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Rathnavali Balika Vidyalaya - Gampaha.

Final Term Test- 2021 Grade 13

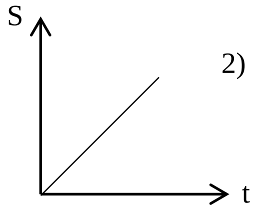
PhysicsI Time : 2 Hrs

- **Answer all the questions.**

(1) In the Equation $E = hf$, E and f represent energy of a photon and frequency respectively. Dimension of h is,

1) ML^2T^{-3} 2) MLT^{-3} 3) ML^2T^{-1} 4) MLT^{-2} 5) ML^2T^{-4}

(2) What is the correct variation of horizontal displacement with time for a particle projected 60^0 with horizontal,

1)


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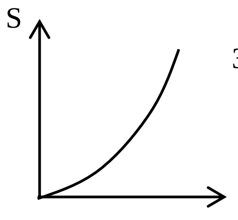

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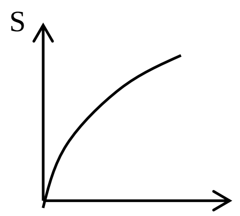

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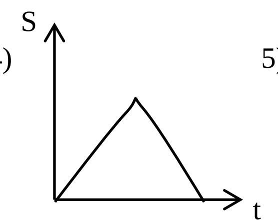

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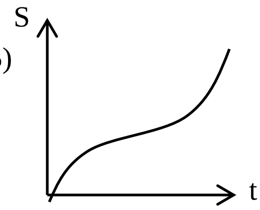


(3) Two forces acting on a point object. One force is horizontal and other one is 60^0 inclined to the horizontal. Magnitude of both forces are same. The horizontal component of the inclined force is 10 N. The resultant acting on the point object is,

1) 20 N 2) $20\sqrt{3}$ N 3) 40 N 4) $10\sqrt{19}$ N 5) $40\sqrt{2}$ N

(4)Which factor the **maximum velocity** of a vehicle on a circular bend is depending on to move if the road is not banked.
A. On gravitational acceleration
B. Radius of the bend
C. Centre of gravity of the vehicle

1) A only 2)A and C only 3)A and B only
4) A, B and C 5) B and C only

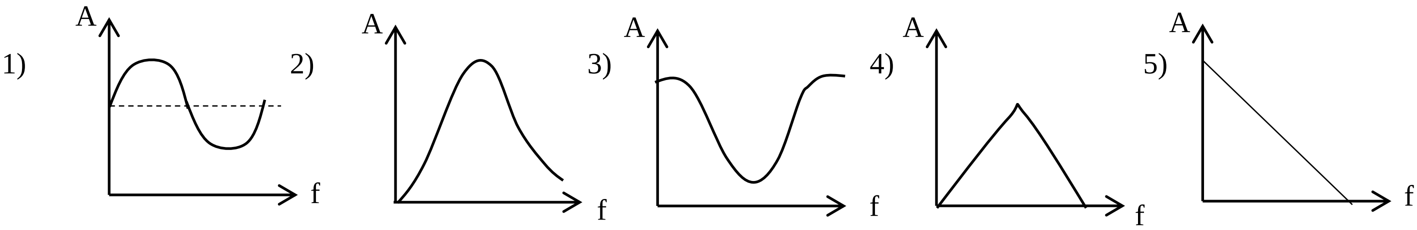
(5) Intensity level of a person is 60dB. How many people can increase the intensity level until 80 dB of the room.

1) 25 2)50 3)100 4)200 5) 400

(6) What is the correct ascending order of magnitude of four fundamental forces in universe.

1) Gravitational force, electromagnetic force, strong force, weak force.
2) Electromagnetic force, gravitational force, weak force strong force.
3) Gravitational force, weak force, electro magnetic force, strong force.
4) Weak force, gravitational force, electromagnetic force, strong force.
5) Gravitational force, strong force, weak force, electromagnetic force.

(7) An oscillator vibrates with a source having variable frequency(f). What should be the correct variation of amplitude(A) of oscillator with forced frequency of source ,

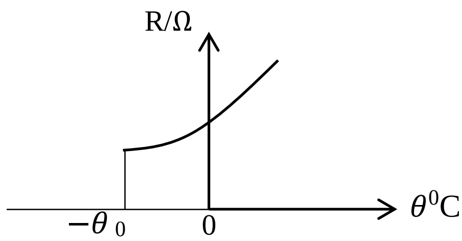


(8) When and object is placed 25 cm ahead the naked eye it will subtended 1^0 angle at eye lens. When a simple microscope is used under normal adjustment it subtended 11^0, what is the focal length of simple microscope,

1) 5 cm 2) 2.5 cm 3) 2.1 cm 4) 2.3 cm 5) 25 cm

(9) The Variation of Resistance with temperature is shown in the graph.

A. Temperature coefficient of resistance is always constant, and it doesn't depend on temperature.
B. Conductivity decreases with the increasing of temperature.
C. This shows Superconducting properties when $\theta < -\theta_0$



The incorrect statement/ statements.

1) A only 2) B only 3) A and B only
4) B and C only 5) A and C only

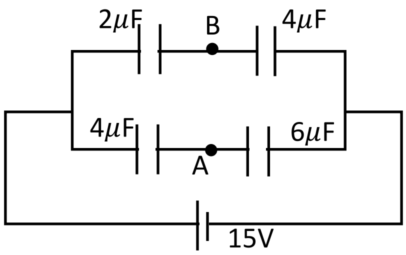
(10) Fundamental frequency of a both end open resonance tube is **n**. What would be the fundamental frequency of the tube when one end is closed"

1) $\frac{n}{4}$ 2) $\frac{n}{2}$ 3) n 4) 2n 5) 4n

(11) Find the correct statement.

1) Neutrons can be generated by nuclear fusion.
2) Alpha particles can be generated by nuclear fusion.
3) Nuclear fusion done by using heavy atoms like radium(Ra).
4) Neutrons can be generated by nuclear fission.
5) Light atoms can be subjected to nuclear fusion at the low temperature.

(12) The figure shows a circuit of four capacitors connected to a power supply 15 V. The potential at B with respect to A is.'



1) 0 2) -1 V 3) -4V
4) 1V 5) 4 V

(13) Magnitude of the velocity at the maximum height is ¼ of it is initial velocity(U) of a projectile motion. How long has it taken to reach its maximum height"

1) $\frac{U}{g}$ 2) $\frac{2U}{g}$ 3) $\frac{3U}{5g}$ 4) $\frac{4U}{5g}$ 5) $\frac{U}{5g}$

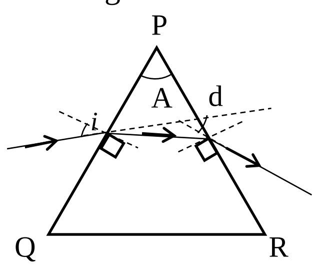
(14) Consider the following statements.
A. When a steady flow goes through a horizontal tube its pressure decreases when the tube is narrowed.
B. Process of spray machine can be explained by Bernoulli principle
C. The Bernoulli Principal can be Applied only for a viscous incompressible steady flow

The correct statement/ statements.

1) A only 2) A and B only 3)BandConly
4)Aand C only 5) A, B, C all correct

(15) Temperature of three liquids A, B and C are 12 ^{0}C, 19 ^{0}C and 28 ^{0}C respectively. Final temperature of mixture of A and B is 16 ^{0}C. The final temperature of the mixture of B and C is 23 ^{0}C. What should be the final temperature of mixture of A and C
1) 18.4 ^{0}C 2) 22.6 ^{0}C 3) 25.6 ^{0}C 4) 20.3 ^{0}C 5) 24.2 ^{0}C

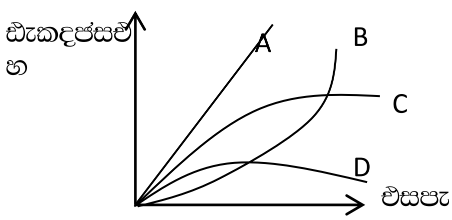
(16) Path of a light ray through a prism is given below. The prism angle is A and Angle of deviation is **d**. Consider the following statements"



A) With the increase of incident angle i the angle of deviation 'd' is decreased at the beginning and then increased'
B) The ray falls normally on PQ emerge with no deviation.
C) The angle of deviation doesn't depend on prism angle for a given value of incident angle'
Correct statement/ statements,

1) A only 2) A and C only 3) B only
4)B and C only 5) A, B, C all correct

(17) The correct variation of velocity with distance d for a spherical object released in a viscous medium"



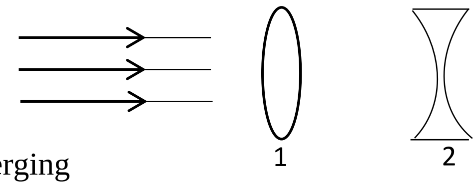
1) A 2) B
3) C 4) D
5) none of the above

(18) Two cables P and Q are made in same material. Cross-sectional area of Q is twice that of P. Tension of P is twice that of Q. The ratio between speed of transverse wave in P and Q"

1) 2 : 1 2) $\sqrt{2}$: 1 3) 1 : $\sqrt{2}$ 4) 1 : 2 5) 1 : 1

(19) Convex lens of focal length 10 cm and Concave lens of focal length 5 cm are placed coaxially 5 cm apart as shown in figure. A narrow parallel beam of light falls on convex lens as shown in figure. The nature of the emergent beam after refraction through both lenses,

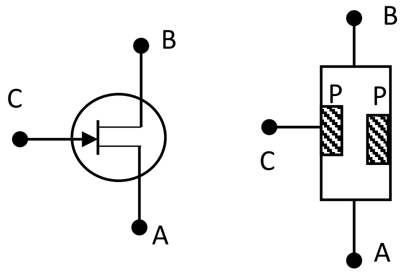
1) Parallel
2) Converge
3) Diverge
4) At the beginning and then converging
5) Converging at the beginning and then diverging



(20) Height of Mercury column in mercury glass thermometer are 100 ^{0}C and 20 ^{0}C temperature are 200 mm and 80 mm respectively. What would be the height of Mercury column at 0 ^{0}C"

1) 33.0 mm 2) 40.0 mm 3) 50.0 mm 4) 100.0 mm5) 104.0 mm

(21) Terminals of junction field effect transistor are given by A,B,C. The correct combination of terminals" A, B,C respectively.



1) Source(S), Drain(D), Gate(G)
2) Drain (D), Source (S), Gate(G)
3) Gate(G), Drain (D), Source (S)
4) Source (S), Gate(G), Drain (D)
5) Gate(G), Source (S), Drain (D)

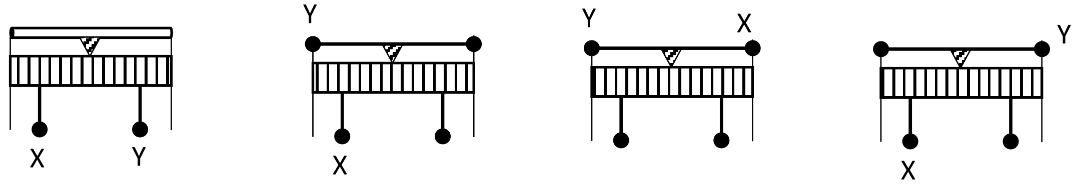
(22) When two identical spheres A and B carrying charges +8q and -2q are placed distance 'r' apart. 'F' force is generated between A and B, Then A touches B and after that A and B are placed at their initial positions, What should be the new force between A and B"

1) $^{9F}/_{16}$ 2) $^{16F}/_{9}$ 3) $^{9F}/_{4}$ 4) $^{4F}/_{9}$ 5) $^{2F}/_{3}$

(23) A disc of moment of inertia 2 kgm^2 is rotating at rate of 210 RPM. It becomes rest by applying external torque for 14 Nm on it. The number of turns rotated by the disc is"

1) 34 2) 25 3) 10 4) 5 5) 2

(24)



(A) (B) (C) (D)

Correct X and Y connection for a rheostat,

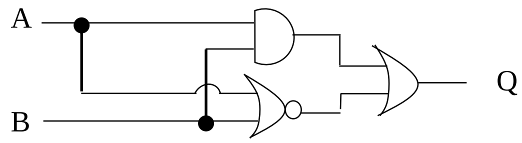
1) Aand B only 2) A and C only 3) B and C only

4) B andDonly 5) A and D only

(25) Average density of an object of volume 0.5 m^3 is 1/4 times of density of water. What would be the mass that kept on it, to sink it completely in water .

1) 375 kg 3) 125 kg 3) 3750 kg 4) 1250 g 5) 500 kg

(26)



For the logic circuit given in figure A and B input and Q is output. Consider the following statements.

A. Always Q= 1, when the output of "AND" Gate is zero.

B. Q = 1, When A=B=1

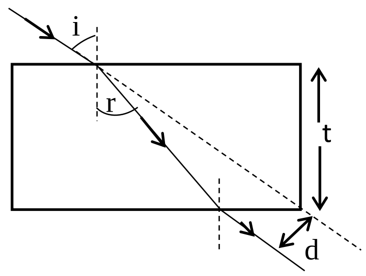
C. Q=1, When A=B=0

The True statements are

1) A only 2) B only 3) A and B only

4) B and C only 5) A, B and C all correct

(27) Monochromatic Ray Travels through a glass block of't' thickness. The lateral displacement 'd' of the light ray is given by"



1) $d = \frac{t \sin i}{\cos(i-r)}$

2) $d = \frac{t \sin(i-r)}{\cos i}$

3) $d = \frac{t \cos(i-r)}{\sin i}$

4) $d = \frac{t \sin r}{\cos(i-r)}$

5) $d = \frac{t \sin(i-r)}{\cos r}$

(28) Water drop is broken into 8 identical drops. The correct statement regarding excess pressure of initial water drop"

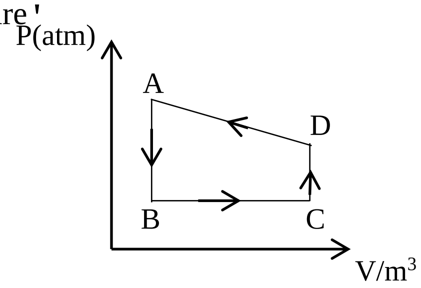
1) Should be equal to excess pressure of one of small droplet.
2) Should be half of the excess pressure of one of small drop.
3) 1/4 times of the excess pressure of the excess pressure of one of the drop.
4) 2 times of the excess pressure of the excess pressure of one of the drop.
5) 8 times of the excess pressure of the excess pressure of one of the drop.

(29) Masses and radii of the Earth and the Moon are M_E, M_M , R_E and R_M respectively. The distance between two centres of the earth and the moon is d. From the midpoint of that line a particle of mass m is projected. Find the minimum velocity should be given to m to project that to infinity"

1) $\sqrt{\frac{2G(M_E+M_M)}{d}}$ 2) $\sqrt{\frac{G(M_E+M_M)}{2d}}$ 3) $\sqrt{\frac{G(M_E+M_M)}{d}}$

4) $2\sqrt{\frac{(M_E+M_M)G}{d}}$ 5) $\sqrt{G(M_E+M_M)d}$

(30) P- V curve for a cyclic thermodynamics process is given in this figure'



A) A→B Process $\Delta Q > 0$

B) B→ C Process $\Delta Q < 0$

C) D→A Process $\Delta W < 0$

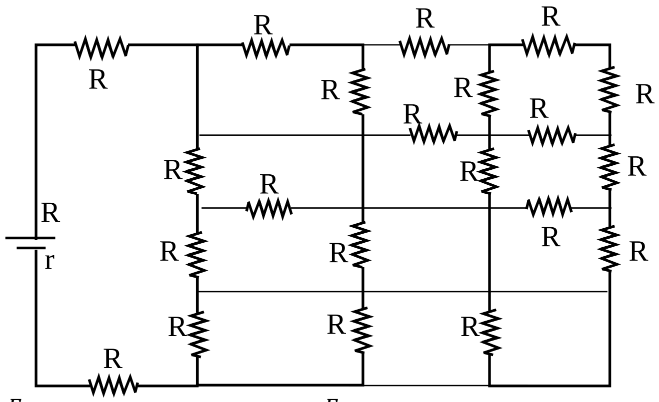
1) Aonly 2) B only 3) A and B only

4) A and C only 5) all incorrect

(31) Vehicle of mass 1200 kg is lifted 20 m up by using a crain of power 5kW. It has taken 2 minutes for this. The efficiency of the motor of the crane is"

1) 4% 2) 40% 3) 8% 4) 80% 5) 50%

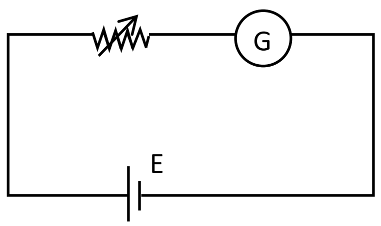
(32) A network of resistors containing resistors having resistance R each are connected to a cell of emf E, and internal resistance r, as shown in above figure. Current through the circuit is,

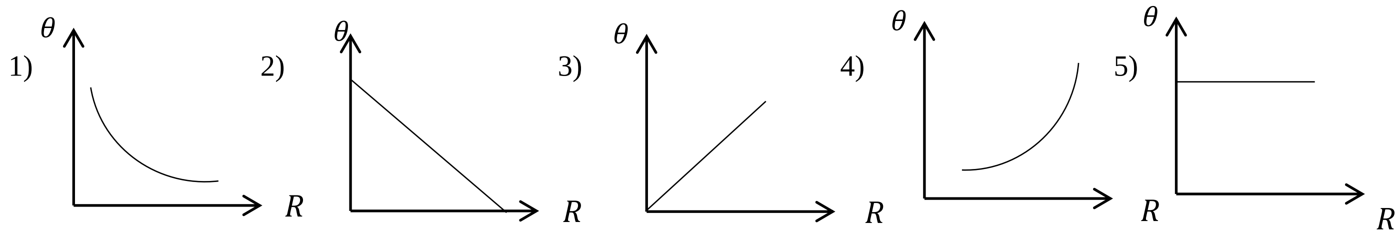


1) $I = \frac{E}{(2R+ r)}$ 2) $I = \frac{E}{(22R+ r)}$ 3) $I = \frac{E}{(11R+ r)}$

2) $I = \frac{E}{(R+ r)}$ 5) $I = \frac{E}{2R}$

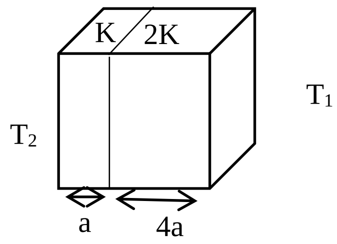
(33) A galvanometer having negligible internal resistance, a cell and variable resistance R has been connected as shown in the figure. What should be the correct variation of deflection θ of galvanometer with resistance R"





(34) Compound object is made by using two metal blocks having thickness **a and 4a** and thermal conductivities K and 2K. And it has been lagged properly. Temperature at both ends of compound object are T1 and T2.(T2>T1)"

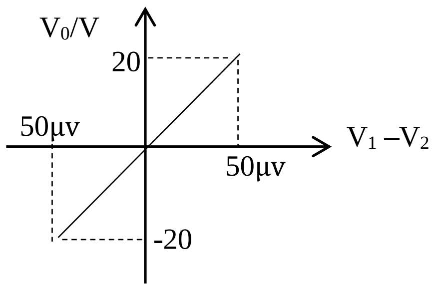
The rate of conduction at steady state is given by.$A\frac{(T_2-T_1)Kf}{a}$ where A is common cross section area volume of f should be

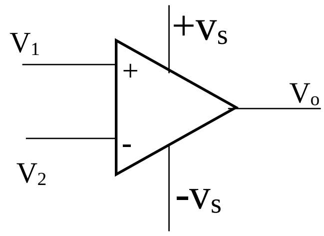


1) 1 2) ½ 3) $^2/_3$

4) $^1/_3$ 5) $^2/_5$

(35) Characteristic for an operational amplifier and open loop condition is given in figure. Open loop Amplification of the voltage amplifier"





1) 1×10^6 2) 1×10^5 3) 4×10^5 4) 2×10^6 5) 2×10^5

(36) Two rods having same length and same cross sectional area are placed tightly between two rigid supports. Linear expansion and Young's modulus of rods are $\alpha_1, \alpha_2, E_1 and E_2$. If it generates same trust in both rods when heated by same temperature, The ratio E_1/E_2 should be, $(\frac{\alpha_1}{\alpha_2} = \frac{2}{3})$

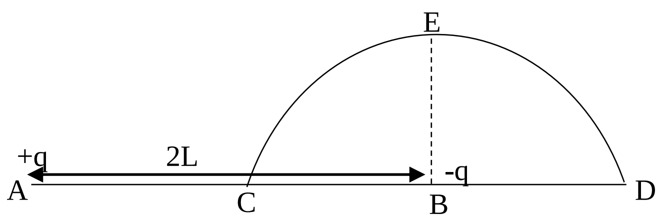
1) 2 : 3 2) 1 : 1 3) 3 : 2 4) 4 : 9 5) 1 : 3

(37) +q and -q charges are placed on A and B respectively. The distance between A and B is $2L$. C is the mid point of AB. Another charge Q is brought from C to D along a circular path as shown in figure. Amount of work done should be, $(\varepsilon_0 = Permitivity of free space.)$"

1) $\frac{qQ}{2\pi\varepsilon_0 L}$ 2) $\frac{-qQ}{6\pi\varepsilon_0 L}$

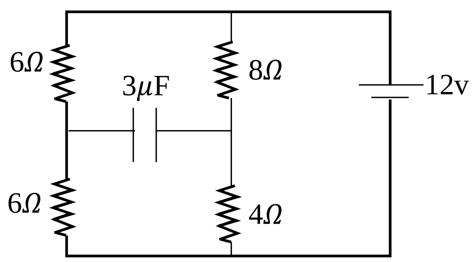
3) $\frac{qQ}{6\pi\varepsilon_0 L}$ 4) $\frac{-qQ}{2\pi\varepsilon_0 L}$

5) $\frac{qQ}{4\pi\varepsilon_0 L}$

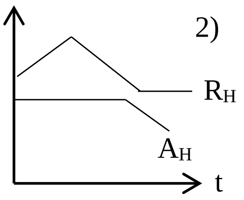


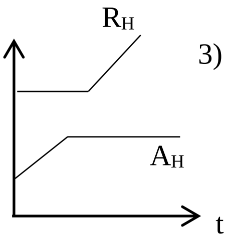
(38) As shown in figure capacitance of capacitors $3\mu F$. Is connected to circuit as shown in figure. Electric energy stored in capacitor is"

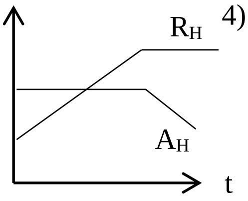
1) 1μJ
2) 2μJ
3) 3μJ
4) 5μJ
5) 6μJ

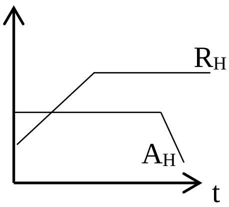


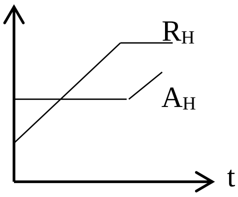
(39) Temperature of a closed chamber of Volume $0.5m^3$ is 28 ℃ and dew point is 22 ℃. This is heated to 75 ℃ and let it cool gradually . What is the correct variation of absolute humidity (AH) and Relative Humidity (RH) with time '

1) 

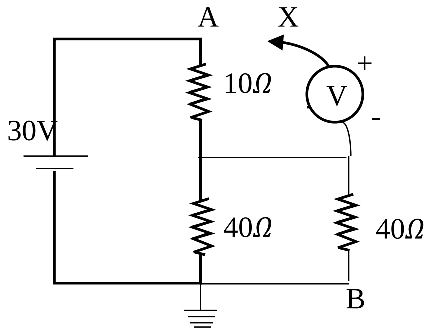
2) 

3) 

4) 

5) 

(40) 30V cell in the given circuit has negligible internal resistance. Ⓥ is an ideal Centre zero voltmeter. What are the readings of voltmeter when X is connected A and B,

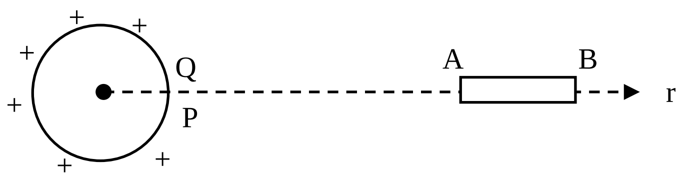


1) 10V, 10V 2) 10V, -10V 3) -10V, 20V
4) -10V, -20V 5)10V, -20V

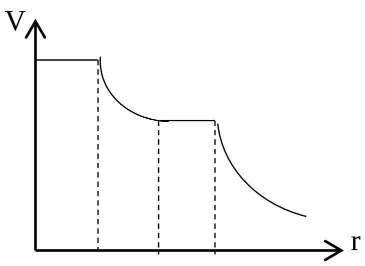
(41) A ball of mass 50 gram hits on a wooden block 10 ms^{-1} velocity. It bounces back with 5ms $^{-1}$ velocity during 0.01 seconds. What should be the minimum force should applied on block to keep it stationary

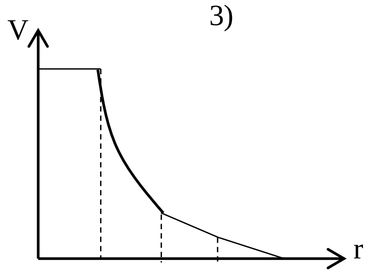
1) 250 N 2) 750 N 3) 50 N 4) 75 N 5) 30N

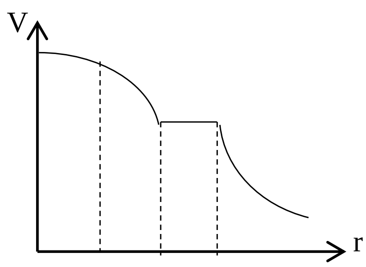
(42)

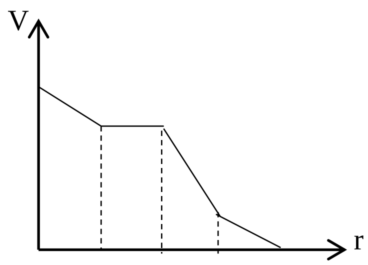


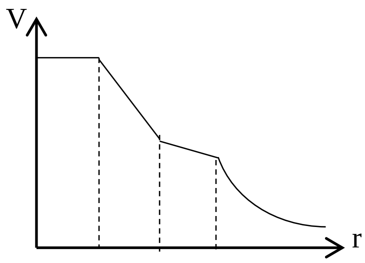
The figure shows a charged sphere. It is carrying Q charge and AB is a neutral rod. The correct variation of electric potential from the centre of the sphere is,"

1) 

2) 

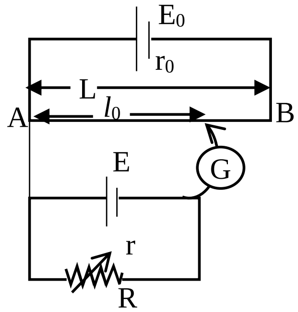
3) 

4) 

5) 

(43) Two light beams A and B of wavelength λ_A *and* λ_B and with same intensities false on unit area of a metal. Find the ratio between number of photoelectrons emitted by A and number of photoelectrons from B,

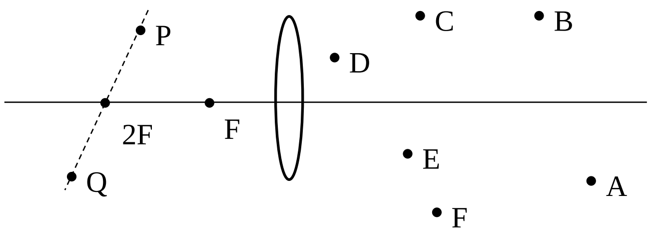
1) $\left(\frac{\lambda_A}{\lambda_B}\right)^2$ 2) $\left(\frac{\lambda_B}{\lambda_A}\right)^2$ 3) $\frac{\lambda_B}{\lambda_A}$ 4) $\frac{\lambda_A}{\lambda_B}$ 5) 1

(44) 

Internal resistance and electromotive force of accumulator are r_0 *and* E_0. In given potentiometer circuit length of AB wire is L and its resistance R0. A variable resistance R is connected to cell E and R is changed until E gives maximum power. What would be the balance length for this occasion"

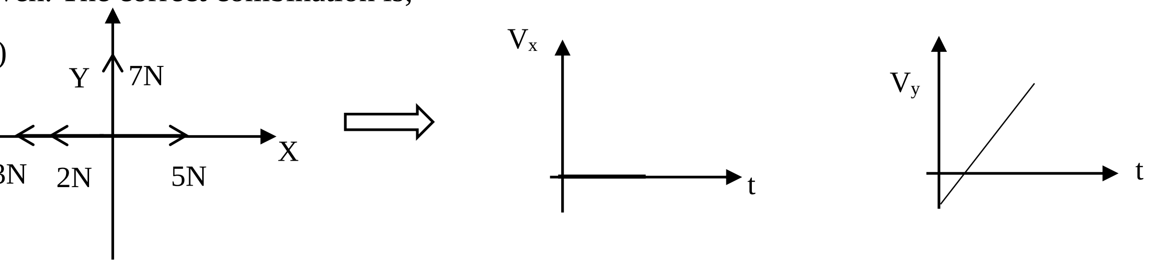
1) $l_0 = \frac{E_0 r_0 L}{E}$ 2) $l_0 = \frac{2E_0\,(r + R_0)}{E}$ 3) $l_0 = \frac{E(r_0 + R_0)L}{2E_0 R}$ 4) $l_0 = \frac{EL}{E_0(R + r_0)}$ 5) $l_0 = \frac{E_0 L r_0}{E(R + 2r_0)}$

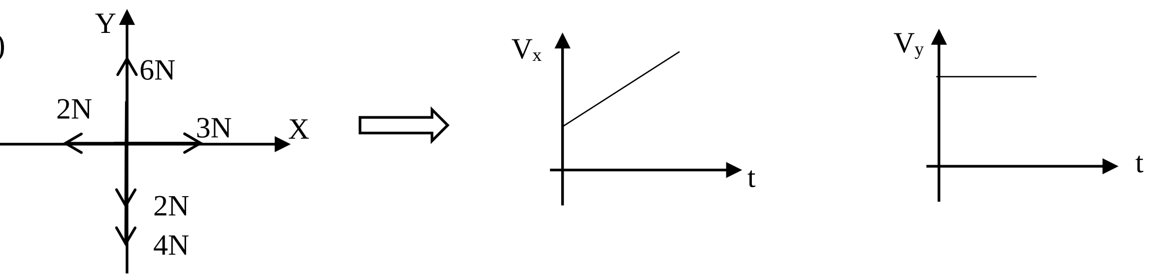
(45) A point object O is brought from P to Q as shown in figure,. The locus of the image of O is

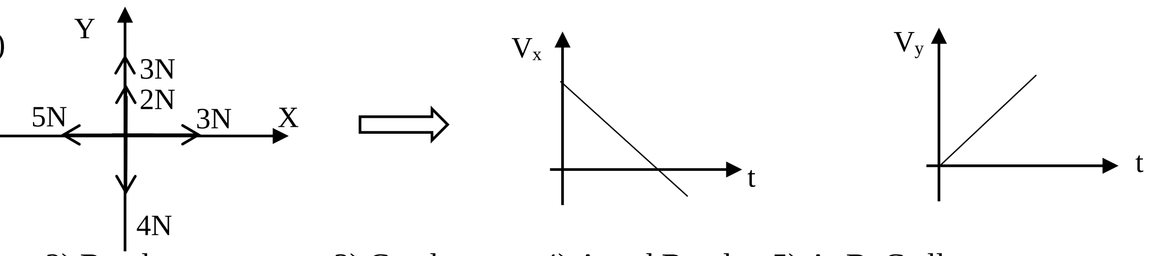


1) AB
2) AC
3) AD
4) AE
5) AF

(46) System of forces acting on body is given. the variation of velocity Vx and vertical velocity Vy are given. The correct combination is,

A)


B)


C)


1* A only 2) B only 3) C only 4) A and B only 5) A, B, C all

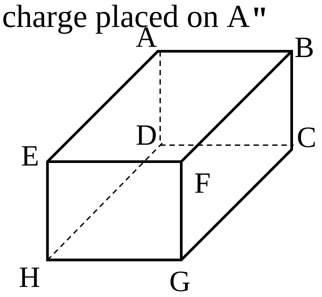
(47) Current sensitivity of a moving coil galvanometer can be increased by"

A)By increasing number of turns of coil.

B) By increasing flux density of radial magnetic field.
C) By reducing area of the coil.
The true statements,

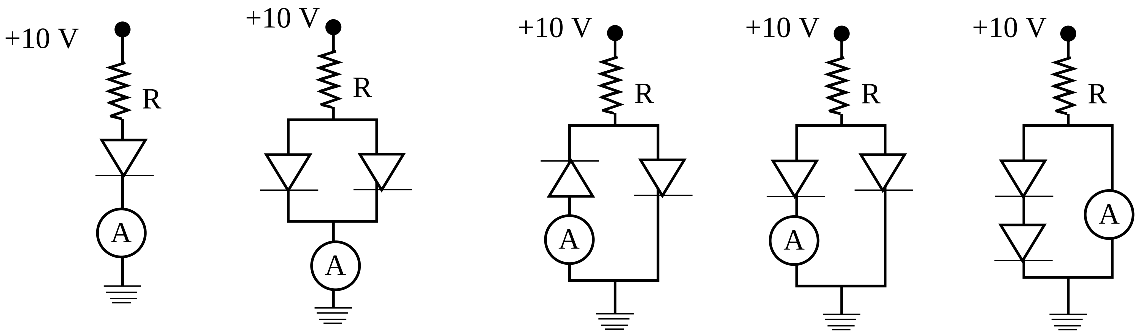
1) A only 2) A and B only 3) A and C only
4) Band C only 5) A, B, C all

(48) 7 charges. q, 2q,3q, 4q, 5q, 6q and 7q Are placed on B, C,D, E, F,G and H of cube as shown in figure. If the electric flux across e-f-g-h is $\frac{q}{3\varepsilon_0}$. What should be the charge placed on A"



1) q 2) $2q$
3) $3q$ 4) $4q$
5) $5q$

(49) All diodes in circuits are silicon and (A) is an ideal ammeter. Which circuit gives maximum and minimum ammeter reading respectively,



(A) (B) (C) (D) (E)

1) A and B 2) C and B 3) B and D 4) C and E 5) D and C

(50) A rod of mass M length L released from rest when t =0. As shown in the figure. It enters into uniform magnetic field when t = t_0. Which of the following graph gives correct variation of velocity of rod with time"