CBSE Sample Paper 12

Class XII Exam 2022-23

Physics

Time: 3 Hours **Max. Marks: 70**

General Instructions:

1. There are 35 questions in all. All questions are compulsory.
2. This question paper has five sections: Section A, Section B, Section C, Section D and Section E. All the sections are compulsory.
3. Section A contains eighteen MCQ of 1 mark each, Section B contains seven questions of two marks each, Section C contains five questions of three marks each, section D contains three long questions of five marks each and Section E contains two case study based questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in section B, C, D and E. You have to attempt only one of the choices in such questions.
5. Use of calculators is not allowed.

SECTION-A

1. Coulombian force is

View Solution

(a) central force (b) electric force (c) both a and b (d) none of these

2. An infinite number of capacitors with capacitances $1\,\mu F$, $\frac{1}{2}\,\mu F$, $\frac{1}{4}\,\mu F$, $\frac{1}{8}\,\mu F$, ... etc. are connected in parallel combination. Their equivalent capacitance will be

View Solution

(a) $8\,\mu F$ (b) $6\,\mu F$ (c) $4\,\mu F$ (d) $2\,\mu F$

3. The power of electric circuit is

View Solution

(a) VR (b) V^2R (c) $\frac{V^2}{R}$ (d) V^2RI

4. The radius of a circular path in which an electron will move, when subjected to a perpendicular uniform magnetic field (B), is

View Solution

(a) $\frac{me}{B}$ (b) $\frac{mB}{e}$ (c) $\frac{Be}{mv}$ (d) $\frac{mv}{Be}$

5. Which radiation in sunlight, causes heating effect?

View Solution

(a) ultra violet (b) infra-red (c) visible light (d) all of these

6. The final image in astronomical telescope is

View Solution

(a) real and erect (b) real and inverted (c) virtual and inverted (d) virtual and erect

7. Which of the following quantity is increased in a step-down transformer?

View Solution

(a) current (b) voltage (c) power (d) frequency

8. Magnetic lines of force
View Solution
(a) always intersect
(b) are always closed
(c) do not pass through vacuum
(d) tend to crowd far way from the poles of a magnet

9. The magnetic flux through a circuit of resistance R changes by an amount $\Delta\phi$ in a time Δt. The
View Solution total electric charge Q that passes any point in the circuit during the time Δt is represented by
(a) $Q = \frac{\Delta\phi}{\Delta t}$ (b) $Q = \frac{\Delta\phi}{R}$ (c) $Q = R \cdot \frac{\Delta\phi}{\Delta t}$ (d) $Q = \frac{1}{R} \cdot \frac{\Delta\phi}{\Delta t}$

10. Alternating current can not be measured by DC ammeter, because
View Solution
(a) AC changes direction
(b) DC ammeter will get damaged
(c) AC can not pass through DC ammeter
(d) average value of current for a complete cycle is zero

11. The kinetic energy of an electron, which is accelerated in the potential difference of 100V is
View Solution (a) 1.6×10^{-17}J (b) 1.6×10^{-14}J (c) 1.6×10^{-10}J (d) 1.6×10^{-8}J

12. With the increase of temperature, width of the forbidden gap
View Solution (a) decreases (b) increases (c) remains same (d) becomes zero

13. In nuclear fission, the percentage of mass converted into energy is about
View Solution (a) 10% (b) 0.01% (c) 0.1% (d) 1%

14. The n-type semiconductors are obtained, when germanium is doped with
View Solution (a) arsenic (b) phosphorus (c) antimony (d) any one of these

15. A current of 10 ampere flows in a wire for 10 sec. If potential difference across the wire is 15
View Solution volt, the work done will be
(a) 150 (b) 75 J (c) 1500 J (d) 750 J

16. **Assertion :** The magnetic field produced by a current carrying solenoid is independent of its
View Solution length and cross-sectional area.
Reason : The magnetic field inside the solenoid is uniform.
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.
(c) Assertion is correct but Reason is incorrect.
(d) Assertion is incorrect but Reason is correct.

17. View Solution
Assertion : Ferro-magnetic substances become paramagnetic above Curse temperature.
Reason : Domains are destroyed at high temperature.
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.
(c) Assertion is correct but Reason is incorrect.
(d) Assertion is incorrect but Reason is correct.

18. View Solution
Assertion : Faraday's laws are consequences of conservation of energy.
Reason : In a purely resistive A.C. circuit, the current lags behind the e.m.f. in phase.
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.
(c) Assertion is correct but Reason is incorrect.
(d) Assertion is incorrect but Reason is correct.

SECTION-B

19. View Solution
Using the concept of force between two infinitely long parallel current carrying conductors define one ampere of current.

20. View Solution
What is the importance of radial magnetic field in a moving coil galvanometer?

21. View Solution
A capacitor of capacitance C is being charged by connecting it across a DC source along with an ammeter. Will the ammeter show a momentary deflection during the process of charging? If so, how would you explain this momentary deflection and the resulting continuity of current in the circuit? Write the expression for the current inside the capacitor.

OR

Write any two properties of X-rays.

22. View Solution
(i) What is the relation between critical angle and refractive index of a material ?
(ii) Does critical angle depend on the colour of light ?

23. View Solution
What are polariod ? Mention its uses.

OR

Radio-waves diffract pronouncedly around buildings, while light waves, which are electromagnetic waves, do not. Why?

24. View Solution
Define ionisation energy. What is its value for hydrogen atom?

25. View Solution
What happens when a forward bias is applied to a p-n-junctions

SECTION-C

26. View Solution Show that the capacitance of an insulated spherical conductor is directly proportional to the radius of the spherical conductor.

27. View Solution Briefly explain how Maxwell was led to predict the existence of electromagnetic waves.

28. View Solution An empty test tube is placed slanting in the water and viewed from above. What will you observe?

OR

A prism can produce spectrum of white light but a glass slab having same material as prism cannot produce any spectrum. Why?

29. View Solution Briefly describe proton-neutron hypothesis of nuclear composition.

OR

What is nuclear fission? Explain how a chain reaction can occur in a fissionable material?

30. View Solution Draw $V-I$ characteristics of a $p-n$ junction diode. Answer the following questions, giving reasons:

(i) Why is the current under reverse bias almost independent of the applied potential upto a critical voltage?

(ii) Why does the reverse current show a sudden increase at the critical voltage?

Name any semiconductor device which operates under the reverse bias in the breakdown region.

SECTION-D

31. View Solution Deduce Coulomb's law from Gauss law.

OR

(i) Can two equipotential surfaces intersect each other? Give reasons.

(ii) Two charges $-q$ and $+q$ are located at points $A(0,0,-a)$ and $B(0,0,+a)$ respectively. How much work is done in moving a test charge from point $P(7,0,0)$ to $Q(-3,0,0)$?

32. View Solution A long solenoid with closely wound turns has n turns, per unit of its length. A steady current I flows through this solenoid. Use Ampere's circuital law to obtain an expression, for the magnetic field, at a point on its axis and close to its midpoint.

OR

(i) Explain giving reasons, the basic difference in converting a galvanometer into (a) a voltmeter and (b) an ammeter.

(ii) Two long straight parallel conductors carrying steady currents I_1 and I_2 are separated by a distance d.

Explain briefly with the help of a suitable diagram, how the magnetic field due to one conductor acts on the other. Hence, deduce the expression for the force acting between the two conductors. Mention the nature of this force.

33. View Solution Describe Rutherford's model of atom developed on the basis of his alpha particle scattering experiment.

OR

Calculate the shortest wavelength in the Balmer series of hydrogen atom. In which region (infrared visible, ultraviolet) of hydrogen spectrum does this wavelength lie?

SECTION-E

34. View Solution An electromagnetic wave transports linear momentum as it travels through space. If an electromagnetic wave transfers a total energy U to a surface in time t, then total linear momentum delivered to the surface is $p = \frac{U}{c}$. When an electromagnetic wave falls on a surface, it exerts pressure on the surface. In 1903, the American scientists Nichols and Hull succeeded in measuring radiation pressures of visible light where other had failed, by making a detailed empirical analysis of the ubiquitous gas heating and ballistic effects.

(i) Find the pressure exerted by an electromagnetic wave of intensity $I(\mathrm{Wm^{-2}})$ on a non-reflecting surface.

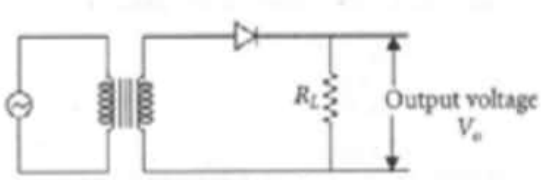
(ii) Light with an energy flux of 18 W $\mathrm{m^{-2}}$ falls on a non-reflecting surface at normal incidence. Find the pressure exerted on the surface.

(iii) Radiation of intensity 0.5 W $\mathrm{m^{-2}}$ are striking a metal plate. Find the pressure on the plate. Find the order of radiation pressure of visible light

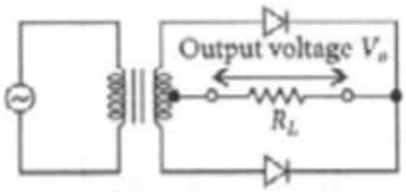
OR

(iv) A point source of electromagnetic radiation has an average power output of 1500 W. Find the maximum value of electric field at a distance of 3 m from this source (in V $\mathrm{m^{-1}}$).

35. View Solution Rectifier is a device which is used for converting alternating current or voltage into direct current or voltage' Its working is based on the fact that the resistance of $p-n$ junction becomes low when forward biased and becomes high when reverse biased. A half-wave rectifier uses only a single diode while a full wave rectifier uses two diodes as shown in figures (a) and (b).



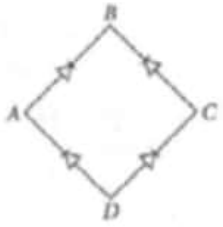
(a) Half wave rectifier



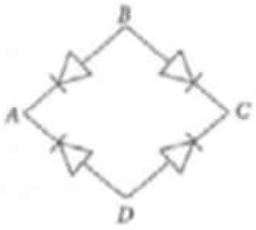
(b) Full wave rectifier

(i) If the rms value of sinusoidal input to a full wave rectifier is. $\frac{V_0}{\sqrt{2}}$ then find the rms value of the rectifier's output.

(ii) In the diagram, the input ac is across the terminals A and C. What is the nature of output across B and D?

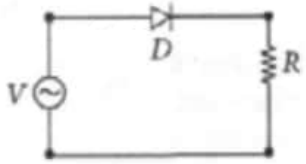


(iii) A bridge rectifier is shown in figure. Alternating input is given across A and C What is the value of output taken across BD.



OR

(iv) A $p-n$ junction (D) shown in the figure can act as a rectifier. An alternating current source (V) is connected in the circuit. Determine the situations of current (I) in the resistor (R).



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