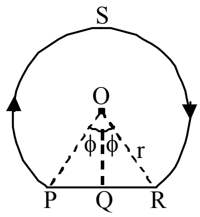
345. A circular arc of wire of radius of curvature r subtends an angle of $_4$ radian at its centre. If i current is flowing in it then the magnetic induction at its centre will be-

(A) $\frac{\mu_0 i}{8r}$ (B) $\frac{\mu_0 i}{4r}$ (C) $\frac{\mu_0 i}{16r}$ (D) 0

346. The total magnetic induction at point O due to curve portion and straight portion in the following figure, will be-



(A) $\frac{\mu_0 i}{2\pi r}$ $[\pi - \phi + \tan\phi]$ (B) $\frac{\mu_0 i}{2\pi r}$

(C) 0 (D) $\frac{\mu_0 i}{2\pi r}$ $[\pi - \phi + \tan\phi]$

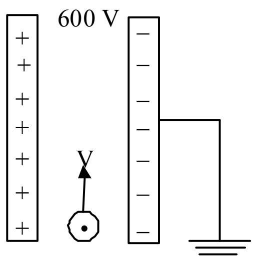
347. A 6.28m long wire is turned into a coil of diameter 0.2m and a current of 1 amp. is passed in it. The magnetic induction at its centre will be-

(A) 6.28×10^{-5} Tesla (B) 0
(C) 6.28 Tesla (D) 6.28×10^{-3} Tesla

348. A proton, a deutron and an α-particle are accelerated through same potential difference and then they enter a normal uniform magnetic field. The ratio of their kinetic energies will be-

(A) 2 : 1 : 3 (B) 1 : 1 : 2
(C) 1 : 1 : 1 (D) 1 : 2 : 4

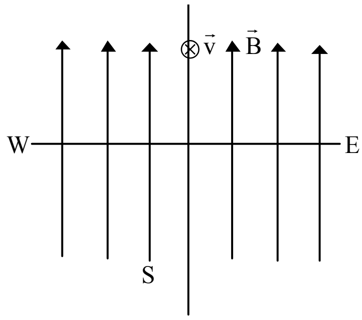
349. A potential difference of 600 volt is applied across the plates of a parallel plate condenser placed in a magnetic field. The separation between the plates is 3 mm. An electron projected vertically upward parallel to the plates with a velocity of 2×10^6 m/s moves undeflected between the plates. The magnitude and direction of the magnetic field in the region between the condenser plates will be (in Wb/m^2)
(Given charge of electron = -1.6×10^{-19} coulomb).



(A) 0.1, vertically downward (B) 0.2 vertically downward
(C) 0.3 vertically upward (D) 0.4 vertically downward.

350. A 5 MeV proton moves vertically downward through a magnetic field of induction 1.5 weber/m^2 pointing horizontally from south to north. The force acting on the proton, mass of proton = 1.6×10^{-27} kg. will be-

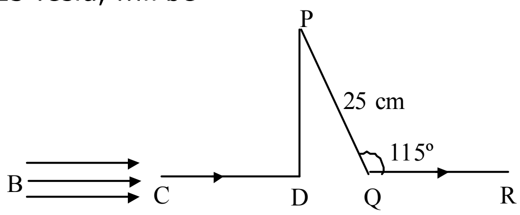
(A) 7.44×10^{-12} N
(B) 3.1×10^{-12} N
(C) 5×10^{-12} N
(D) 6×10^{-12} N



351. An α-particle is describing a circle of radius 0.45 m in a field of magnetic induction 1.2 weber/m^2. The potential difference required to accelerate the particle, so as to give this much energy to it (The mass of α-particle is 6.8×10^{-27} kg and its charge is 3.2×10^{-19} coulomb.) will be-

(A) 6×10^{6} V (B) 2.3×10^{-12} V
(C) 7×10^{6} V (D) 3.2×10^{-12} V

352. The magnetic force on segment PQ, due to a current of 5 amp. flowing in it, if it is placed in a magnetic field of 0.25 Tesla, will be-

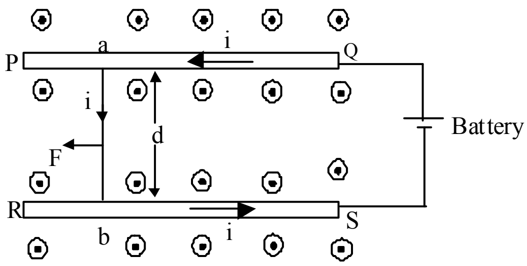


(A) 0.3125 sin 65° N (B) 0
(C) 31.25 sin 65° N (D) 3.125 sin 65° N

353. A loop of flexible conducting wire of length 0.5 m lies in a magnetic field of 1.0 tesla perpendicular to the plane of the loop. The tension developed in the wire if the current is of 1.57 amp. will be-

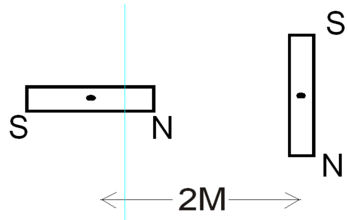
(A) 0.15 N (B) 0.25 N
(C) 0.125 N (D) 0.138 N

354. A metal wire of mass m slides without friction on two rails spaced at a distance d apart. The track lies in a vertical uniform field of induction B, a constant current i flows along one rail, across the wire and back down the other rail. The velocity (speed and direction) of the wire as a function of time, assuming it to be at rest initially will be-



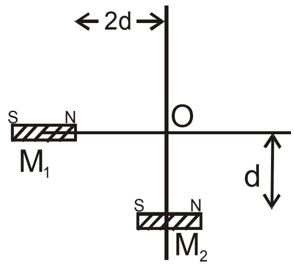
(A) $\frac{Bid}{m}t$ (B) 0
(C) Bidmt (D) none

355. Two identical magnetic dipoles of magnetic moment 1.0 A-m^2 each, placed at a separation of 2m with their axis perpendicular to each other. The resultant magnetic field at a point midway between dipoles is



(A) $\sqrt{5} \times 10^{-7}$T (B) 3×10^{-7}T
(C) 2×10^{-7}T (D) zero

356. Two short barmagnet of magnetic moments M_1 and M_2 are kept on X and Y axis as shown is figure. If resultant magnetic field at origin is zero, Then $\frac{M_1}{M_2}$ will be



(A) 1 : 4 (B) 4 : 1
(C) 2 : 1 (D) 8 : 1

357. A magnet of length 14 cm and magnetic moment μ is broken into two parts of length 6 cm and 8 cm. They are put at right angles to each other with opposite poles together. The magnetic dipole moment of the combination is-

(A) $\frac{\mu}{1.4}$ (B) μ (C) 1.4 μ (D) 2.8 μ

358. Torques τ_1 and τ_2 are required for a magnetic needle to remain perpendicular to the magnetic fields at two different places. The magnetic field at those places are B_1 and B_2 respectively, then $\frac{B_1}{B_2}$ is

(A) $\frac{\tau_1}{\tau_2}$ (B) $\frac{\tau_2}{\tau_1}$ (C) $\frac{\tau_1+\tau_2}{\tau_1-\tau_2}$ (D) $\frac{\tau_1-\tau_2}{\tau_1+\tau_2}$

359. A magnetised wire of moment M is bent into an arc of a circle subtending an angle of 60° at the centre; then the new magnetic moment is –

(A) $(2M/\pi)$ (B) (M/π) (C) $(3\sqrt{3}M/\pi)$ (D) $(3M/\pi)$

360. Magnetic field produced by electrons in aotms and molecules is due to their -
(A) spin motion only (B) orbital motion only
(C) spin and orbital motion both (D) neither spin nor orbital motion.

361. When a magnet is heated, its strength –
(A) always decreases (B) always increases
(C) may increase or decrease (D) remains unaffected

362.* The lines of force due to earth's horizontal magnetic field are –
(A) parallel and straight (B) concentric circle
(C) elliptical (D) curved lines

363. A deflection magnetometer can be used for measuring –
(A) declination (B) dip (C) horizontal component (D) all these

364. Lines passing through points of zero declination are –
(A) isogonic lines (B) isoclinic lines (C) agonic lines (D) aclinic lines

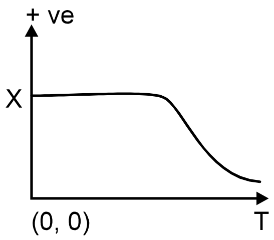
365. A hydrogen atom is a paramagnetic. A hydrogen molecule is –
(A) Diamagnetic (B) Paramagnetic (C) Ferromagnetic (D) None of these

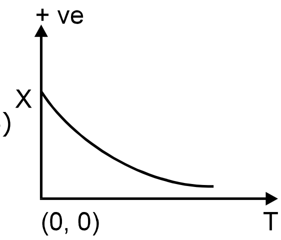
366. The core of an electromagnet is made of soft iron, because –
(A) the susceptibility of soft iron is very high
(B) coercivity of soft iron is very low
(C) both of these
(D) none of these

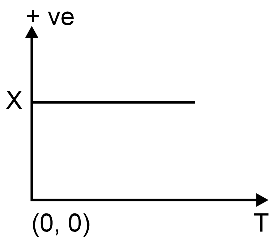
367. A permanent magnet –
(A) attracts all substances
(B) attracts only ferromagnetic substances
(C) attacts ferromagnetic substances and repels all others
(D) attracts some substances and repels others

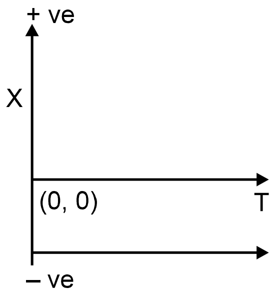
368.* The relative permeability of a substance X is slightly less than unity and that of substance Y is slightly more than unity then –
(A) X is paramagnetic and Y is ferromagnetic
(B) X is diamagnetic and Y is ferromagnetic
(C) X and Y both are paramagnetic
(D) X is diamagnetic and Y is paramagnetic

369. The variation of magnetic susceptibility (x) with absolute temperature T for a diamagnetic material is given by –

(A)


(B)


(C)


(D)


370. A conducting loop is pulled with a constant velocity towards a region of uniform magnetic field as shown in the figure then the current involved in the loop is (d > r) -
(A) Clockwise while entering
(B) Anticlockwise while entering
(C) Zero when partially outside
(D) Anticlockwise while leaving.