



FACULTY HIGHER SECONDARY SCHOOL
SAMPLE PAPER- 2019-20
SUBJECT- PHYSICS
CLASS- XII
MARKS- 70

General Instructions:

1. All questions are compulsory. There are 37 questions in all.
2. The questions paper has four sections: SECTION-A, SECTION-B, SECTION-C and SECTION-D
3. SECTION-A Contains 20 questions of one mark, SECTION-B contains 7 questions of two marks, SECTION-C contains 7 questions of three marks and SECTION-D contains three questions of five marks each.
4. SECTION-A comprises of MCQ's. These questions are to be answered in one word, one sentence or as per the exact requirement of the question.
5. There is no overall choice. However, an internal choice(s) has been provided in one question of two marks, one question of three marks and three questions of five marks. You have to attempt only one of the choices in such questions.
6. Use of calculator is not permitted. You may ask for logarithmic tables, if required.
7. You may use the following values of the physical constants wherever necessary.
 $e = 1.6 \times 10^{-19} \text{C}$, $\epsilon_0 = 8.854 \times 10^{-12} \text{C}^2 \text{N}^{-1} \text{m}^{-2}$, $m_e = 9.1 \times 10^{-31} \text{kg}$

SECTION-A

1. The work done in placing a charge of $8 \times 10^{-18} \text{C}$ on a capacitor of capacity 100 microfarad is:
 (a) $16 \times 10^{-32} \text{ joule}$ (b) $3.1 \times 10^{-26} \text{ joule}$
 (c) $4 \times 10^{-10} \text{ joule}$ (d) $32 \times 10^{-32} \text{ joule}$
2. To supply maximum current, cells should be arranged in
 (a) series (b) parallel
 (c) mixed grouping (d) depends on the internal and external resistance
3. Resistances in the two gaps of a metre bridge are 10Ω and 30Ω respectively. If the resistance are interchanged the balance point shifts by
 (a) 33.3cm (b) 66.67cm
 (c) 25cm (d) 50cm
4. A long wire carries a steady current. It is bent into a circle of one turn and the magnetic field at the centre of the coil is B. It is then bent into a circular loop of n turns. The magnetic field at the centre of the coil will be

(a) nB (b) n^2B

(c) $2nB$ (d) $2n^2B$

5. Frequency order of γ -rays, β -rays, UV rays are a,b and c respectively. Which of the following is correct relation among a,b and c?

(a) $a>b, b<c$ (b) $a>b, b>c$

(c) $a>b, b>c$ (d) $a=b=c$

26. The unit of inductance is

(a) volt/ampere

(b) joule/ampere

(c) volt \times second/ampere

(d) volt ampere

6. In a coil of self inductance 5 henry, the rate of change of current is 2 amp per second. The emf induced in the coil is

(a) -5 V (b) 5V

(c) -10V (d) 10V

7. A straight line conductor of length 0.4m is moved with a speed of 7ms^{-1} perpendicular to magnetic field of intensity 0.9Wbm^{-2} . The induced emf across the conductor is

(a) 1.26 V (b) 2.52 V

(c) 5.24 V (d) 25.2 V

8. Inductive reactance(X_L) varies with frequency ν as

(a) $X_L=\text{constant} \times \nu$ (b) $X_L=\text{constant} \times \nu^2$

(c) $X_L\nu=\text{constant}$ (d) None of these

9. Transformer ratio of a step up transformer is

(a) greater than one (b) less than one

(c) equal to one (d) none of these.

10. A circuit has a resistance of 12 ohm and an impedance of 15 ohm. The power factor of the circuit will be

(a) 0.8 (b) 0.4

(c) 1.25 (d) 0.125

11. In a coil of self inductance 5H, the rate of change of current is 2A/s. Then emf induced in the coil is

(a) 10V (b) -10V

(c) 5V (d) -5V

12. Magnetic meridian is a

(a) point (b) horizontal plane

(c) vertical plane (d) line along N-S

13. In a cyclotron, if a deuteron can gain an energy of 40MeV, then a proton can gain an energy of

(a) 40MeV (b) 80MeV

(c) 20MeV (d) 60MeV

14. A wire of radius r has resistance R . If it is stretched to the wire of $r/2$ radius., then the resistance becomes

(a) $2R$ (b) $4R$

(c) $16R$ (d) zero

15. The best instrument for accurate measurement of emf of a cell

(a) potentiometer (b) metre bridge

(c) voltmeter (d) ammeter and voltmeter

16. Some charge is being given to a conductor. Then, its potential

(a) is maximum at surface

(b) is maximum at centre

(c) remains the same throughout the conductor

(d) is maximum somewhere between surface and centre

17. In air the value of the total electric flux emitted from unit positive charge is

(a) ϵ_0 (b) $(\epsilon_0)^{-1}$

(c) $4\pi \epsilon_0$ (d) $(4\pi \epsilon_0)^{-1}$

18. The number of electrons for one coulomb of charge is

(a) 6.25×10^{18} (b) 6.25×10^{19}

(c) 6.25×10^{21} (d) 6.25×10^{23}

19. The law of force that governs the force between two electric charges was discovered by :

(a) Ampere (b) Faraday

(c) Ohm (d) Coulomb

20. The dielectric constant of metal is:

(a) 1 (b) greater than 1

(c) zero (d) infinite

SECTION-B

21. Show that electric field intensity is given by the negative gradient of electric potential.

22. Potential is the degree of electrification of a body. Explain.

23. We have three capacitors each of capacitance C . In how many ways can we connect them?

24. The light of the electric lamp gets dimmer for a moment when the geyser is switched on. Why?

25. Calculate the resistivity of the material of a wire 1.0m long, 0.4mm diameter and having a resistance of 2.0ohm.

26. What is Q-factor of an LCR circuit?

27. What is eddy current? State its advantages.

Or

What is self-inductance? State its unit.

SECTION-C

28. The number of free electrons in 1cm^3 of copper is 8.5×10^{22} . If 1A current flows through the copper wire of cross section 2mm^2 , calculate the drift velocity of the electrons in the copper wire.

29. An electron experiences a force of $2.4 \times 10^{-13}\text{N}$ when enters a magnetic field with a velocity of 10^6 m/s at an angle of 30° . What is the flux density?

30. Distinguish dia, para and ferromagnetic substances.

31. Explain the phenomenon of mutual induction. Define its co-efficient.

32. A 100Hz a.c is flowing in a coil of inductance 10mH. What is the reactance of the coil ?

33. Find the average power in an LCR circuit.

34. What is phasor diagram? Draw the phasor diagram for capacitive circuit.

or

What is resonance frequency? How it can be achieved?

SECTION-D

35. (a) With the help of a labeled diagram, explain the principle and working of a moving coil galvanometer.

(b) Two parallel coaxial circular coils of equal radius “R” and equal number of turns “N”, carry equal current i in the same direction and are separated by a distance “2R”. Find the magnitude and direction of the net magnetic field produced at the mid point of the line joining their centres.

36. What is phasor diagram? Differentiate phasor diagrams for an a.c. source when connected across L, C and R independently.

Or

What is r.m.s value of a.c source. Find an expression for it. Express power factor in terms of rms value.

37. What do you mean by impedance of a circuit?

An alternating emf of 283volt and frequency 50Hz is applied to a series LCR circuit in which resistance

$R=3\Omega$, inductance $L= 25.48 \text{ mH}$ and capacitor of capacitance $C= 7.96 \times 10^{-4}\text{F}$. Find:

- (a) The peak current and the phase angle.
- (b) The power dissipated in the circuit.
- (c) The frequency of supply at which resonance occurs.
- (d) The power dissipated at resonance.
