Bihar Board Class 12 Physics Half Yearly Examination (Sep - 2025) Question Paper with Solutions

Time Allowed :3 Hours 15 Minutes	**Maximum Marks :**70	**Total Questions :**66

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 3 hours 15 Minutes duration.
2. The question paper consists of 70 questions.
3. For subjects with a 70-mark theory paper (with practicals): 42 MCQs (35 to be attempted, 1 mark each).
4. Minimum 30% marks in each subject (30 out of 100 for theory, adjusted for practicals where applicable).

1. Which of the following relations is correct?

(A) $\vec{E} = \frac{\vec{F}}{q}$
(B) $\vec{E} = q\vec{F}$
(C) $\vec{E} = \frac{q}{\vec{F}}$
(D) $\vec{E} = \frac{1}{4\pi\epsilon_0}\frac{q}{\vec{F}}$

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2. S.I. unit of electric flux is

(A) ohm-metre
(B) ampere-metre
(C) volt-metre
(D) (volt) x $(\text{metre})^{-1}$

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3. Which of the following values of n is not possible in relation Q = ne?

(A) 8
(B) 4
(C) 100
(D) 4.2

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4. Which of the following is correct for resistivity of a material ?

(A) $\rho = RLA$
(B) $\rho = \frac{L}{RA}$
(C) $\rho = \frac{RA}{L}$
(D) $\rho = \frac{RL}{A}$

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5. When a body is charged, then its mass

(A) decreases
(B) increases
(C) may increase or decrease
(D) remains constant

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6. The quantum of electric charge in esu is

(A) 2.99×10^{9}
(B) 4.78×10^{-10}
(C) 1.6×10^{-19}
(D) -1.6×10^{-19}

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7. The electric field at a distance r from the centre of the dipole is proportional to

(A) r
(B) $\frac{1}{r}$
(C) $\frac{1}{r^2}$
(D) $\frac{1}{r^3}$

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8. Potential gradient is equal to

(A) $\frac{dx}{dv}$
(B) $dx \cdot dv$
(C) $\frac{dv}{dx}$
(D) none of these

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9. Which one of the following is a vector quantity ?

(A) Electric charge
(B) Electric potential
(C) Intensity of electric field
(D) Surface density of charge

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10. If any hollow spherical conductor is positively charged, then the potential inside it will be .

(A) zero
(B) positive and uniform
(C) positive and non-uniform
(D) negative and uniform

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11. If R is resistance and C is capacitance then the dimensional formula of RC is

(A) M^0L^0T
(B) MLT^{-2}
(C) $M^0L^0T^{-1}$
(D) M^0LT

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12. Two capacitors $C_1 = 2\mu F$ and $C_2 = 4\mu F$ are connected in series and a potential difference of 1200 V is applied across them. The potential difference across the ends of 2μF capacitor will be

(A) 600 V
(B) 900 V
(C) 400 V
(D) 800 V

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13. The resistance of an ideal ammeter is

(A) zero
(B) very small
(C) very large
(D) infinite

14. Unit of surface charge density is

(A) newton/metre (Nm^{-1})
(B) coulomb-metre (Cm)
(C) newton / metre^2 (Cm^{-2})
(D) coulomb / volt (CV^{-1})

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15. The power of electric circuit is

(A) $V^2.R$
(B) $V.R$
(C) $V^2.R.t$
(D) $\frac{V^2}{R}$

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16. Wheatstone bridge is used to measure

(A) current
(B) electro-motive force
(C) charge
(D) resistance

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17. The algebraic sum of all currents meeting at a point of any electric circuit is

(A) zero
(B) infinite
(C) positive
(D) negative

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18. A tangent galvanometer is maximum sensitive when its deflection is

(A) 0
(B) $\pi/2$
(C) $\pi/3$
(D) $\pi/4$

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19. The relation between the drift velocity (V_d) and applied electric field (E) of a conductor is

(A) $V_d \propto \sqrt{E}$
(B) $V_d \propto E$
(C) $V_d \propto E^2$
(D) $V_d \propto E^{-2}$

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20. The dielectric constant of water is

(A) $V_d \propto \sqrt{E}$
(B) $V_d \propto E$
(C) $V_d \propto E^2$
(D) $V_d \propto E^{-2}$

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21. The electric capacity of earth of radius R is

(A) $4\pi\epsilon_0 R$
(B) $\frac{R}{4\pi\epsilon_0}$
(C) $4\pi\epsilon_0 R^2$
(D) $\frac{4\pi\epsilon_0}{R}$

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22. S.I. unit of electric dipole moment is

(A) cm
(B) cm^2
(C) cm^{-1}
(D) cm^{-2}

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23. If a charge is moved from low potential region to high potential region, then electric potential energy

(A) decreases
(B) increases
(C) remains the same
(D) either increases or decreases

24. If +q charge is placed inside any spherical surface then total flux coming out from whole surface will be

(A) $q \times \epsilon_0$
(B) $\frac{q}{\epsilon_0}$
(C) $\frac{\epsilon_0}{q}$
(D) $\frac{q^2}{\epsilon_0}$

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25. At constant potential difference, if the resistance of any electric circuit is halved, then the value of heat produced will be

(A) half
(B) double
(C) four times
(D) same

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26. The wavefront due to a point source at a finite distance from the source is

(A) cylindrical
(B) spherical
(C) circular
(D) plane

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27. The angle of minimum deviation of a thin prism of refractive index μ and angle of prism A is

(A) $(1-\mu)A$
(B) $(\mu-1)A$
(C) $(\mu+1)A$
(D) $(\mu+1)A^2$

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28. The Boolean expression for NAND gate is

(A) $Y = A + B$
(B) $Y = \overline{A.B}$
(C) $Y = \overline{A+B}$

(D) $Y = A.B$
Note: The options in the image are slightly different from the OCR. (B) is Y = A.B, (C) is Y = $\overline{A + B}$ and (D) is Y = $\overline{A.B}$. I will solve based on the image.

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29. Light owes its colour due to its

(A) amplitude
(B) velocity
(C) frequency
(D) phase

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30. Equivalent focal length of two lenses in contact having powers -15 D and +5 D will be

(A) -10 cm
(B) -20 cm
(C) +20 cm
(D) +10 cm

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31. The image formed by objective lens of a compound microscope is

(A) virtual and diminished
(B) real and diminished
(C) real and large
(D) virtual and large

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32. A convex lens is dipped in a liquid, whose refractive index is equal to refractive index of the material of lens; then its focal length will

(A) become zero
(B) become infinite
(C) decrease
(D) increase

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33. In earth's magnetic field B_H, if the frequency of oscillation of a magnetic needle is n, then

(A) $n \propto B_H$
(B) $n^2 \propto B_H$
(C) $n \propto B_H^2$
(D) $n^2 \propto \frac{1}{B_H}$
