PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 46

Physics

1. A magnet suspended at 30° with magnetic meridian makes an angle of 45° with the

horizontal. What shall be the actual value of the angle of dip?

A. $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

B. $\tan^{-1}(\sqrt{3})$

C. 45°

D. 30°

Answer: A

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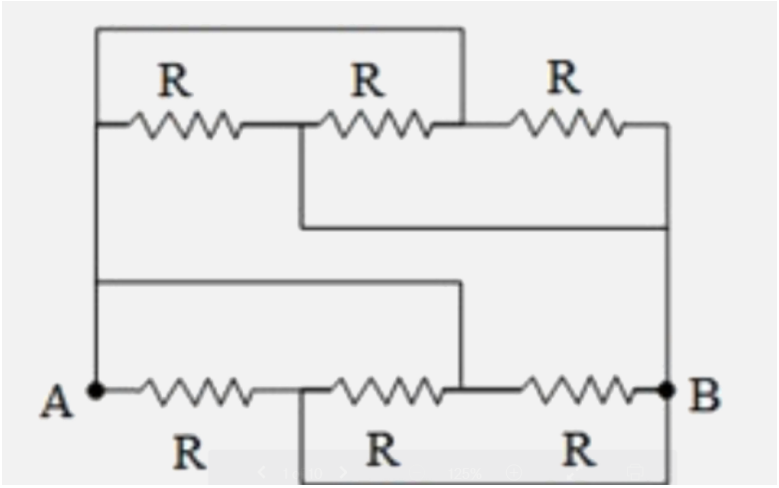
2. Equivalent resistance between points A & B in the given circuit is



A. $\frac{R}{6}$

B. $\frac{R}{3}$

C. $\frac{2R}{3}$

D. $\frac{5R}{3}$

Answer: A

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3. In an experiment to measure the internal resistance of a cell by potentiometer, it is found that the balance point is at a length of 2 m when the cell is shunted by a 4Ω resistance and at 3 m when cell is shunted by a 8Ω resistance. The internal resistance of cell is -

A. 12Ω

B. 8Ω

C. 16Ω

D. 1Ω

Answer: B

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4. The flux linked with a coil at any instant 't' is given by $\phi = 10t^2 - 50t + 250$

The induced emf at $t = 3s$ is

A. 10 V

B. 190 V

C. $-190V$

D. $-10V$

Answer: D

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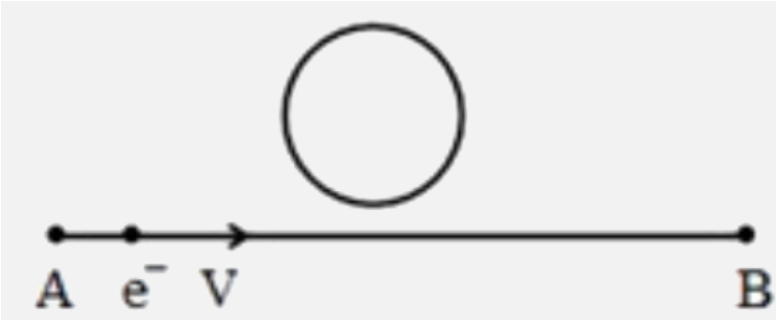
5. An electron moves along the line AB with constant velocity V which lies in the same plane as a circular loop of conducting wire , as

shown in the figure . What will be the direction of current induced in the loop ?



A. no current will be induced

B. induced current will be clockwise

C. induced current will be anticlockwise

D. the current will change direction as the electron passes by

Answer: D

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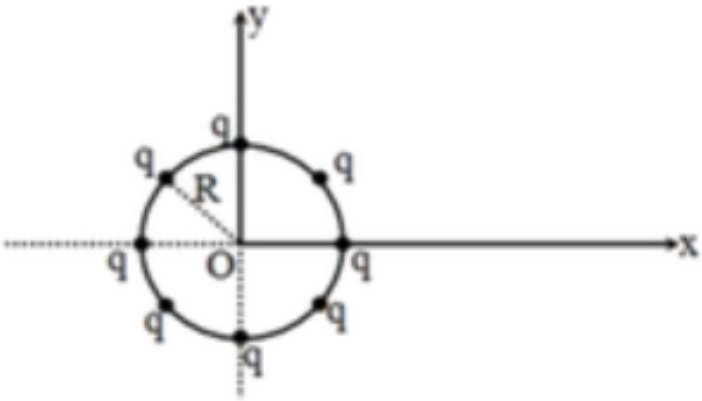
6. Eight charges each of value q are placed on a ring of radius R placed in x - y plane with origin at centre . A - q charge having mass m is projected from $z = \infty$ towards the centre of the ring with velocity v . The velocity of - q when it reaches the centre of ring is (neglect

gravity)



A. $\sqrt{\frac{8kq^2}{mR}}$

B. $\sqrt{\frac{8kq^2}{mR}+v}$

C. $\sqrt{\frac{16kq^2}{mR}+v^2}$

D. $\sqrt{\frac{16kq^2}{mR}+v}$

Answer: C

Watch Video Solution

7. A condenser of capacitance $10\mu F$ has been charged to $100V$. It is now connected to another uncharged condenser in parallel. The common potential becomes $40V$. The capacitance of another condenser is

A. $15\mu F$

B. $5\mu F$

C. $10\mu F$

D. $16umF$

Answer: A

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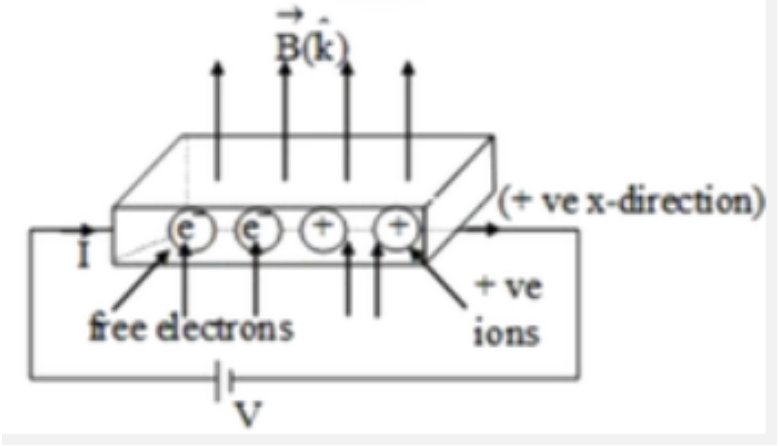
8. If magnetic field is along +z- axis and a potential difference is applied across an ionized gas chamber placed in the x - y plane



(i) Magnetic force on positive ions will act along + y axis

(ii) Magnetic force on electrons will act along + y axis

A. both (i) and (ii) are correct

B. both (i) and (ii) are wrong

C. only (i) is correct

D. only (ii) is correct

Answer: B

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9. A uniform magnetic field exist in a region which forms an equilateral triangle of side a. The magnetic field is perpendicular to the plane of the triangle . A charged q enters into this magnetic field perpendicular to a side with speed v. The charge enters from midpoint

and leaves the field from midpoint of other side. Magnetic induction in the triangles is

A. $\frac{mv}{qa}$

B. $\frac{2mv}{qa}$

C. $\frac{mv}{2qa}$

D. $\frac{mv}{4qa}$

Answer: B

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10. A star which appears blue will be

A. very cold

B. colder than the Sun

C. a black hole

D. hotter than the Sun

Answer: D

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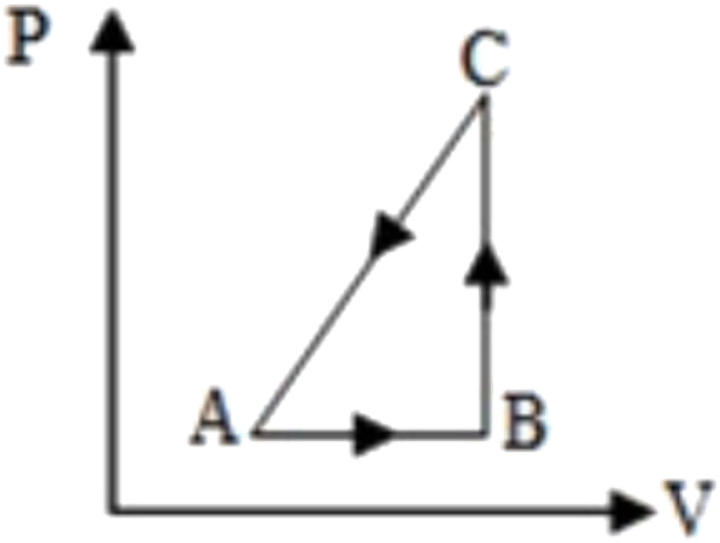
11. The P - V diagram of a system undergoing thermodynamic transformation is shown in figure . The work done on the system in going from $A \rightarrow B \rightarrow C$ is 50 J and 20 cal heat is given to the system . The change in internal energy between A and C is -



A. 34 J

B. 70 J

C. 84 J

D. 134 J

Answer: A

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12. The ratio of work done by an ideal diatomic gas to the heat supplied by the gas in an isobatic process is

A. $\frac{5}{7}$

B. $\frac{3}{5}$

C. $\frac{2}{7}$

D. $\frac{5}{3}$

Answer: C

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13. During the melting of a slab of ice at 273K at atmospheric pressure,

A. positive work is done by ice - water system on the atmosphere

B. positive work is done on the ice - water system by the atmosphere

C. the internal energy of the ice - water system decreases

D. the internal energy of the ice - water system remains same

Answer: B

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14. The reading of brass scale at room temperature is L_1 . Above room temperature reading is L_2 and below room temperature reading is L_3 . Then , relation between the readings is

A. $L_1 > L_2 > L_3$

B. $L_3 > L_1 > L_2$

C. $L_2 > L_3 > L_1$

D. $L_1 = L_2 = L_3$

Answer: B

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15. Thermometer A and B have ice points marked at 15° and 25° and steam points at 75° and 125° respectively. When thermometer A measures the temperature of a bath as 60°, the reading of B for the same bath is

A. 60°

B. 75°

C. 100°

D. 90°

Answer: C

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16. The speed of a wave in a streched string is $20ms^{-1}$ and its frequency is 50 Hz. Calculate the phase difference in radian between two points situated at a distance of 10 cm on the string.

A. $\frac{\pi}{2}$

B. π

C. $\frac{3\pi}{2}$

D. 2π

Answer: A

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17. A particle moves along a straight line path.

After some time it comes to rest. The motion

is with constant acceleration whose direction with respect to the direction of velocity is :

A. positive throughout motion

B. negative throughout motion

C. first positive then negative

D. first negative then negative

Answer: B

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18. Ratio of minimum kinetic energies of two projectiles of same mass is $4:1$. The ratio of the maximum height attained by them is also $4:1$. The ratio of their ranges would be

A. $16:1$

B. $4:1$

C. $8:1$

D. $2:1$

Answer: B

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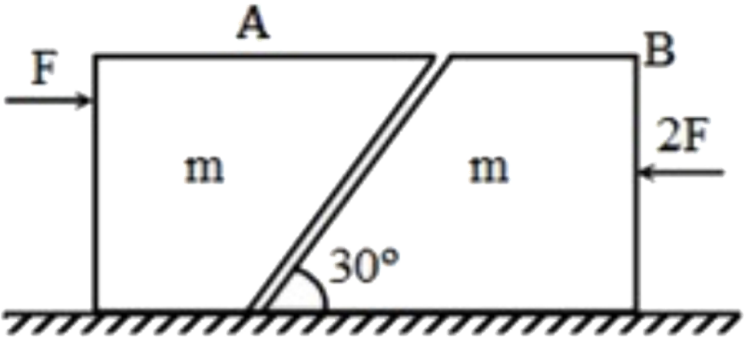
19. Two blocks 'A' and 'B' each of mass 'm' are placed on a smooth horizontal surface . Two horizontal force F and 2F are applied on the blocks A and B , respectively , as shown in figure . The block A does not slide on block B . The normal reaction acting between the two blocks is



A. F

B. $\frac{F}{2}$

C. $\frac{F}{\sqrt{3}}$

D. 3F

Answer: D

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20. A particle of mass 1 g moving with a velocity $\overrightarrow{v}_1 = 3\hat{i} - 2\hat{j}ms^{-1}$ experiences a perfectly in elastic collision with another

particle of mass 2 g and velocity $\overrightarrow{v}_2 = 4\hat{j} - 6\hat{k} ms^{-1}$. The velocity of the particle is

A. $\hat{i} + 2\hat{j} - 4\hat{k}$

B. $\hat{i} - 2\hat{j} + 4\hat{k}$

C. $\hat{i} - 2\hat{j} - 4\hat{k}$

D. $\hat{i} + 3.33\hat{j} + 4\hat{k}$

Answer: A

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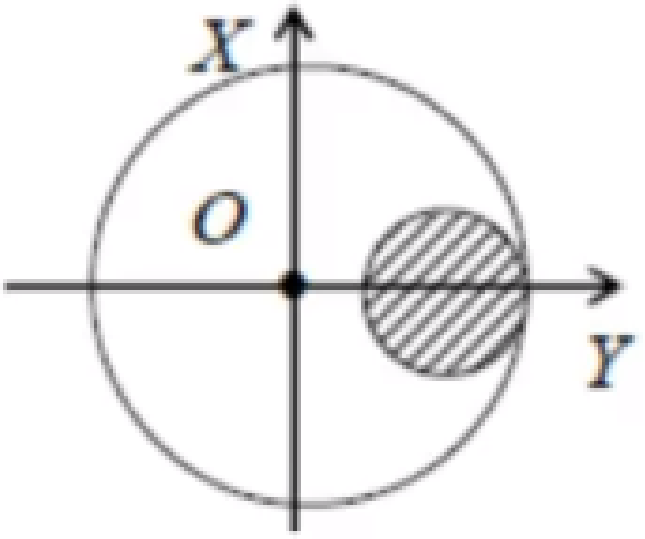
21. From a uniform circular plate of radius R, a small circular plate of radius R/4 is cut off as shown. If O is the centre of the complete plate, then the x coordinate of the new centre of mass of the remaining plate will be:



A. $-\frac{R}{20}$

B. $-\frac{R}{16}$

C. $-\frac{R}{15}$

D. $-\frac{R}{12}$

Answer: A

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22. If the external forces acting on a system have zero resultant, the centre of mass

A. must not move

B. must not accelerate

C. must move

D. may accelerate

Answer: B

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23. A particle of mass m moving with velocity $1m/s$ collides perfectly elastically with another stationary particle of mass $2m$. If the incident particle is deflected by 90°, the heavy

mass will make an angle θ with the initial direction of in equal to

A. 60°

B. 45°

C. 15°

D. 30°

Answer: D

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24. A stone hanging from a massless string of length 15m is projected horizontally with speed $\sqrt{147}ms^{-1}$ Then the Speed of the particle, at the point where tension in string equals the weight of particle, is

A. $10ms^{-1}$

B. $7ms^{-1}$

C. $12ms^{-1}$

D. none of these

Answer: B

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25. A satellite S is moving in an elliptical orbit around the earth. The mass of the satellite is very small compared to the mass of the earth.

A. the acceleration of S is always directed towards the centre of the earth

B. The angular momentum of S about the centre of the earth changes in direction , but its magnitude remains constant

C. the total mechanical energy of S varies periodically with time

D. the linear momentum of S remains constant in magnitude

Answer: A

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26. A projectile is projectile with velocity kv_e in vertically upward direction from the ground into the space (v_e is escape velocity and $k < 1$

). If air resistance is considered to be negligible then the maximum height from the centre of earth to which it can go, will be : (R =raduis of earth)

A. $\frac{R}{k^2+1}$

B. $\frac{R}{k^2-1}$

C. $\frac{R}{1-k^2}$

D. $\frac{R}{k+1}$

Answer: C

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27. Which of the following quantities are always positive in a simple harmonic motion?

A. $\vec{F} \cdot \vec{a}$

B. $\vec{v} \cdot \vec{r}$

C. $\vec{a} \cdot \vec{r}$

D. $\vec{F} \cdot \vec{r}$

Answer: A

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28. A body is executing S.H.M. when its displacement from the mean position is 4 cm and 5 cm, the corresponding velocity of the body is 10 cm/sec and 8 cm/sec. Then the time period of the body is

A. $2\pi s$

B. $\frac{\pi}{2}s$

C. πs

D. $\frac{3\pi}{2}s$

Answer: C

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29. Consider the equations

$$P = \lim_{\triangle s \to 0} \frac{F}{\triangle S} \text{ and } P_1 - P_2 = \rho g z$$

In an elevator accelerating upward

A. both the equations are valid

B. first is valid but not the second

C. second is valid but not the first

D. both are invalid

Answer: B

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30. A water drop is divided into 8 equal droplets. The pressure difference between the inner and outer side of the big drop will be

A. same as for smaller droplet

B. $\frac{1}{2}$ of that for smaller droplet

C. $\frac{1}{4}$ of that for smaller droplet

D. twice that for smaller droplet

Answer: B

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31. The moment of inertia of a body depends upon

A. mass only

B. angular velocity only

C. distribution of particles only

D. mass and distribution of mass about the axis

Answer: D

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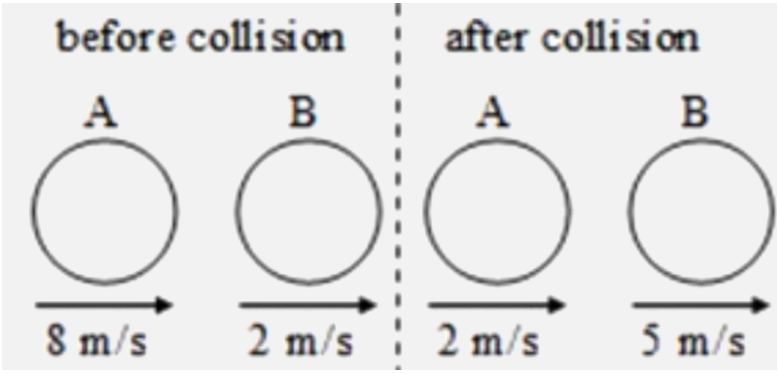
32. The two diagrams show the situation before and after a collision between two spheres A and B of equal radii moving along the same straight line on a smooth horizontal surface. The coefficient of restitution e is



A. $\frac{2}{3}$

B. $\frac{1}{2}$

C. $\frac{1}{3}$

D. $\frac{1}{4}$

Answer: B

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33. An α - particle after passing through a potential difference of V volts collides with a nucleus . If the atomic number of the nucleus

is Z then the distance of closest approach of α – particle to the nucleus will be

A. $14.4\frac{Z}{V}\text{Å}$

B. $14.4\frac{Z}{V}m$

C. $14.4\frac{Z}{V}cm$

D. all of these

Answer: A

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34. Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region?

A. Brackett series

B. Lyman series

C. Balmer series

D. Paschan series

Answer: C

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35. The activity of a sample of a radioactive meterial is A_1 , at time t_1 , and A_2 at time $t_2(t_2 > t_1)$. If its mean life T, then

A. $A_1 t_1 = A_2 t_2$

B. $\frac{A_1 + A_2}{t_2 - t_1}$ = constant

C. $A_2 = A_1 e^{\frac{t_1 - t_2}{T}}$

D. $A_2 = A_1 e^{\left(\frac{t_1}{T t_2}\right)}$

Answer: C

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36. The rediation emitted when an electron jumps from $n = 3 \rightarrow n = 2$ orbit in a hydrogen atom falls on a metal to produce photoelectron. The electron from the metal surface with maximum kinetic energy are made to move perpendicular to a magnetic field of $(1/320)T$ in a radius of $10^{-3}m$. Find (a) the kinetic energy of the electrons, (b) Work function of the metal , and (c) wavelength of radiation.

A. 1.03eV

B. 1.89eV

C. 0.86eV

D. 2.03 eV

Answer: A

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37. When the photons of energy hv fall on a photosensitive metallic surface of work function hv_0, electrons are emitted are from jthe surface. The most energetic electron

coming out of the surfece have kinetic energy equal to

A. the kinetic energy of all emitted electrons is hv_0

B. the kinetic energy of all emitted electrons is $h(v - v_0)$

C. the kinetic energy of all fastest electrons is $h(h - v_0)$

D. the kinetic energy of all emitted electrons is hv

Answer: C

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38. Input waveforms A and B as shown in Fig-I are applied to the combination of gates as shown in Fig-II. Which of the waveforms shown in Fig.(i) to (iv) correctly represents the output waveform?

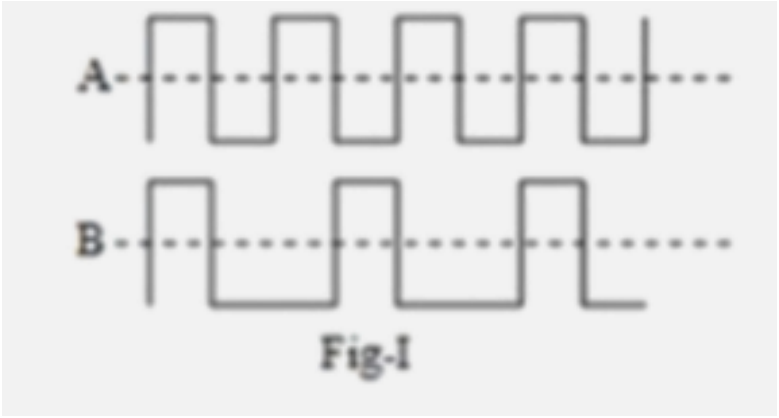

Fig-I

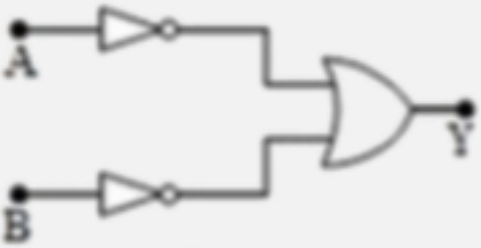

Fig-II

Fig-(i)

Fig-(ii)

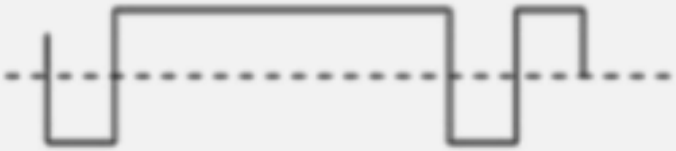

Fig-(iii)

Fig-(iv)

A. Fig .(i)

B. Fig .(ii)

C. Fig .(iii)

D. Fig .(iv)

Answer: C

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39. To get an output 1 from the circuit shown in the figure, the input must be

A. $A = 0, B = 1, C = 0$

B. $A = 1, B = 0, C = 0$

C. $A = 1, B = 0, C = 1$

D. $A = 1, B = 1, C = 0$

Answer: C

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40. In a transistor, the value of $\alpha = 0.9$. Then the value of β is:

A. 1

B. 0.09

C. 0.9

D. 9

Answer: D

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41. A common emitter transistor amplifier has a current gain of 50. If the load resistance is $4k\Omega$, and input resistance is 500Ω, the voltage gain of amplifier is.

A. 160

B. 200

C. 400

D. none

Answer: C

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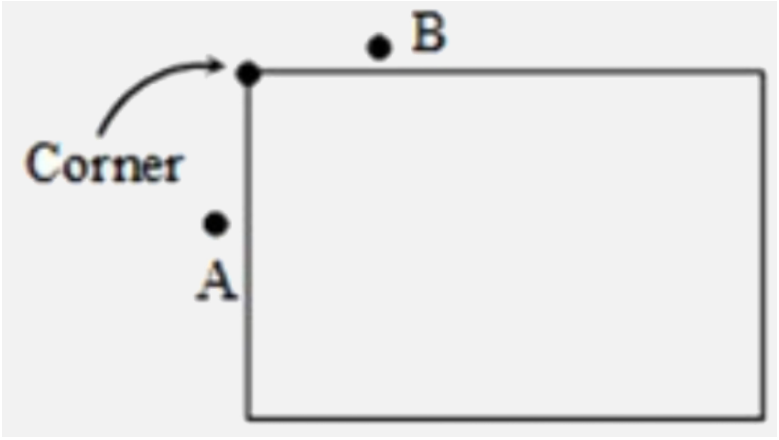
42. A 90° corner is made from a transparent optical material with a refractive index such that A cannot see B when he is standing behind the corner. Minimum value of refractive index is



A. $\sqrt{3}$

B. $\sqrt{2}$

C. $\sqrt{5}$

D. $\sqrt{7}$

Answer: B

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43. A crown glass prism of refracting angle 8° is combined with a flint glass prism to obtain deviation without dispersion. If the refractive indicates for red and violet rays for the crown

glass are 1.514 and 1.524 and for the flint glass are 1.645 and 1.665 respectivey, find the angle of flint glass prism and net deviation.

A. 3°

B. 4°

C. 4.5°

D. 5°

Answer: A

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44. An unpolarised beam of intensity I_0 is incident on a pair of nicols making an angle of 60° with each other. The intensity of light emerging from the pair is

A. I_0

B. $\frac{I_0}{2}$

C. $\frac{I_0}{4}$

D. $\frac{I_0}{8}$

Answer: D

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45. A slit of width a is illuminated by white light. For red light $\left(\lambda = 6500\text{Å}\right)$, the first minima is obtained at $\theta = 30^\circ$. Then the value of a will be

A. 3250Å

B. $6.5 \times 10^{-4} cm$

C. $1.3 \mu m$

D. $2.6 \times 10^{-4} cm$

Answer: C

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46. A magnet suspended at 30° with magnetic meridian makes an angle of 45° with the horizontal. What shall be the actual value of the angle of dip?

A. $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

B. $\tan^{-1}(\sqrt{3})$

C. 45°

D. 30°

Answer: A

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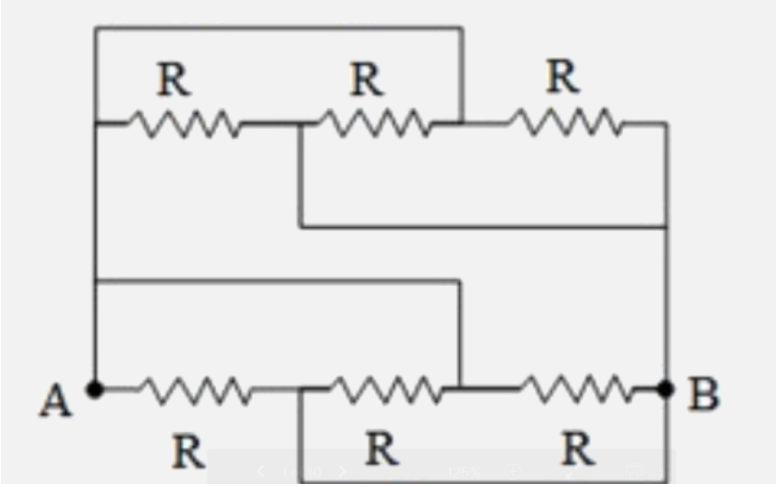
47. Equivalent resistance between points A & B in the given circuit is



A. $\frac{R}{6}$

B. $\frac{R}{3}$

C. $\frac{2R}{3}$

D. $\frac{5R}{3}$

Answer: A

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48. In an experiment to measure the internal resistance of a cell by potentiometer, it is found that the balance point is at a length of 2 m when the cell is shunted by a 4Ω

resistance and at 3 m when cell is shunted by a 8Ω resistance. The internal resistance of cell is -

A. 12Ω

B. 8Ω

C. 16Ω

D. 1Ω

Answer: B

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49. The flux linked with a coil at any instant 't' is given by $\phi = 10t^2 - 50t + 250$

The induced emf at $t = 3s$ is

A. 10 V

B. 190 V

C. $-190V$

D. $-10V$

Answer: D

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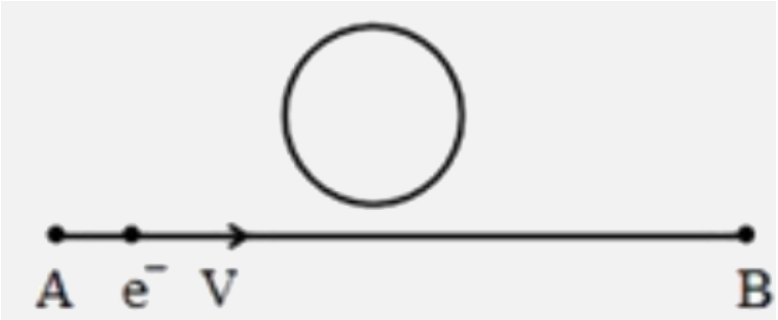
50. An electron moves along the line AB with constant velocity V which lies in the same plane as a circular loop of conducting wire , as shown in the figure . What will be the direction of current induced in the loop ?



A. no current will be induced

B. induced current will be clockwise

C. induced current will be anticlockwise

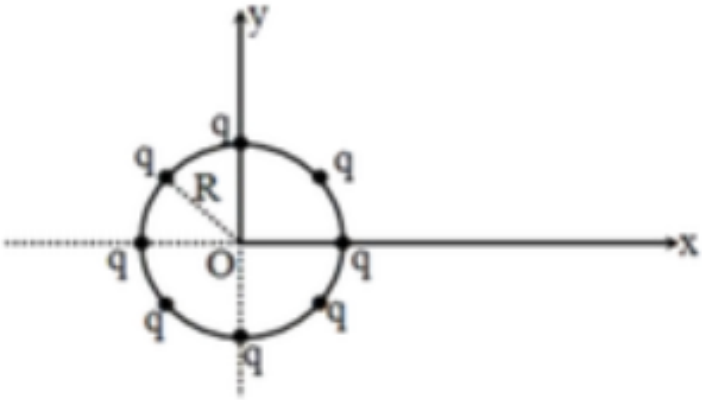
D. the current will change direction as the electron passes by

Answer: D

 Watch Video Solution

51. Eight charges each of value q are placed on a ring of radius R placed in x - y plane with origin at centre . A - q charge having mass m is projected from $z = \infty$ towards the centre of the ring with velocity v . The velocity of - q

when it reaches the centre of ring is (neglect gravity)



A. $\sqrt{\frac{8kq^2}{mR}}$

B. $\sqrt{\frac{8kq^2}{mR}} + v$

C. $\sqrt{\frac{16kq^2}{mR} + v^2}$

D. $\sqrt{\frac{16kq^2}{mR}} + v$

Answer: C

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52. A condenser of capacitance $10\mu F$ has been charged to $100V$. It is now connected to another uncharged condenser in parallel. The common potential becomes $40V$. The capacitance of another condenser is

A. $15\mu F$

B. $5\mu F$

C. $10\mu F$

D. $16umF$

Answer: A

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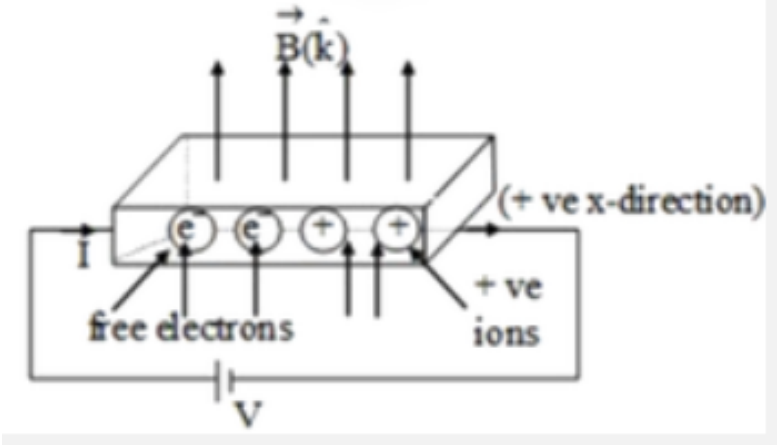

(i) Magnetic force on positive ions will act along + y axis

(ii) Magnetic force on electrons will act along + y axis

A. both (i) and (ii) are correct

B. both (i) and (ii) are wrong

C. only (i) is correct

D. only (ii) is correct

Answer: B

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54. A uniform magnetic field exist in a region which forms an equilateral triangle of side a. The magnetic field is perpendicular to the plane of the triangle . A charged q enters into this magnetic field perpendicular to a side with speed v. The charge enters from midpoint

and leaves the field from midpoint of other side. Magnetic induction in the triangles is

A. $\frac{mv}{qa}$

B. $\frac{2mv}{qa}$

C. $\frac{mv}{2qa}$

D. $\frac{mv}{4qa}$

Answer: B

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A. very cold

B. colder than the Sun

C. a black hole

D. hotter than the Sun

Answer: D

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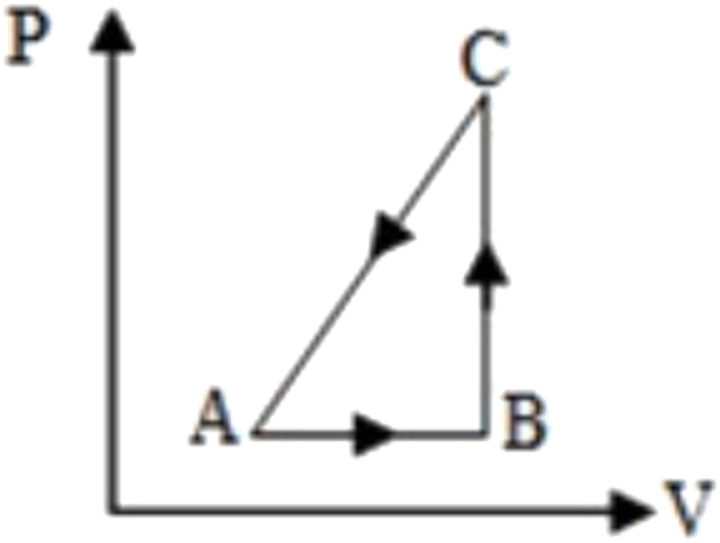
56. The P - V diagram of a system undergoing thermodynamic transformation is shown in figure . The work done on the system in going from $A \rightarrow B \rightarrow C$ is 50 J and 20 cal heat is given to the system . The change in internal energy between A and C is -



A. 34 J

B. 70 J

C. 84 J

D. 134 J

Answer: A

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57. The ratio of work done by an ideal diatomic gas to the heat supplied by the gas in an isobatic process is

A. $\frac{5}{7}$

B. $\frac{3}{5}$

C. $\frac{2}{7}$

D. $\frac{5}{3}$

Answer: C

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58. During the melting of a slab of ice at 273K at atmospheric pressure,

A. positive work is done by ice - water system on the atmosphere

B. positive work is done on the ice - water system by the atmosphere

C. the internal energy of the ice - water system decreases

D. the internal energy of the ice - water system remains same

Answer: B

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59. The reading of brass scale at room temperature is L_1 . Above room temperature reading is L_2 and below room temperature reading is L_3 . Then , relation between the readings is

A. $L_1 > L_2 > L_3$

B. $L_3 > L_1 > L_2$

C. $L_2 > L_3 > L_1$

D. $L_1 = L_2 = L_3$

Answer: B

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60. Thermometer A and B have ice points marked at 15° and 25° and steam points at 75° and 125° respectively. When thermometer A measures the temperature of a bath as 60°, the reading of B for the same bath is

A. 60°

B. 75°

C. 100°

D. 90°

Answer: C

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61. The speed of a wave in a streched string is $20ms^{-1}$ and its frequency is 50 Hz. Calculate the phase difference in radian between two points situated at a distance of 10 cm on the string.

A. $\frac{\pi}{2}$

B. π

C. $\frac{3\pi}{2}$

D. 2π

Answer: A

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62. A particle moves along a straight line path.

After some time it comes to rest. The motion

is with constant acceleration whose direction with respect to the direction of velocity is :

A. positive throughout motion

B. negative throughout motion

C. first positive then negative

D. first negative then negative

Answer: B

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63. Ratio of minimum kinetic energies of two projectiles of same mass is $4:1$. The ratio of the maximum height attained by them is also $4:1$. The ratio of their ranges would be

A. $16:1$

B. $4:1$

C. $8:1$

D. $2:1$

Answer: B

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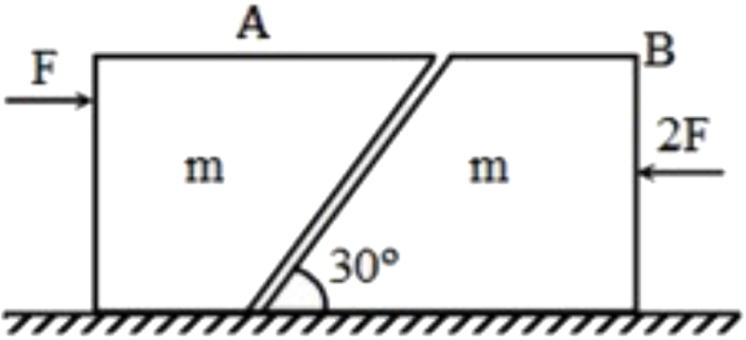
64. Two blocks 'A' and 'B' each of mass 'm' are placed on a smooth horizontal surface . Two horizontal force F and 2F are applied on the blocks A and B , respectively , as shown in figure . The block A does not slide on block B . The normal reaction acting between the two blocks is



A. F

B. $\frac{F}{2}$

C. $\frac{F}{\sqrt{3}}$

D. 3F

Answer: D

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65. A particle of mass $1.0g$ moving with velocity $v_1 = 3.0i - 2.0j$ experiences a perfectly inelastic collision with another

particle of mass $2.0g$ and velocity $v_2 = 4.0j - 6.0k$. Find the velocity of the formed particle (both the vector v and its modulus), if the components of the vectors v_1 and v_2 are given in the SI units.

A. $\hat{i} + 2\hat{j} - 4\hat{k}$

B. $\hat{i} - 2\hat{j} + 4\hat{k}$

C. $\hat{i} - 2\hat{j} - 4\hat{k}$

D. $\hat{i} + 3.33\hat{j} + 4\hat{k}$

Answer: A

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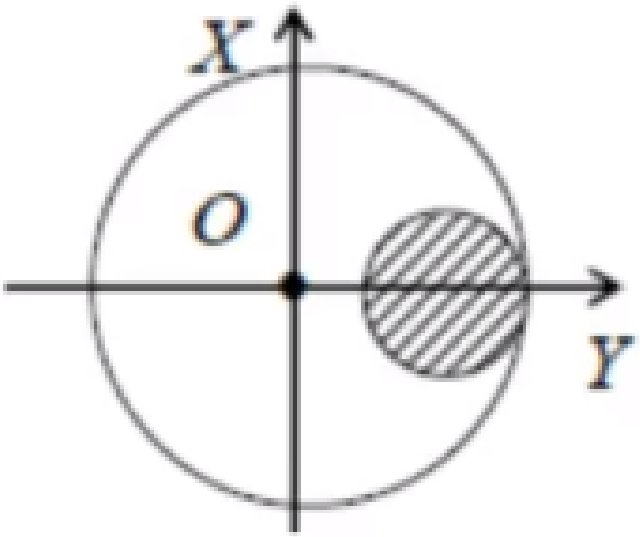
66. From a uniform circular plate of radius R, a small circular plate of radius R/4 is cut off as shown. If O is the centre of the complete plate, then the x coordinate of the new centre of

mass of the remaining plate will be:



A. $-\frac{R}{20}$

B. $-\frac{R}{16}$

C. $-\frac{R}{15}$

D. $-\frac{R}{12}$

Answer: A

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67. If the external forces acting on a system have zero resultant, the centre of mass

A. must not move

B. must not accelerate

C. must move

D. may accelerate

Answer: B

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68. A partical of mass m moving with velocity $1m/s$ collides perfectly elastically with another particle of mass $2m$. If the incident particle is deflected by 90°. The heavy mass will make and angle θ with the initial direction of m equal to:

A. 60°

B. 45°

C. 15°

D. 30°

Answer: D

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69. A stone hanging from a massless string of length 15m is projected horizontally with speed $\sqrt{147}ms^{-1}$ Then the Speed of the

particle, at the point where tension in string equals the weight of particle, is

A. $10ms^{-1}$

B. $7ms^{-1}$

C. $12ms^{-1}$

D. none of these

Answer: B

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70. A satellite S is moving in an elliptical orbit around the earth. The mass of the satellite is very small compared to the mass of the earth.

A. the acceleration of S is always directed towards the centre of the earth

B. The angular momentum of S about the centre of the earth changes in direction , but its magnitude remains constant

C. the total mechanical energy of S varies periodically with time

D. the linear momentum of S remains constant in magnitude

Answer: A

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71. A projectile is projectile with velocity kv_e in vertically upward direction from the ground into the space (v_e is escape velocity and $k < 1$). If air resistance is considered to be negligible then the maximum height from the

centre of earth to which it can go, will be : (R =raduis of earth)

A. $\frac{R}{k^2+1}$

B. $\frac{R}{k^2-1}$

C. $\frac{R}{1-k^2}$

D. $\frac{R}{k+1}$

Answer: C

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72. Which of the following quantities are always positive in a simple harmonic motion?

A. $\vec{F} \cdot \vec{a}$

B. $\vec{v} \cdot \vec{r}$

C. $\vec{a} \cdot \vec{r}$

D. $\vec{F} \cdot \vec{r}$

Answer: A

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73. A body is executing S.H.M. when its displacement from the mean position is 4 cm and 5 cm, the corresponding velocity of the body is 10 cm/sec and 8 cm/sec. Then the time period of the body is

A. $2\pi s$

B. $\frac{\pi}{2} s$

C. πs

D. $\frac{3\pi}{2} s$

Answer: C

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74. Consider the equations

$$P = \lim_{\triangle s \to 0} \frac{F}{\triangle S} \text{ and } P_1 - P_2 = \rho g z$$

In an elevator accelerating upward

A. both the equations are valid

B. first is valid but not the second

C. second is valid but not the first

D. both are invalid

Answer: B

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75. A water drop is divided into 8 equal droplets. The pressure difference between the inner and outer side of the big drop will be

A. same as for smaller droplet

B. $\frac{1}{2}$ of that for smaller droplet

C. $\frac{1}{4}$ of that for smaller droplet

D. twice that for smaller droplet

Answer: B

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76. Moment of inertia of a body depends upon

A. mass only

B. angular velocity only

C. distribution of particles only

D. mass and distribution of mass about the axis

Answer: D

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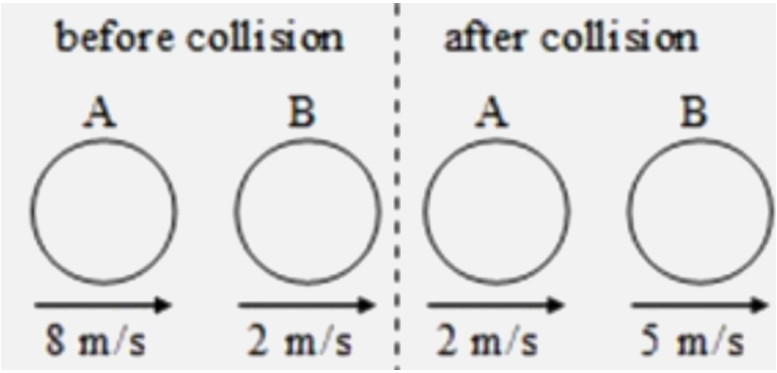
77. The two diagrams show the situation before and after a collision between two spheres A and B of equal radii moving along the same straight line on a smooth horizontal surface. The coefficient of restitution e is



A. $\frac{2}{3}$

B. $\frac{1}{2}$

C. $\frac{1}{3}$

D. $\frac{1}{4}$

Answer: B

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78. An α - particle after passing through a potential difference of V volts collides with a nucleus . If the atomic number of the nucleus

is Z then the distance of closest approach of α – particle to the nucleus will be

A. $14.4\frac{Z}{V}\text{Å}$

B. $14.4\frac{Z}{V}m$

C. $14.4\frac{Z}{V}cm$

D. all of these

Answer: A

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79. Which of the following series fall in the visible range of electromagnetic spectrum of a hydrogen atom ?

A. Brackett series

B. Lyman series

C. Balmer series

D. Paschan series

Answer: C

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80. The activity of a sample of a radioactive meterial is A_1 , at time t_1 , and A_2 at time $t_2(t_2 > t_1)$. If its mean life T, then

A. $A_1 t_1 = A_2 t_2$

B. $\frac{A_1 + A_2}{t_2 - t_1}$ = constant

C. $A_2 = A_1 e^{\frac{t_1 - t_2}{T}}$

D. $A_2 = A_1 e^{\left(\frac{t_1}{T t_2}\right)}$

Answer: C

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81. The radiation emitted when an electron jumps from $n = 3 \rightarrow n = 2$ orbit in a hydrogen atom falls on a metal to produce photoelectron. The electron from the metal surface with maximum kinetic energy are made to move perpendicular to a magnetic field of $(1/320)T$ in a radius of $10^{-3}m$. Find (a) the kinetic energy of the electrons, (b) Work function of the metal , and (c) wavelength of radiation.

A. 1.03eV

B. 1.89eV

C. 0.86eV

D. 2.03 eV

Answer: A

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82. When the photons of energy hv fall on a photosensitive metallic surface of work function hv_0, electrons are emitted are from jthe surface. The most energetic electron

coming out of the surfece have kinetic energy equal to

A. the kinetic energy of all emitted electrons is hv_0

B. the kinetic energy of all emitted electrons is $h(v - v_0)$

C. the kinetic energy of all fastest electrons is $h(h - v_0)$

D. the kinetic energy of all emitted electrons is hv

Answer: C

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83. Input waveforms A and B as shown in Fig-I are applied to the combination of gates as shown in Fig-II. Which of the waveforms shown in Fig.(i) to (iv) correctly represents the output waveform?

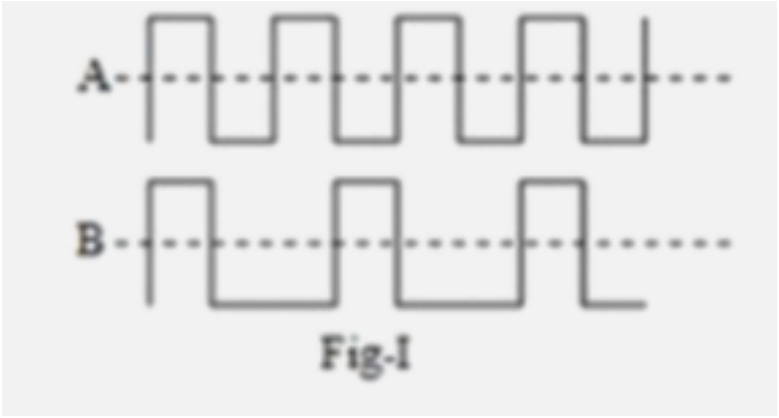

Fig-I

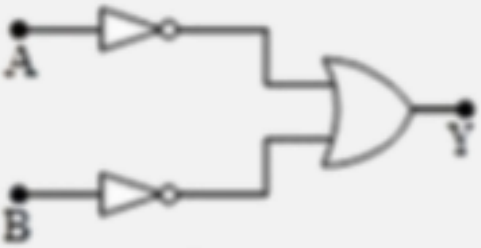

Fig-II

Fig-(i)

Fig-(ii)

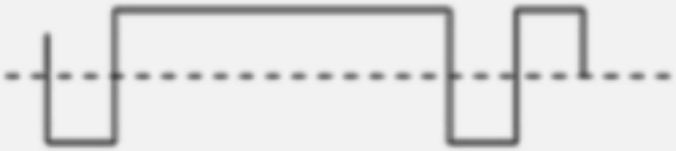

Fig-(iii)

Fig-(iv)

A. Fig .(i)

B. Fig .(ii)

C. Fig .(iii)

D. Fig .(iv)

Answer: C

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84. To get an output 1 from the circuit shown in the figure, the input must be

A. $A = 0, B = 1, C = 0$

B. $A = 1, B = 0, C = 0$

C. $A = 1, B = 0, C = 1$

D. $A = 1, B = 1, C = 0$

Answer: C

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85. For a transistor the value of α is 0.9. β value is

A. 1

B. 0.09

C. 0.9

D. 9

Answer: D

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86. A common emitter transistor amplifier has a current gain of 50. If the load resistance is $4k\Omega$, and input resistance is 500Ω, the voltage gain of amplifier is.

A. 160

B. 200

C. 400

D. none

Answer: C

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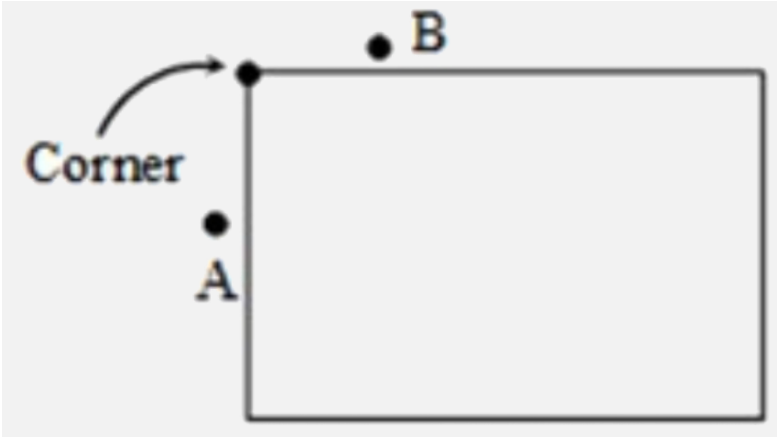
87. A 90° corner is made from a transparent optical material with a refractive index such that A cannot see B when he is standing behind the corner. Minimum value of refractive index is



A. $\sqrt{3}$

B. $\sqrt{2}$

C. $\sqrt{5}$

D. $\sqrt{7}$

Answer: B

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88. A crown glass prism of refracting angle 8° is combined with a flint glass prism to obtain deviation without dispersion. If the refractive indicates for red and violet rays for the crown

glass are 1.514 and 1.524 and for the flint glass are 1.645 and 1.665 respectivey, find the angle of flint glass prism and net deviation.

A. 3°

B. 4°

C. 4.5°

D. 5°

Answer: A

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89. An unpolarised beam of intensity I_0 is incident on a pair of nicols making an angle of 60° with each other. The intensity of light emerging from the pair is

A. I_0

B. $\frac{I_0}{2}$

C. $\frac{I_0}{4}$

D. $\frac{I_0}{8}$

Answer: D

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90. A slit of width a is illuminiated by white light. The first diffraction minimum for light of $\lambda = 6500\text{Å}$ is formed at $\theta = 30^\circ$, then the width (a) of the slit is

A. 3250Å

B. $6.5 \times 10^{-4} cm$

C. $1.3 \mu m$

D. $2.6 \times 10^{-4} cm$

Answer: C

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