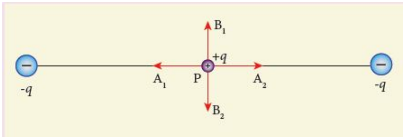
QB365 SCHOOL ASSESSMENT SOFTWARE
12TH STANDARD - PHYSICS
MODEL QUESTION PAPER

Exam Time: 03:00 Hrs
Date: 05/03/2026

Total Marks: 90

Multiple Choice Question 15 x 1 = 15

1.Two identical point charges of magnitude –q are fixed as shown in the figure below. A third charge +q is placed midway between the two charges at the point P. Suppose this charge +q is displaced a small distance from the point P in the directions indicated by the arrows, in which direction(s) will +q be stable with respect to the displacement?



(a) A_1 and A_2 (b) B_1 and B_2 (c) both directions (d) No stable

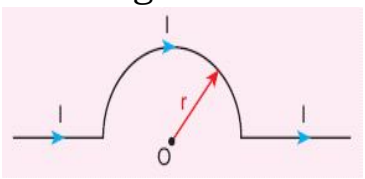
2.A toaster operating at 240 V has a resistance of 120 Ω. The power is _____.

(a) 400 W (b) 2 W (c) 480 W (d) 240 W

3.In a large building, there are 15 bulbs of 40 W, 5 bulbs of 100 W, 5 fans of 80 W and 1 heater of 1 kW are connected. The voltage of electric mains is 220 V. The maximum capacity of the main fuse of the building will be _____.

(a) 14 A (b) 8 A (c) 10 A (d) 12 A

4.The magnetic field at the centre O of the following current loop is



(a) $\frac{\mu_0 I}{4r} \otimes$ (b) $\frac{\mu_0 I}{4r} \odot$ (c) $\frac{\mu_0 I}{2r} \otimes$ (d) $\frac{\mu_0 I}{2r} \odot$

5.A particle having mass m and charge q accelerated through a potential difference V. Find the force experienced when it is kept under perpendicular magnetic field $\vec{B}$.

(a) $\sqrt{\frac{2q^3BV}{m}}$ (b) $\sqrt{\frac{q^3B^2V}{2m}}$ (c) $\sqrt{\frac{2q^3B^2V}{m}}$ (d) $\sqrt{\frac{2q^3BV}{m^3}}$

6.Two short bar magnets have magnetic moments 1.20 Am^2 and 1.00 Am^2 respectively. They are kept on a horizontal table parallel to each other with their north poles pointing towards south. They have a common magnetic equator and are separated by a distance of 20.0 cm. The value of the resultant horizontal magnetic induction at the mid-point O of the line joining their centres is (Horizontal components of Earth's magnetic induction is 3.6×10^{-5} Wb m^{-2})

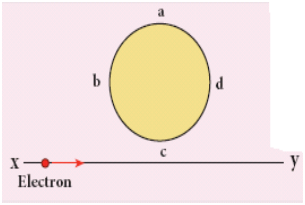
(a) 3.60×10^{-5} Wb m^{-2} (b) 3.5×10^{-5} Wb m^{-2} (c) 2.56×10^{-4} Wb m^{-2}
(d) 2.2×10^{-4} Wb m^{-2}

7.The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?

(a) 30° (b) 45° (c) 60° (d) 90°

8.An electron moves on a straight line path XY as shown in the figure. The coil abcd is adjacent to the path of the electron. What will be the direction of

current, if any, induced in the coil?



(a) The current will reverse its direction as the electron goes past the coil
(b) No current will be induced (c) abcd (d) adcb

9. The dimension of $\frac{1}{\mu_0 \varepsilon_0}$ is _____.

(a) $[LT^{-1}]$ (b) $[L^2T^{-2}]$ (c) $[L^{-1}T]$ (d) $[L^{-2}T^2]$

10. The speed of light in an isotropic medium depends on, _____.

(a) its intensity (b) its wavelength (c) the nature of propagation
(d) the motion of the source w.r.t medium

11. The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by _____.

(a) $\lambda_p \propto \lambda_e$ (b) $\lambda_p \propto \sqrt{\lambda_e}$ (c) $\lambda_p \propto \frac{1}{\sqrt{\lambda_e}}$ (d) $\lambda_p \propto \lambda_e^2$

12. A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and λ /2. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function of the material is _____.

(a) $\frac{hc}{\lambda}$ (b) $\frac{2hc}{\lambda}$ (c) $\frac{hc}{3\lambda}$ (d) $\frac{hc}{2\lambda}$

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13. Suppose an alpha particle accelerated by a potential of V volt is allowed to collide with a nucleus of atomic number Z, then the distance of closest approach of alpha particle to the nucleus is _____.

(a) $14.4\frac{Z}{V}\mathring{A}$ (b) $14.4\frac{V}{Z}\mathring{A}$ (c) $1.44\frac{Z}{V}\mathring{A}$ (d) $1.44\frac{V}{Z}\mathring{A}$

14. The ratio between the radius of first three orbits of hydrogen atom is _____.

(a) 1:2:3 (b) 2:4:6 (c) 1:4:9 (d) 1:3:5

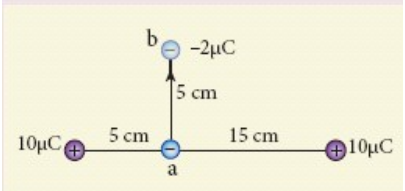
15. In J.J. Thomson e/m experiment, electrons are accelerated through 2.6 kV enter the region of crossed electric field and magnetic field of strength 3.0 x 10^4 Vm^{-1} and 1.0 x 10^{-3} T, respectively, and pass through it and undeflected, then the specific charge is _____.

(a) 1.6×10^{10} C kg^{-1} (b) 1.7×10^{11} Ckg^{-1} (c) 1.5×10^{11} Ckg^{-1}
(d) 1.8×10^{11} Ckg^{-1}

Answer any Six and Q no 17 is compulsory 6 x 2 = 12

16. Define 'electric field'

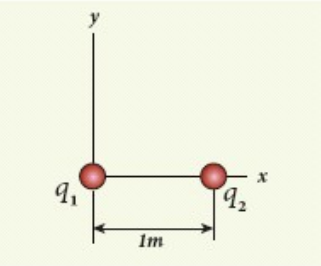
17. A point charge of +10 μC is placed at a distance of 20 cm from another identical point charge of +10 μC. A point charge of -2 μC is moved from point a to b as shown in the figure. Calculate the change in potential energy of the system? Interpret your result.



18. Define temperature coefficient of resistance.
19. State Joule's law of heating.
20. Define magnetic flux.
21. What is meant by hysteresis?
22. State Fleming's left hand rule.
23. Give the principle of AC generator.
24. What are mirage and looming?
25. State de Broglie hypothesis.

Answer any Six and Q No 28 is compulsory 6x 3 = 18

26. Consider two point charges q_1 and q_2 at rest as shown in the figure.



They are separated by a distance of 1m. Calculate the force experienced by the two charges for the following cases:
(a) q_1 = +2μC and q_2 = +3μC
(b) q_1 = +2μC and q_2 = -3μC
(c) q_1= +2μC and q_2 = -3μC kept in water (ε_r = 80)

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27. Derive an expression for electrostatic potential due to a point charge.
28. In a Wheatstone's bridge P = 100 Ω, Q = 1000 Ω and R = 40 Ω. If the galvanometer shows zero deflection, determine the value of S.
29. State and explain Kirchhoff 's rules
30. Mention the various energy losses in a transformer.
31. Write short notes on
    (a) microwaves
    (b) X - rays
    (c) Radio waves
    (d) Visible spectrum
32. Derive the relation between f and R for a spherical mirror.
33. Derive an expression for de Broglie wavelength of electrons.
34. Write down the postulates of Bohr atom model.
35. Write down the draw backs of Bohr atom model.

Answer any Five of the following 9 x 5 = 45

36. Obtain the expression for electric field due to an charged infinite plane sheet.
37. Describe the microscopic model of current and obtain general form of Ohm's law.

38. Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current using Biot-Savart law.

39. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.

40. Write down the properties of electromagnetic waves.

41. Obtain lens maker's formula and mention its significance.

42. Obtain Einstein's photoelectric equation with necessary explanation.

43. Explain the Young's double slit experimental setup and obtain the equation for path difference.

44. Give circuit symbol, logical operation, truth table, and Boolean expression of
    i) AND gate
    ii) OR gate
    iii) NOT gate
    iv) NAND gate
    v) NOR gate and
    vi) EX-OR gate.

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