V12-P

Virudhunagar District Schools

Mid Term Test - March 2021

Standard 12

PHYSICS

Time: 1.30 Hrs. Marks: 50

I. Choose the correct answer: **12×1=12**

1) Which charge configuration produces uniform electric field?
   a) point charge
   b) uniformly charged (infinite plane)
   c) uniformly charged infinite line
   d) uniformly charged spherical shell

2) Two identical conducting balls having positive charge q_1 and q_2 are separated by a centre to centre distance 'r'. If they are made to touch each other and then separated to the same distance, the force between them will be
   a) less than before b) same as before
   c) more than before d) zero

3) The number of lines of force from a charge of 1 coulomb
   a) 4π b) $4\pi\varepsilon_0$ c) $1/\varepsilon_0$ d) all of these

4) The energy density of a parallel plate capacitor does not depend on
   a) Area of plates b) Distance between the plates
   c) Electric field between the plates d) Both a and b

5) The internal resistance of a 2.1 volt cell which gives a current of 0.2A through a resistance of 10 ohm is
   a) 0.2 ohm b) 0.5 ohm c) 0.8 ohm d) 1.0 ohm

6) Two wires of A and B with circular cross section are made up of the same material with equal lengths. Suppose $R_A = 3R_B$ then what is the ratio of radius of wire A to that of B.
   a) 3 b) $\sqrt{3}$ c) $1/\sqrt{3}$ d) $1/3$

7) Ohm's law is valid
   a) for all materials b) for semiconductors
   c) only for conductors d) all of these

8) Magnetic field inside of solenoid is
   a) directly proportional to current
   b) directly proportional to its length
   c) inversely proportional to current
   d) all the above

9) A circular coil of radius 5 cm and 50 turns carries a current of 3 Ampere. The magnetic dipole moment of the coil is nearly
   a) 0.1 Am^2 b) 1.2 Am^2 c) 0.5 Am^2 d) 0.8 Am^2

10) The force experienced by a particle having mass m and charge q accelerated through a potential difference V, when it is kept in perpendicular magnetic field B is
   a) $\sqrt{\frac{2q^2BV}{m}}$ b) $\sqrt{\frac{q^2B^2V}{2m}}$ c) $\sqrt{\frac{2q^3B^2V}{m}}$ d) $\sqrt{\frac{2q^3BV}{m}}$

11) Which of the following electromagnetic radiation is used for viewing objects through fog
a) microwave b) gamma rays c) x-rays d) infrared rays

12) Spectra produced by ammonia gas in the discharge tube is
a) Band emission spectrum b) Band absorption spectrum
c) line emission spectrum d) line absorption spectrum

II. Answer any four of the following questions: **4×2=8**
Q.No.18 is compulsory.

13) What are the differences between coulomb force and gravitational force?
14) Define electric dipole moment. Give the formula and unit.
15) Define current density.
16) State Kirchoff's current rule.
17) What is a moving coil galvanometer? Mention its principle.
18) If the relative permeability and relative permittivity of the medium is 1.0 and 2.25 respectively. Find the speed of the electromagnetic wave in this medium.

III. Answer any five of the following questions: **5×3=15**
Q.No. 25 is compulsory.

19) Derive an expression for resultant capacitance when capacitors are connected in parallel.
20) Describe the microscopic model of current.
21) How is galvanometer converted into an ammeter?
22) Write the properties of electromagnetic waves.
23) When two resistances connected in series and parallel their equivalent resistances are 15 ohm and $^{56}/_{15}$ ohm respectively. Find the individual resistances.
24) Applying Gauss law obtain the expression for electric field due to infinitely long charged wire.
25) Describe the magnetic field produced by a current carrying solenoid.

IV. Answer the following questions: **3×5=15**

26) a) Derive an expression for the force between two parallel current carrying conductors.

(OR)

b) Explain in detail the construction and working of a Van de graff generator.

27) a) Derive an expression for electric potential due to an electric dipole.

(OR)

b) Write down Maxwell's integral form equations.

28) a) Obtain the condition for bridge balance in Wheat stone's bridge.

(OR)

b) Describe the motion of a charged particle in a uniform magnetic field.
