Bihar Board 12 Physics Set G 2024 Question Paper

Time Allowed :3 Hours 15 mins	**Maximum Marks :**70	**Total questions :**96

General Instructions

Instructions to the candidates:

1. **Candidate must enter his/her Question Booklet Serial No. (10 Digits) in the OMR Answer Sheet.**
2. Candidates are required to give their answers in their own words as far as practicable.
3. Figures in the right-hand margin indicate full marks.
4. An extra time of 15 minutes has been allotted for the candidates to read the questions carefully.
5. This question booklet is divided into two sections — **Section-A** and **Section-B**.

1. The image formed in a compound microscope is

(A) real and erect

(B) real and inverted

(C) virtual and inverted

(D) virtual and erect

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2. The image of any object formed on the retina of the human eye is

(A) real and inverted

(B) real and erect

(C) virtual and erect

(D) virtual and inverted

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3. Convex lens is used in

(A) short-sightedness

(B) long-sightedness

(C) presbyopia

(D) astigmatism

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4. The colour of the sky is blue due to

(A) interference

(B) scattering

(C) diffraction

(D) polarisation

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5. The fringe width in interference of light due to two coherent sources is

(A) proportional to wavelength

(B) inversely proportional to wavelength

(C) proportional to square of wavelength

(D) inversely proportional to square of wavelength

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6. Two sources of monochromatic light is coherent, when their

(A) intensities are equal

(B) amplitudes are equal

(C) phases are equal

(D) none of these

---

7. de Broglie wavelength is

(A) $\lambda = h\nu$

(B) $\lambda = \frac{h}{mv}$

(C) $\lambda = \frac{mc^2}{\nu}$

(D) $\lambda = h\nu$

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8. If in a logic gate output Y is obtained by the product of its both inputs $A \cdot B$, then the gate is

(A) AND

(B) OR

(C) NOR

(D) NOT

---

9. The width of forbidden energy gap in the semiconductor is approximately

(A) 1 eV

(B) 10 eV

(C) 100 eV

(D) 0.01 eV

---

10. The equivalent number of decimal number 27 into binary number system will be

(A) $(10011)_2$

(B) $(10111)_2$

(C) $(11011)_2$

(D) $(11101)_2$

---

11. In full wave rectifier, if input frequency is 50 Hz, then output frequency will be

(A) 25 Hz

(B) 50 Hz

(C) 100 Hz

(D) 200 Hz

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12. The device which works for both modulation and demodulation is called

(A) Laser

(B) Radar

(C) Modem

(D) Fax

---

13. The distance of the communication satellite from the surface of the earth is

(A) 36000 km

(B) 36000 mile

(C) 3600 km

(D) 36000 metre

---

14. Attenuation is measured in

(A) ohm

(B) decibel

(C) mho

(D) siemen

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15. Photocell is based on

(A) chemical effect of current

(B) photo-electric effect

(C) magnetic effect of current

(D) electro-magnetic induction

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16. Cathode rays are group of

(A) electrons

(B) protons

(C) neutrons

(D) atoms

---

17. Half-life of radioactive substance is

(A) $0.6931 \times \lambda$

(B) $\frac{\log 10^2}{\lambda}$

(C) $\frac{0.6931}{\lambda}$

(D) Average age 0.6931

18. S.I. unit of decay constant is

(A) metre

(B) hertz

(C) per metre

(D) metre²

---

19. Number of neutrons in an atom of ^{90}Th is

(A) 320

(B) 230

(C) 140

(D) 90

---

20. P-N junction diode is used as

(A) an amplifier

(B) an oscillator

(C) a modulator

(D) a rectifier

---

21. Instrument used to increase input voltage/current is called

(A) oscillator

(B) amplifier

(C) diode

(D) rectifier

---

22. In AC circuit, power is lost in only

(A) resistance

(B) inductance

(C) capacitance

(D) all of these

---

23. An alternating electric current is represented by the equation $I = 0.6 \sin 100\pi t$. The frequency of alternating current is

(A) 50

(B) 50

(C) 100

(D) 100

---

24. Current used in electroplating is

(A) DC

(B) AC

(C) both DC and AC

(D) none of these

---

25. A large virtual image of an object is formed by

(A) concave mirror

(B) convex mirror

(C) plane mirror

(D) concave lens

---

26. Powers of two lenses kept in contact are P_1 and P_2. The power of equivalent lens will be

(A) $\frac{P_1}{P_2}$

(B) $\frac{P_2}{P_1}$

(C) $P_1 \times P_2$

(D) $P_1 + P_2$

---

27. The wavelength of which colour is minimum?

(A) Violet

(B) Yellow

(C) Blue

(D) Red

---

28. Which causes the formation of a rainbow?

(A) Diffraction

(B) Scattering

(C) Refraction

(D) Dispersion

---

29. The value of $(\mu_0 \epsilon_0)^{-1/2}$ is

(A) 3×10^8 cm/second

(B) 3×10^{10} cm/second

(C) 3×10^9 cm/second

(D) 3×10^8 m/second

---

30. An electron of charge e moves parallel to uniform lines of force in magnetic field B with velocity v. Force acting on the electron is

(A) evB

(B) $\frac{eu}{B}$

(C) zero

(D) $\frac{Bu}{e}$

---

31. The nature of electron beams moving with uniform velocity in the same direction will be

(A) converging

(B) diverging

(C) parallel

(D) none of these

---

32. The value of $(\mu_0 \epsilon_0)^{-1/2}$ is

(A) 3×10^8 cm/second

(B) 3×10^{10} cm/second

(C) 3×10^9 cm/second

(D) 3×10^8 m/second

---

33. S.I. unit of self-induction is

(A) coulomb (C)

(B) volt (V)

(C) ohm ()

(D) henry (H)

---

34. On oscillating any metallic sphere in the magnetic field, its oscillatory motion is

(A) Accelerated

(B) Damping

(C) Uniform

(D) None of these

---

35. The working principle of dynamo is based on

(A) heating effect of current

(B) electromagnetic induction

(C) induced magnetism

(D) induced current

---

36. What is produced by induction coil?

(A) High current

(B) High voltage

(C) Low current

(D) Low voltage

---

37. The energy density of magnetic field B is

(A) $\frac{B^2}{2\mu_0}$

(B) $\frac{B^2}{\mu_0}$

(C) $\frac{B^2}{4\mu_0}$

(D) $\frac{B^2}{3\mu_0}$

---

38. What value of alternating current is measured by hot wire ammeter?

(A) High value

(B) Average value

(C) Root mean square value

(D) None of these

---

39. If magnetic field B is perpendicular to surface area vector dS, then the magnetic flux $\mathrm{B} \cdot dS$ will be

(A) $B\,\mathrm{dS}\cos\theta$

(B) $B\,\mathrm{dS}\sin\theta$

(C) $B\,\mathrm{dS}\tan\theta$

(D) zero

---

40. Unit of reactance is

(A) ohm

(B) tesla

(C) henry

(D) farad

---

41. Mean value of alternating current in a full cycle is

(A) I

(B) $\frac{I}{2}$

(C) $2I$

(D) zero

---

42. If the phase difference between alternating current and e.m.f. is φ, then the value of power factor is

(A) $\cos\varphi$

(B) $\cos^2\varphi$

(C) $\sin\varphi$

(D) $\tan\varphi$

---

43. Unit of linear charge density is

(A) coulomb/metre

(B) coulomb $\times$ metre

(C) metre/coulomb

(D) none of these

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44. The dimensional formula of intensity of electric field is

(A) $[MLT^{-2}A^{-1}]$

(B) $[MLT^{-3}A^{-1}]$

(C) $[MLT^{3}A]$

(D) $[ML^{2}T^{-3}A^{-1}]$

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45. Number of electrons present in 8 coulomb negative charge is

(A) 5×10^{19}

(B) 2.5×10^{19}

(C) 12.8×10^{19}

(D) 1.6×10^{19}

---

46. Two equal and opposite charges of 5 coulombs are kept mutually at a distance of 5.0 cm. The electric dipole moment of the system is

(A) 5×10^{2} coulomb-metre

(B) 25×10^{-2} coulomb-metre

(C) 1 coulomb-metre

(D) zero

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47. On moving from the surface of a charged metallic sphere to the center of the sphere, the electric field

(A) decreases

(B) increases

(C) remains the same as at the surface

(D) zero at all places

---

48. If n electric dipoles are situated in a closed surface, total electric flux coming out from closed surface will be

(A) $\frac{q}{\epsilon_0}$

(B) $\frac{2q}{\epsilon_0}$

(C) $\frac{nq}{\epsilon_0}$

(D) zero

---

49. In broad-side-on position, the electric potential due to electric dipole is

(A) $\frac{1}{4\pi\epsilon_0}\frac{p}{r}$

(B) $\frac{1}{4\pi\epsilon_0}\frac{p}{r^2}$

(C) zero

(D) infinite

---

50. Which of the following is blocked by a capacitor?

(A) AC

(B) DC

(C) Both AC and DC

(D) Neither AC nor DC

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51. Two bulbs of 40 W and 60 W are connected to a 220 V source. The ratio of their resistances will be

(A) $4 : 3$

(B) $3 : 4$

(C) $2 : 3$

(D) $3 : 2$

---

52. The resistance of any wire is 500 Ω. Its electrical conductivity will be

(A) $0.002\,\Omega^{-1}$

(B) $0.02\,\Omega^{-1}$

(C) $50\,\Omega^{-1}$

(D) $500\,\Omega^{-1}$

---

53. n equal resistors are first connected in series and then in parallel. The ratio of maximum and minimum resistances will be

(A) $\frac{1}{n}$

(B) n

(C) $\frac{1}{n^2}$

(D) n^2

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54. To increase the sensitivity of a potentiometer

(A) The cross-section area of its wire will have to be increased

(B) Current in its wire will have to be decreased

(C) Current in its wire will have to be increased

(D) Length of its wire will have to be increased

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55. Kirchhoff's second law of electricity is related to

(A) Conservation of mass

(B) Conservation of charge

(C) Conservation of energy

(D) Conservation of momentum

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56. Which one of the following is not a unit of magnetic field?

(A) tesla

(B) weber/meter^2

(C) newton/ampere-meter

(D) newton/ampere^2

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57. A magnet is situated near a closed conductor. Current can be produced in the conductor, if

(A) only magnet is in motion

(B) only conductor is in motion

(C) both magnet and conductor are in motion

(D) there is relative motion between magnet and conductor

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58. The value of current obtained in a moving coil galvanometer is proportional to

(A) deflection θ

(B) resistance R

(C) magnetic field B

(D) none of these

59. A galvanometer is converted into ammeter by adding

(A) low resistance in parallel

(B) high resistance in series

(C) low resistance in series

(D) high resistance in parallel

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60. The magnetic field produced at the center of current carrying circular coil is

(A) on the plane of coil

(B) perpendicular to the plane of coil

(C) at 45° to the plane of coil

(D) at 180° to the plane of coil

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61. On dividing any magnet of magnetic moment (M) parallel to its length into n equal pieces, the moment of each piece will be

(A) $\frac{M}{n}$

(B) $\frac{M}{n^2}$

(C) $\frac{M}{2n}$

(D) $M \times n$

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62. Which of the following shows hysteresis?

(A) Paramagnetic materials

(B) Ferromagnetic materials

(C) Diamagnetic materials

(D) None of these

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63. The value of magnetic potential at a distance r from a pole strength m is

(A) $\frac{\mu_0 m}{4\pi r}$

(B) $\frac{\mu_0 m}{4\pi r^2}$

(C) $\frac{\mu_0 m}{4\pi r^3}$

(D) zero

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64. An electron is accelerated to 5 volt potential difference. The energy gained by the electron will be

(A) 5 joule

(B) 5 eV

(C) 5 erg

(D) 0.5 watt

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65. The relation between electric field (E) and electric potential (V) is

(A) $E = -\frac{dV}{dr}$

(B) $E = -\frac{dr}{dV}$

(C) $E = \frac{dV}{dr}$

(D) $E = \frac{dr}{dV}$

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66. The electrostatic energy of the system made by two electric dipoles kept at a distance r is proportional to

(A) r^2

(B) r^{-3}

(C) r^4

(D) none of these

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67. Picofarad is the unit of

(A) electric charge

(B) intensity of electric field

(C) electric capacity

(D) electric flux

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68. Capacity of any condenser does not depend upon

(A) shape of plates

(B) size of plates

(C) charges on plates

(D) distance between plates

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69. The capacity of a spherical conductor is $1.0\mu F$. Its radius will be

(A) 1.11 meter

(B) 10 meter

(C) 9 km

(D) 1.11 cm

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70. The dielectric constant of a metal is

(A) 1

(B) 0

(C) ∞

(D) none of these

Section B

1. What is electromagnetic wave? On which factors does its velocity in vacuum depend?

2. What is cyclotron? State its two limitations.

3. Define two magnetic elements of the earth.

4. What is eddy current? Write down its utilities.

5. Write down energy losses in transformer.

6. Explain polarization of light.

7. Convert binary number $(1101)_2$ into decimal system.

8. Explain www and Fax.

9. What is critical angle? Write down its necessary conditions.

10. $10^{19} electrons are placed on an uncharged body. Calculate the charge produced on the body.$

11. Explain the difference between nuclear fission and nuclear fusion.

12. What is Rydberg constant? Write down its unit.

13. What is wattless current?

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14. What is light-emitting diode (LED)? Write down its one application.

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15. p-type and n-type semiconductors: Mention the difference between them.

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16. Write down two uses of shunt.

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17. Define intensity of electric field at any point. Write down its S.I. unit.

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18. An electric dipole of dipole moment 2×10^{-6} Cm is kept inside a closed surface. What will be the net flux coming out from the surface?

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19. Find the increase in energy of a condenser of capacity 6 μF on changing potential difference from 10 V to 20 V.

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20. What are ohmic and non-ohmic resistances? Write down one example of both.

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21. What is an electric dipole? Find an expression for electric potential at any point due to an electric dipole.

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22. What is interference of light? Find an expression for fringe width in Young's double slit experiment.

23. Mention the defects of human vision and describe the method to remove them.

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24. Write the properties of diamagnetic, paramagnetic, and ferromagnetic materials.

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25. Define self-inductance and write its S.I. unit. Find the self-inductance for a solenoid of N turns, length l, and radius r.

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26. Describe with diagram the working method of p-n-p and n-p-n transistors.
