductance depends.

ii. Write down the methods to improve the efficiency of a transformer.

iii. Can a D.C. motor be turned into a D.C. generator? What changes are required to be done?

iv. Define work function and threshold frequency.

v. Calculate the value of Compton wavelength of electron.

vi. We do not notice a de-Broglie wavelength for a pitched cricket ball. Explain why?

vii. When does light behave as a wave and when does it behave as a particle?

viii. Describe the types of spectra and give its example.

ix. What are advantages of laser over ordinary light?

SECTION - II

5. (a) How did Millikan calculate the charge on an electron? Explain **(5)**

(b) A rectangular bar of iron is 2.0cm by 2.0cm in cross section and 40cm long. Calculate its resistance if the resistivity of iron is 11×10^{-8} Ωm **(3)**

6. (a) Define galvanometer. Explain its principle, construction and working. **(5)**

(b) The back emf in a motor is 120V when the motor is turning at 1680 rev per min. What is the back emf when the motor turns 3360 rev per min? **(3)**

7. (a) Explain Reverse Biased p-n junction and describe how depletion region increases due to Reverse Biased of p-n junction. **(5)**

(b) Find the value of the current flowing through a capacitor of capacitance 0.5μF, when connected to a source of 150V at 50Hz. **(3)**

8. (a) State and explain photoelectric effect. Write down its experimental results. **(5)**

(b) The length of a steel wire is 1m and its cross-sectional area is $0.03 \times 10^{-4} m^2$. Calculate the work done in stretching the wire when a force of 100N is applied within the elastic region. Young's modulus of steel is $3.0 \times 10^{11} Nm^{-2}$. **(3)**

9. (a) Derive the expression for Quantized Energy of Hydrogen atom on the basis of Bohr's atomic model. **(5)**

(b) How much energy is absorbed by a man of mass 80Kg who receives a lethal whole body dose of 400 rem in the form of low energy neutrons for which RBE factor is 10? **(3)**

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