INDIAN SCHOOL AL WADI AL KABIR
DEPARTMENT OF SCIENCE 2021-22

ASSESSMENT 1 – CLASS 12 **PHYSICS** (THEORY) **042**

TIME ALLOWED: 1.5 HOURS MAXIMUM MARKS :35

General instructions;
(i) all questions are compulsory. There are 35 questions in all.
(ii)This question paper has 3 sections. section A, section B and section C.
Section A contains 20 multiple choice questions of one mark each, section B contains
7 assertion-reason type questions of one mark each, Section C contains 2 case study-based questions four marks each.
(iv) There is no overall choice. you may use the following values of physical constant whenever necessary;

$C = 3x\ 10^{8}\ m/s$
$h = 6.63 \times 10^{-34}\ Js$
$e = 1.6 \times 10^{-19}\ C$
$\mu_0 = 4\pi \times 10\text{-}7\ TmA^{-1}$
$\epsilon_0 = 8.85\ X\ 10^{-12}\ C^2N^{-1}m^{-1}$

SECTION – A

1.The number of electric lines of force radiating from an enclosed surface in vacuum is 1.13×10^{11}. The charge enclosed by the surface is

(a) 1 C
(b) 0.1 C
(c) 1 μC
(d) 0.1 μC

2.Force between two identical charges placed at a distance of r in vacuum is F. Now a slab of dielectric constant 4 is inserted between two charges and distance between charges become r/2 then force between the charges become

(a) F
(b)2F
(c)8F
(d)16F

3. The unit of permittivity of free space ($\boldsymbol{\varepsilon_0}$) is

(a)$CN^{-1}m^{-1}$ (b) Nm^2C^{-2} (c) $C^2N^{-1}m^{-2}$ (d) $C^2N^{-2}m^{-2}$

4. When an electric dipole is held at an angle in a uniform electric field, the net force F and torque τ on the dipole are;
(a) F = 0, τ =0

(b) F ≠ 0, τ≠0

(c) $F \neq 0, \tau = 0$

(d) $F = 0, \tau \neq 0$

5. A capacitor of capacitance C is connected to a cell of emf V and when charged, it is disconnected. Now the separation between the plates is doubled, the change in flux through a closed surface enclosing the capacitor is

(a)$CV/2\epsilon_o$

(b) CV/ϵ_o

(c) $2CV/\epsilon_o$

(d) zero

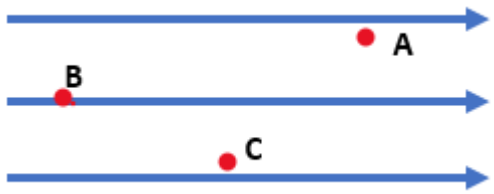
6. A, B and C are three points in a uniform electric field the electric potential is;

(a) same at all three points A, B and C

(b) maximum at A

(c) maximum at B

(c) maximum at C



7. Three capacitor of 1μF, 2μF and 3μF are combined, what is the maximum and minimum value of the combination respectively?

(a)6 μF and 11/5 μF

(b) 6 μF and 6/11 μF

(c) 6/11 μF and 6 μF

(d) 4μF and 11/3 μF

8. A wire of resistance 10 Ω is elongated by 10 %. The resistance of the elongated wire is

(a) 10.1 Ω.

(b) 11.1 Ω.

(c) 12.1 Ω.
(d) 13.1 Ω.

9. Which of the following physical quantities possesses the dimensions of $M^{-1}L^{-3}T^{3}A^{2}$?
(a) resistance.
(b) resistivity.
(c) conductivity.
(d) emf.

10. In India electricity is supplied for domestic use at 220 V. It is supplied at 110 V in U.S.A. If the resistance of a 60 W bulb for use in India is R Ω, then resistance of a 60 W bulb for use in U.S.A will be
(a) R Ω.
(b) 2R Ω.
(c) R/4 Ω.
(d) R/2 Ω.

11. Ohm's law is true for
(a) For metallic conductors at low temperature.
(b) For metallic conductors at high temperature.
(c) for electrolytes when current passes through them.
(d) For diode when current flows.

12. A fuse wire is a wire of
(a) Both low resistance and low melting point.
(b) High resistance and low melting point.
(c) Low resistance and high melting point.
(d) Both high resistance and high melting point.

13. Horizontal component of earth at a place is 3.2×10^{-5} T, and angle of dip is 60°. The resultant intensity of the earth's field at the place is.

(a) 3.2×10^{-5} T (b) 6.4×10^{-5} T (c) 1.6×10^{-5} T (d) 12.8×10^{-5} T

14. Torque acting on a magnet held at angle θ with a magnetic field is maximum, when θ =

(a) 0°

(b) 180°

(c) 360°

(d) 90°

15. A conducting wire of length L is turned in the form of a circular coil and a current 'I' is passed through it. For the torque, due to magnetic field produced at its center, to be maximum, the number of turns in the coil will be

(a) 1

(b) 2

(c) 3

(d) more than three

16. A charge particle goes (with a velocity $\vec{v}$) undeflected in a region containing electric ($\vec{E}$) and magnetic field ($\vec{B}$). It is possible that,

(a) $\vec{E} \parallel \vec{B}$ but $\vec{v}$ is not parallel to $\vec{E}$

(b) $\vec{v} \parallel \vec{B}$ but $\vec{E}$ is not parallel to $\vec{B}$

(c) $\vec{E} \parallel \vec{B}$, $\vec{v} \parallel \vec{E}$

(d) $\vec{E}$ is not parallel to $\vec{B}$ and $\vec{v}$

17. The correct value of Bohr magneton is;

(a) 9.27×10^{-24} Am^2 (b) 9.27×10^{24} Am^2

(c) 9.27×10^{-24} Am^{-2} (d) 9.27×10^{24} Am^{-2}

18. The SI units of magnetising force or magnetising intensity are same as those of

(a) magnetic induction
(b) intensity of magnetisation
(c) magnetic susceptibility
(d) none of the above

19. The CGS unit of magnetising intensity is 1 oersted, where 1 oersted =

(a) 80 Am (b) 80 $A^{-1}m$ (c) 80 Am^{-1} (d) 80 $A^{-1}m^{-1}$

20. Two wires of same length and shaped into a square and a circle.
If they carry same current, ratio of magnetic moment is
(a) 2: π
(b) π :2
(c) π : 4
(d) 4: π

AR questions

Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false and R is also false

21. **Assertion**: - For a point charge, concentric spheres centered at the location of the charge, are equipotential surfaces.
Reason: - An equipotential surface is a surface over which potential has zero value.

22. **Assertion**: - The capacitance of a parallel plate capacitor increases when a dielectric is inserted between the plates.
Reason: - The capacitance of a parallel plate capacitor is directly proportional to the dielectric constant of the medium between the plates.

23. **Assertion**: - If a proton and an electron is placed in the same uniform electric field, they experience different acceleration.
Reason: - Electric force on a test charge is independent to its mass.

24. **Assertion**: - Earth's magnetic field doesn't affect the working of moving coil galvanometer.
Reason: - Earth's magnetic field is very weak.

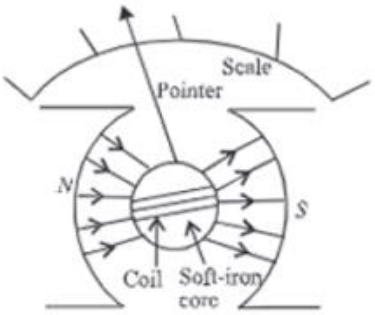
25. **Assertion**: - A voltmeter is always an inherently inaccurate instrument.
Reason: - Voltmeter is always connected in parallel.

26. **Assertion**: - Electromagnets are made up of soft iron.
Reason: - Coercivity of soft iron is small.

27. **Assertion**: - Electric appliances with metallic body has three pin connection, whereas electric bulb has two pin connection.
Reason: - Three pin connection reduces the heating effect.

Case study based

Moving coil galvanometer operates on Permanent Magnet Moving Coil (PMMC) mechanism and was designed by the scientist D'arsonval.
Moving coil galvanometers are of two types
(i) Suspended coil
(ii) Pivoted coil type or tangent galvanometer.
Its working is based on the fact that when a current carrying coil is placed in a magnetic field, it experiences a torque. This torque tends to rotate the coil about its axis of suspension in such a way that the magnetic flux passing through the coil is maximum.

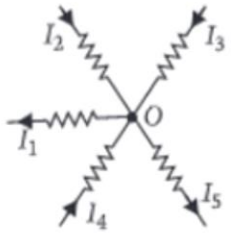


1. A moving coil galvanometer in an instrument
(a) is used to measure emf
(b) is used to measure potential difference
(c) is used to measure resistance
(d) is a deflection instrument, which gives a deflection whenever current passes through it
2. To make the field radial in a moving coil galvanometer,
(a) number of turns in coil kept small.
(b) magnet is taken in the form of horse shoe.
(c) poles are very strong magnets.
(d) poles are cylindrically cut.

3. The deflection in a moving coil galvanometer is
(a) directly proportional to torsional constant.
(b) directly proportional to the number of turns in the coil.
(c) inversely proportional to the area of the coil.
(d) inversely proportional to the current in the coil.
4.
To increase the current sensitivity of a moving coil galvanometer, we should decrease
(a) strength of the magnet
(b) torsional constant of the spring
(c) number of turns in coil
(d) area of coil

Case study 2

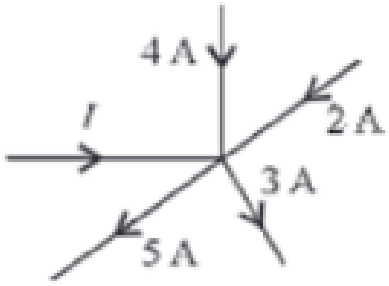
Kirchhoff's Rules



In 1942, a German physicist Kirchhoff extended Ohm's law to complicated circuits and gave two laws, which enable us to determine current in any part of such a circuit.
According to Kirchhoff's first rule, the algebraic sum of the currents meeting at a junction in a closed electric circuit is zero. The current flowing in a conductor towards the junction is taken as positive and the current flowing away from the junction is taken as negative.
According to Kirchhoff's second rule, in a closed loop, the algebraic sum of the emf's and algebraic sum of the products of current and resistance in the various arms of the loop is zero. While traversing a loop, if negative pole of the cell is encountered first, then its emf is negative, otherwise positive.

1. Kirchhoff's 1st law follows
(a) law of conservation of energy
(b) law of conservation of charge
(c) law of conservation of momentum
(d) Newton's 3rd law of motion

2. The value of current I in the given figure is
(a)4.5 A
(b)3.7 A
(c)2.0 A
(d) 2.5 A



3. Kirchhoff's 2nd law based on
(a) law of conservation of momentum of electron.
(b) law of conservation of charge and energy
(c) law of conservation of energy
(d) none of these

4. Point out the correct statement about the validity of Kirchhoff's junction rule
(a) The current following towards the junction is taken as positive
(b) The current following away from the junction is taken as negative
(c) Bending or reorienting of the wire does not change validity of Kirchhoff's rule
(d) All of the above

Answers: -

1 a	8 c	15 a	22 a	29 d
2 d	9 c	16 c	23 b	30 b
3 c	10 c	17 a	24 a	31 b
4 d	11 a	18 b	25 b	32 b
5 d	12 b	19 c	26 a	33 c
6 c	13 b	20 c	27 c	34 c
7 b	14 d	21 c	28 d	35 d

CHECKED BY : HOD - SCIENCE