

General Instructions :-

1. **Section-A** : Q.No. 1 contains **7 multiple choice** questions carrying **1 mark** each.
Q.No.2 contains **7 very short answer** type of questions carrying **1 mark** each.
2. **Section-B** : Q.No. 3 to Q.No. 13 are **11 short answer-I** type questions carrying **two marks** each. Attempt any **EIGHT**.
3. **Section-C** : Q.No.14 to Q.No.19 are **6 short answer-II** type questions carrying **three marks** each. Attempt any **FOUR**.
4. **Section-D** : Q.No.20 to Q.No.23 are **4 long answer** type questions carrying **four marks** each. Attempt any **TWO**
5. **Use of Logarithm Table** is allowed. Use of calculator is not allowed.

Section - A

Q.1 Select and write the correct answer.

7

- i) A place where the vertical components of Earth's magnetic field is zero has the angle of dip equal to _____
a) 0° b) 45°
c) 60° d) 90°
- ii) The internal resistance of a cell of emf 2V is 0.1Ω , it is connected to a resistance of 0.9Ω . The voltage across the cell will be _____
a) 0.5 V b) 1.8 Ω
c) 1.95 V d) 3 V
- iii) For a particle undergoing a uniform circular motion, which of the following is constant ?
a) Speed b) Acceleration
c) Velocity d) Displacement
- iv) If $\vec{A}$, $\vec{B}$ and $\vec{C}$ are three vectors, then which of the following is NOT correct?
a) $\vec{A} \cdot (\vec{B} + \vec{C}) = \vec{A} \cdot \vec{B} + \vec{A} \cdot \vec{C}$
b) $\vec{A} \cdot \vec{B} = \vec{B} \cdot \vec{A}$
c) $\vec{A} \times \vec{B} = \vec{B} \times \vec{A}$
d) $\vec{A} \times (\vec{B} + \vec{C}) = \vec{A} \times \vec{B} + \vec{A} \times \vec{C}$
- v) Dimensions of Kinetic energy are the same as that of
a) Force b) Acceleration
c) Work d) Pressure
- vi) Two forces each of magnitude 2N act at an angle of 60° . The magnitude of resultant force is _____
a) $\sqrt{2} N$ b) $\sqrt{6} N$
c) $\sqrt{8} N$ d) $\sqrt{12} N$
- vii) The bob of a conical pendulum undergoes
a) rectilinear motion in horizontal plane.
b) a uniform motion in a horizontal circle.
c) a uniform motion in a vertical circle.
d) a rectilinear motion in vertical circle.

Q.2 Answer the following.

7

- i) Define magnetic meridian.
- ii) If $R_1 = 7 \Omega$ and $R_2 = 8.5 \Omega$ are in series combination. Find the series equivalent (R_s) for this combination.
- iii) Define uniform circular motion.
- iv) Define scalar product of two vectors.
- v) If 2% is the error in the measurement of diameter of sphere. Find the % error in the measurement of its volume.
- vi) Define magnetic declination.
- vii) Define scalar quantity.

Section -B**Attempt any Eight.**

16

- Q.3** If $\vec{P} = 2\hat{i} + 3\hat{j} - \hat{k}$ and $\vec{Q} = 2\hat{i} - 5\hat{j} + 2\hat{k}$ Find (i) $\vec{P} + \vec{Q}$ (ii) $3\vec{P} - 2\vec{Q}$.
- Q.4** Prove that equation, $v^2 = u^2 + 2as$ is dimensionally correct.
- Q.5** State triangle law of vector addition.
- Q.6** Explain any two types of errors involved in the measurement of physical quantities.
- Q.7** A current of 4A flows through an automobile headlight. How many electrons flows through the headlight in a time of 2 hrs.
- Q.8** Define magnetic axis and magnetic equator.
- Q.9** Find the value of 'a' if $\vec{A} = 3\hat{i} - 2\hat{j} + 4\hat{k}$ and $\vec{B} = a\hat{i} + 2\hat{j} - \hat{k}$ are perpendicular to each other.
- Q.10** Define i) Centripetal force
ii) Radius Vector
- Q.11** Define temperature coefficient of resistance with the help of formula.
- Q.12** Write an equation of trajectory of projectile in a projectile motion.
- Q.13** The vertical and horizontal component of the Earth's magnetic field at a place are $3 \times 10^{-5} \text{ T}$ and $4 \times 10^{-5} \text{ T}$ respectively. Calculate the magnitude of the earth's magnetic field at that place.

Section - C**Attempt any FOUR.**

12

- Q.14** A car moves in a circle at the constant speed of 50 m/s and completes one revolution in 40 s. Determine the magnitude of the acceleration of the car.
- Q.15** Derive the expression for time of flight in projectile motion.
- Q.16** Distinguish between ohmic and non-ohmic substances, explain with the help of example.
- Q.17** State the characteristics of scalar product.
- Q.18** Calculate the magnitude of the magnetic field due to a short magnet of magnetic moment 5 Am^2 at 5 cm from its center along its axis.
- Q.19** Define a) Specific resistance
b) One ohm resistance
c) Current density.

Section - D**Attempt any TWO.****8**

- Q.20** a) Derive the expression for time period of conical pendulum.
b) A man throws a ball to maximum horizontal distance of 80m. Calculate the maximum height reached.
- Q.21** a) What is fundamental quantity. Also define unit.
b) Find the percentage error in Kinetic energy of body having mass 60.0 ± 0.3 g moving with a velocity 25.0 ± 0.1 cm/s
- Q.22** Derive an expression for the magnitude of magnetic field at an arbitrary point due to a bar magnet.
- Q.23** State parallelogram law of vector addition with the help of neat labelled diagram. Hence determine magnitude and direction of resultant vector.
-