MPBSE Class 12th Physics - 2023 Question Paper

Time Allowed :3 Hour	Maximum Marks :70	Total Questions :19

General Instructions

Read the following instructions very carefully and strictly follow them:

1. Attempt all questions.
2. Read the instructions carefully.
3. Marks alloted to each question are indicated against it.

1. (i) S.I. unit of current density is -
(1) Coulomb / meter
(2) Ampere / meter^2
(3) Coulomb / meter^2
(4) Ampere / meter

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1. (ii) The phase difference between flowing current and applied voltage in alternating circuit containing pure capacitor is -
(1) 0
(2) 1
(3) $\frac{\pi}{2}$
(4) $-\frac{\pi}{2}$

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1. (iii) Bhabha Atomic Research Centre is situated in -
(1) New Delhi
(2) Mumbai
(3) Kolkata
(4) Bangalore

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1. (iv) Forbidden energy gap for Germanium semiconductor is -
(1) 1.1 eV
(2) 1.9 eV
(3) 0.72 eV
(4) 0.75 eV

1. (v) Which device is used as a rectifier?
(1) Junction diode
(2) Transformer
(3) Zener diode
(4) Photo diode

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1. (vi) The focal length of eye piece in telescope $_t he focal length of the objective.$
(1) is less than
(2) is more than
(3) is equal
(4) none of these

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2. (i) The ohmic resistance of an ideal inductance is
(1) Zero
(2) Infinite
(3) 1 ohm
(4) None of these

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2. (ii) The frequency of a Direct Current is
(1) Zero
(2) 50 Hz
(3) 60 Hz
(4) 100 Hz

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2. (iii) Electromagnetic wave of highest frequency is
(1) Gamma rays
(2) X-rays
(3) Ultraviolet
(4) Radio waves

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2. (iv) The frequency of the light wave is order of
(1) 10^3 Hz
(2) 10^{14} Hz

(3) 10^{10} Hz
(4) 10^{8} Hz

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2. (v) The velocity of light $_{when it goes to a rare medium to denser.}$
(1) Increases
(2) Decreases
(3) Remains the same
(4) None of these

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2. (vi) Magnetic field is a $_{quantity.}$
(1) Scalar
(2) Vector
(3) Neither scalar nor vector
(4) Both scalar and vector

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2. (vii) The $_{of the galvanometer is reduced by the use of shunt.}$
(1) Resistance
(2) Current
(3) Voltage
(4) Sensitivity

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3. Write True or False:
(i) Infrared radiation is invented by scientist Retar.
(1) True
(2) False

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3. (ii) In an intrinsic semiconductor the number of free electrons is equal to the number of holes.
(1) True
(2) False

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3. (iii) Voltmeter is more superior to potentiometer.

(1) True
(2) False

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3. (iv) De-broglie waves are an electromagnetic wave.
(1) True
(2) False

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3. (v) Atom is a positive particle.
(1) True
(2) False

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3. (vi) The average power supplied to an inductor over one complete cycle is zero.
(1) True
(2) False

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3. (vii) Working of microwave oven is based on Radio wave.
(1) True
(2) False

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4. Write answer of each question in one sentence:
(i) What is threshold frequency?

(ii) What is diffraction?

(iii) What is the unit of power of lens?

(iv) What is direction of magnetic dipole moment of a magnet?

(v) How Galvanometer is changed in a voltmeter?

(vi) What is the affect of temperature on drift velocity?

(vii) Give relations between energy and frequency of a radiation.

5. What is Photoelectric effect? Write Einstein's photoelectric equation.
OR
What is de-broglie matter wave? Write de-broglie wave relation.

6. Write any two Postulates of Bohr's model.
OR
Who discovered the nucleus model of atom? Draw its diagram.

7. What is isotopes? Write any two isotopes of hydrogen atom.
OR
What is Isobar? Give example.

8. What is a fundamental charge? Write its value.
OR
Where will an electron move in an electric field, either high potential side or low potential side? And why?

9. What is an electric cell? Give an example.
OR
Write Ohm's law and also draw the graph between voltage and current.

10. Write Bio-Savart expansion in vector form.
OR
Why there is no end point of magnetic field lines?

11. A light bulb is rated at 200 W for a 220 V supply. Find the resistance of the bulb.
OR
A light bulb is rated at 200 W for a 220 V supply. Find the rms current through the bulb.

12. What is Conjugate focus?
OR
Write any two differences between refractive telescope and reflective telescope.

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13. Compare the resistance of 100 watt and 400 watt of two bulbs if their voltage is same.
OR
What will be the resistance of a wire if their length changes to half of their original length and cross-sectional area changes two times of original?

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14. The radii of curvatures of the focus of a double convex lens are 10 cm and 15 cm and its focal length is 12 cm. What is the refractive index of glass? (Refractive index of air = 1)
OR
A convex lens has 20 cm focal length in air. What is focal length in water? (Refractive index of air-water = 1.33, refractive index for air-glass = 1.5)

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15. Derive an expression for Coulomb's law of electrostatics by Gauss's law.
OR
What is capacity of a conductor? Write the factors affecting the capacity of a conductor.

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16. Write any three differences between electromotive force and potential difference.
OR
Write any three differences between Resistance and Specific Resistance.

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17. Write the differences between intrinsic semiconductor and extrinsic semiconductor.
OR
What is P-N junction diode? Describe its use as a full wave rectifier with diagram.

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18. Derive an expression for the refractive index of a glass prism.
OR
Derive the lens maker formula for thin lenses.

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19. What is Self Inductance? Derive an expression for the self-inductance of a solenoid. Also write the factor affecting it.
OR
What is a Transformer? Describe its principle and different types of energy losses in it.
