Moving Charges and Magnetism

1. A charged particle is moving in a cyclotron, what effect on the radius of path of this charged particle will occur when the frequency of the ratio frequency field is doubled?
(a) It will also be doubled.
(b) It will be halved.
(c) It will be increased by four times.
(d) It will remain unchanged.

▼ **Answer**

Answer: d

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2. Which of the following is not correct about cyclotron?
(a) It is a machine to accelerate charged particles or ions to high energies.
(b) Cyclotron uses both electric and magnetic fields in combination to increase the energy of charged particles.
(c) The operation of the cyclotron is based on the fact that the time for one revolution of an ion is independent of its speed or radius of its orbit.
(d) The charged particles and ions in cyclotron can move on any arbitrary path.

▼ **Answer**

Answer: d

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3. If an electron is moving with velocity $\vec{\nu}$ produces a magnetic field $\vec{B}$, then
(a) the direction of field $\vec{B}$ will be same as the direction of velocity $\vec{\nu}$.
(b) the direction of field $\vec{B}$ will be opposite to the direction of velocity $\vec{\nu}$.
(c) the direction of field $\vec{B}$ will be perpendicular to the direction of velocity $\vec{\nu}$.
(d) the direction of field $\vec{B}$ does not depend upon the direction of velocity $\vec{\nu}$.

▼ **Answer**

Answer: c

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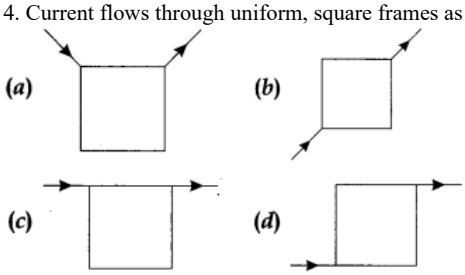
4. Current flows through uniform, square frames as shown in the figure. In which case is the magnetic field at the centre of the frame not zero?



▼ **Answer**

Answer: c

5. Ampere's circuital law is given by

(a) $\oint \vec{H}.\vec{dl} = \mu_0 I_{enc}$ (b) $\oint \vec{B}.\vec{dl} = \mu_0 I_{enc}$

(c) $\oint \vec{B}.\vec{dl} = \mu_0 J$ (d) $\oint \vec{H}.\vec{dl} = \mu_0 J$

▼ **Answer**

Answer: b

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6. Two identical current carrying coaxial loops, carry current I in opposite sense. A simple amperian loop passes through both of them once. Calling the loop as C, then which statement is correct?

(a) $\oint_c \vec{B}.\vec{dl} = \pm 2\mu_0 I$

(b) the value of $\oint_c \vec{B}.\vec{dl}$ is independent of sense of C.

(c) there may be a point on C where B and dl are parallel.

(d) none of these

▼ **Answer**

Answer: b

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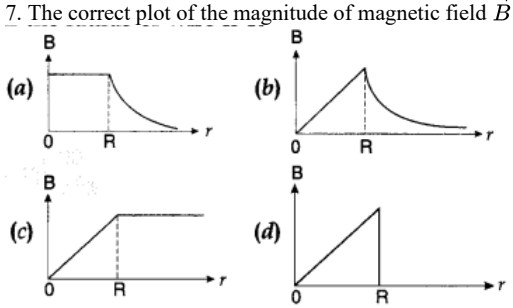
7. The correct plot of the magnitude of magnetic field $\vec{B}$ vs distance r from centre of the wire is, if the radius of wire is R



▼ **Answer**

Answer: b

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8. The nature of parallel and anti-parallel currents are

(a) parallel currents repel and antiparallel cur¬rents attract.

(b) parallel currents attract and antiparallel cur-rents repel.

(c) both currents attract. '

(d) both currents repel.

▼ **Answer**

Answer: b

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9. The magnetic moment of a current I carrying circular coil of radius r and number of turns N varies as

(a) $\frac{1}{r^2}$

(b) $\frac{1}{r}$

(c) r

(d) r^2

▼ **Answer**

Answer: d

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10. A short bar magnet has a magnetic moment of 0. 65 J T^{-1}, then the magnitude and direction of the magnetic field produced by the magnet at a distance 8 cm from the centre of magnet on the axis is

(a) 2.5×10^{-4} T, along NS direction

(b) 2.5×10^{-4} T along SN direction

Answer: c

(c) 4.5×10^{-4} T, along NS direction
(d) 4.5×10^{-4} T, along SN direction

▼ **Answer**

Answer: b

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11. A current carrying loop is placed in a uniform magnetic field. The torqe acting on it does not depend upon
(a) area of loop
(b) value of current
(c) magnetic field
(d) None of these

▼ **Answer**

Answer: d

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12. In a moving coil galvanometer the deflection (Φ) on the scale by a pointer attached to the spring is

(a) $\left(\frac{NA}{kB}\right)I$ (b) $\left(\frac{N}{kAB}\right)I$

(c) $\left(\frac{NAB}{k}\right)I$ (d) $\left(\frac{NAB}{kI}\right)$.

▼ **Answer**

Answer: c

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13. A moving coil galvanometer can be converted into an ammeter by
(a) introducing a shunt resistance of large value in series.
(b) introducing a shunt resistance of small value in parallel.
(c) introducing a resistance of small value in series.
(d) introducing a resistance of large value in parallel.

▼ **Answer**

Answer: b

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14. The conversion of a moving coil galvanometer into a voltmeter is done by
(a) introducing a resistance of large value in series.
(b) introducing a resistance of small value in parallel.
(c) introducing a resistance of large value in parallel.
(d) introducing a resistance of small value in series.

▼ **Answer**

Answer: a

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15. When a magnetic compass needle is carried nearby to a straight wire carrying current, then
(I) the straight wire cause a noticeable deflection in the compass needle.
(II) the alignment of the needle is tangential to an imaginary circle with straight wire as its centre and has a plane perpendicular to the wire
(a) (I) is correct
(b) (II) is correct
(c) both (I) and (II) are correct
(d) neither (I) nor (II) is correct

▼ **Answer**

Answer: c

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16. A strong magnetic field is applied on a stationary electron. Then the electron
(a) moves in the direction of the field.
(b) remained stationary.
(c) moves perpendicular to the direction of the field.
(d) moves opposite to the direction of the field.

▼ **Answer**

Answer: b

17. In an inertial frame of reference, the magnetic force on a moving charged particle is $\vec{F}$ Its value in another inertial frame of reference will be
(a) remained same
(b) changed due to change in the amount of charge
(c) changed due to change in velocity of charged particle
(d) changed due to change in field direction

▼ **Answer**

Answer: c

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18. Which one of the following is correct statement about magnetic forces?
(a) Magnetic forces always obey Newton's third law.
(b) Magnetic forces do not obey Newton's third law.
(c) For very high current, magnetic forces obey Newton's third law.
(d) Inside low magnetic field, magnetic forces obey Newton's third law.

▼ **Answer**

Answer: b

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19. A charged particle is moving on circular path with velocity v in a uniform magnetic field B, if the velocity of the charged particle is doubled and strength of magnetic field is halved, then radius becomes
(a) 8 times
(b) 4 times
(c) 2 times
(d) 16 times

▼ **Answer**

Answer: b

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20. Two a-particles have the ratio of their velocities as 3 : 2 on entering the field. If they move in different circular paths, then the ratio of the radii of their paths is
(a) 2 : 3
(b) 3 : 2
(c) 9 : 4
(d) 4 : 9

▼ **Answer**

Answer: b
