PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET TEST 79

Physics

1. The energy of the reaction $Li^7 + p \rightarrow 2He^4$ is (the binding energy per nucleon in Li^7 and

He^4 nuclei are 5.60 and $7.60MeV$ respectively.)

A. 19.6 MeV

B. 2.4 MeV

C. 8.4 MeB

D. 17.28 MeV

Answer: D

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2. The work function of the metal A is equal to the ionization energy of the hydrogen atom in the first excited state. The work function of the metal B is equal to the ionization energy of He^+ ion in the second orbit. Photons of the same energy E are incident on both A and B the maximum kinetic energy of photoelectrons emitted from A is twice that of photoelectrons emitted from B. Value of E (in eV) is

A. 23.8 eV

B. 20.8 eV

C. 32.2 eV

D. 24.6 eV

Answer: A

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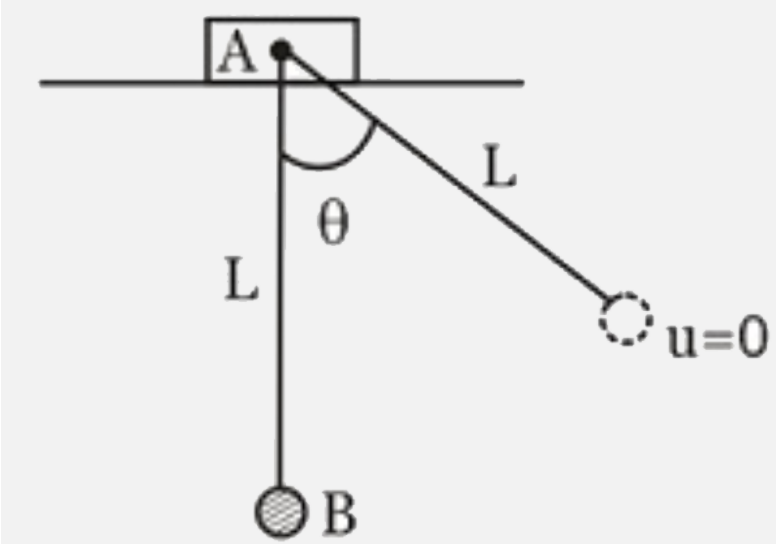
3. A small ball of mass M is suspended with light inelastic string of length L from a block A of same mass which can move on a smooth horizontal surface as shown in the figure. The wall is displaced by the angleθ from

equilibrium position & then released.



Maximum velocity of block during subsequent motion of the system after release of ball is

A. $[gL(1-\cos\theta)]^{1/2}$

B. $[2gL(1-\cos\theta)]^{-1/2}$

C. $[gL\cos\theta]^{1/2}$

D. Insufficient information to decide

Answer: A

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4. The masses of five balls at rest and lying at equal distance in a straight line are in geometrical progression with ratio 2 and their coefficients of restitution are each 2/3 . If the first ball is started towards the second with

velocity u, then the velocity communicated to 5^{th} ball is

A. $\frac{5}{9}u$

B. $\left(\frac{5}{9}\right)^2 u$

C. $\left(\frac{5}{9}\right)^3 u$

D. $\left(\frac{5}{9}\right)^4 u$

Answer: D

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5. A simple pendulum is oscillating with angular displacement 90° For what angle with vertical the acceleration of bob direction horizontal?

A. $\sin^{-1}\left(\frac{1}{3}\right)$

B. $\cos^{-1}\left(\frac{1}{3}\right)$

C. $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

D. $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$

Answer: D

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6. Two particles A and B separated by a distance $2R$ are moving counter clockwise along the same circular path of radius R each with uniform speed v. At time $t = 0$, A is given a tangential acceleration of magnitude $a = \frac{32v^2}{25\pi R}$ in the same direction of initial velocity

A. The time - lapse for the two bodies to collide is $\frac{6\pi R}{5V}$

B. The angle covered by (A) is $\frac{9\pi}{4}$

C. Angular velocity of A is $\frac{11V}{5R}$

D. Radial acceleration of A is $\frac{289V^2}{5R}$

Answer: B

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7. Two bulbs when connected in parallel to a source take 100 W each. The total power consumed when they are connected in series with the same source is

A. 25 W

B. 50 W

C. 100 W

D. 200 W

Answer: B

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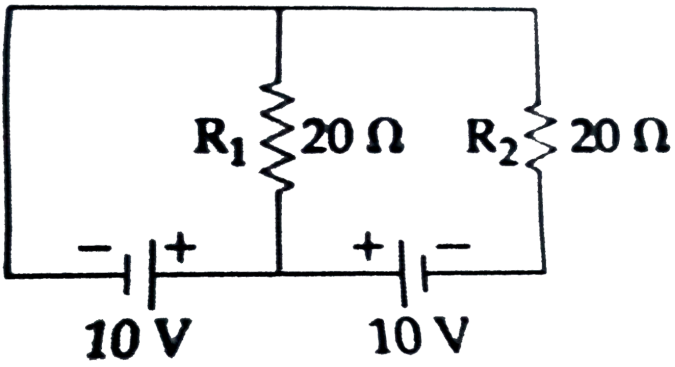
8. In the given circuit the cells have zero internal resistance. The currents (in Amperes) passing through resistance R_1 and R_2

respectively, are :



A. 0, 1

B. 2, 2

C. 0.5 , 0

D. 1 , 2

Answer: C

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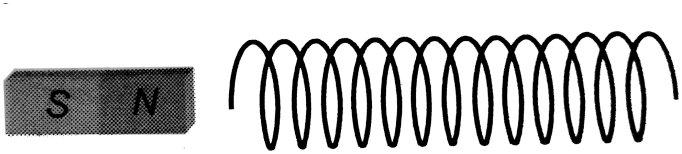
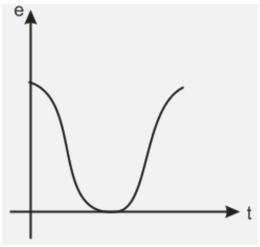
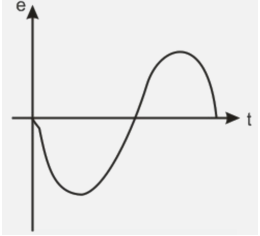
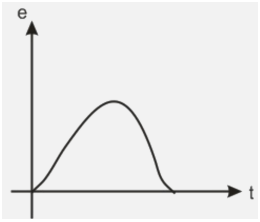
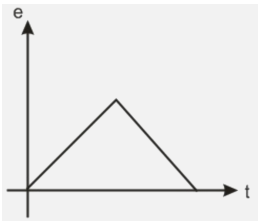
9. The variation of induced emf (E) with time (t) in a coil if a short bar magnet is moved along its axis with a constant velocity is best represent as



A. 

B. 

C. 

D. 

Answer: B

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10. For an ideal step-down transformer, the quantity which is constant for both the coils is

A. Current in the coils

B. Voltage across the coils

C. Resistance of coils

D. Power in the coils

Answer: D

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11. Two small identical spheres having charges $+10\mu C$ and $-90\mu C$ attract each other with a force of F newton . If they are kept in contant and then separated by the same distance, the new force between them is -

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

B. 16 F

C. $\frac{16F}{9}$

D. 9F

Answer: C

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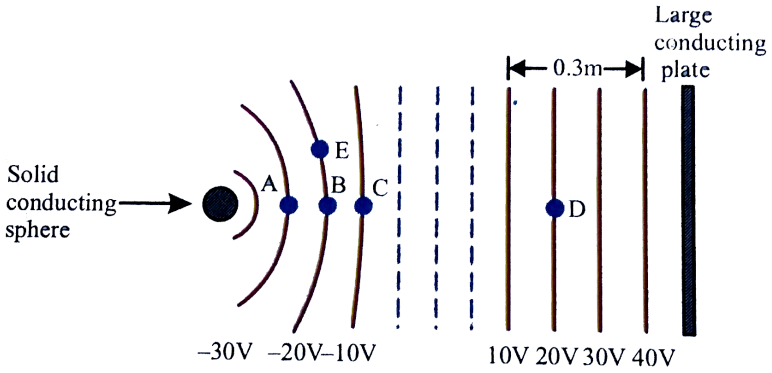
12. The sketch below show cross section so equipotential surfaces between two charged.Conductors that are shown in solid black.Some points on the equipotenital surfaces .near the conductors are marked as $A, B, C \ldots .$ The arrangements lies in air (Take $\varepsilon_0 = 8.85 \times 10^{-12} C^2 / Nm^2$]



Surfaces charge density of the plate is equal to

A. $8.85 \times 10^{-10} Cm^{-2}$

B. $-8.85 \times 10^{-10} Cm^{-2}$

C. $17.7 \times 10^{-10} Cm^{-2}$

D. $-17.7 \times 10^{-10} Cm^{-2}$

Answer: A

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13. Two bodies of masses 2 kg and 8 kg are separated by a distance of 9 m. The point where the resultant gravitational field intensity is zero at the distance of

A. 4.5 m from each mass

B. 6 m from 2 kg

C. 6 m from 8 kg

D. 2.5 m from 2 kg

Answer: C

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14. What should be the angular velocity of earth about its own axis so that the weight of the body at the equator would become $\frac{3}{4}$ th of its present value ?

A. $\frac{1}{400} rads^{-1}$

B. $\frac{1}{800} rads^{-1}$

C. $\frac{1}{1600} rads^{-1}$

D. $\frac{1}{3200} rads^{-1}$

Answer: C

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15. A black body at $1373^\circ C$ emits maximum energy corresponding to a wavelength of 1.78 microns. The temperature of the moon for which $\lambda_m = 14$ micron wood be

A. $62.6^\circ C$

B. $-58.9^\circ C$

C. $-63.7^\circ C$

D. $64.2^{\circ} C$

Answer: C

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16. A Carnot engine operates with a source at 500 K and sink at 375 K. Engine consumes 600 kcal of heat per cycle. The heat rejected to sink per cycle is

A. 250 kcal

B. 350 kcal

C. 450 kcal

D. 550 kcal

Answer: C

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17. Pressure P, Volume V and temperature T of a certain material are related by the $P = \frac{\alpha T^2}{V}$. Here α is constant. Work done by

the material when temparature changes from T_0 to $2T_0$ while pressure remains constant is :

A. $3\alpha T_0^2$

B. $5\alpha T_0^2$

C. $\frac{2}{3}\alpha T_0^2$

D. $7\alpha T_0^2$

Answer: A

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18. A charged particle with charge q enters a region of constant, uniform and mututally orthogonal fields $\overrightarrow{E}$ and $\overrightarrow{B}$ with a velocity $\overrightarrow{v}$ perpendicular to both $\overrightarrow{E}$ and $\overrightarrow{B}$, and comes out without any change in magnitude or direction of $\overrightarrow{v}$. Then

A. $\overrightarrow{v} = \dfrac{\overrightarrow{B} \times \overrightarrow{E}}{E^2}$

B. $\overrightarrow{v} = \dfrac{\overrightarrow{E} \times \overrightarrow{B}}{B^2}$

C. $\overrightarrow{v} = \dfrac{\overrightarrow{B} \times \overrightarrow{E}}{B^2}$

D. $\overrightarrow{v} = \dfrac{\overrightarrow{E} \times \overrightarrow{B}}{E^2}$

Answer: B

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19. A current- carrying straight wire is kept along the axis of a circular loop carrying a current. The straight wire

A. will exert an inward force on the circular loop

B. will exert an outward force on the circular loop

C. Will wxert a force on the circular loop parallel to itself

D. Will not exert any force on the circular loop

Answer: D

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20. A magnet of moment $4Am^2$ is kept suspended in a magnetic field of induction

$5 \times 10^{-5} T$. The workdone in rotating it through 180° is

A. $4 \times 10^{-4} J$

B. $5 \times 10^{-4} J$

C. $2 \times 10^{-4} J$

D. $10^{-4} J$

Answer: A

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21. A car accelerates from rest at a constant rate for some time after which it decelerates at a constant rate β to come to rest. If the total time elapsed is t, the maximum velocity acquired by the car is given by :

A. $\left(\frac{\alpha^2 - \beta^2}{\alpha\beta}\right)t$

B. $\left(\frac{\alpha^2 + \beta^2}{\alpha\beta}\right)t$

C. $\frac{(\alpha + \beta)t}{\alpha\beta}$

D. $\frac{\alpha\beta t}{\alpha + \beta}$

Answer: D

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22. To a stationary man, rain appears to be falling at his back at an angle 30° with the vertical. As he starts moving forward with a speed of $0.5ms^{-1}$, he finds that the rain is falling vertically.

The speed of rain with respect to the stationary man is.

A. $0.5ms^{-1}$

B. $1ms^{-1}$

C. $\frac{\sqrt{3}}{2} ms^{-1}$

D. $\frac{1}{\sqrt{3}} ms^{-1}$

Answer: B

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23. A liquid of density p is coming out of a hose pipe of radius a with horizontal speed v and hits a mesh . 50 % of the liquid passes through the mesh unaffected . 25 % comes

back with the same speed .The resultant pressure on the mesh will be:

A. $\frac{1}{2}\rho v^2$

B. ρv^2

C. $\frac{3}{4}\rho v^2$

D. $\frac{1}{4}\rho v^2$

Answer: C

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24. In the figure shown , all surface are smooth . Acceleration of mass '4m' , when the system Is released from rest will be

A. $\frac{2g}{9}$

B. $\frac{4g}{9}$

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

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

Answer: B

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25. There is a stream of neutrons with a kinetic energy of $0.0327eV$. If the half-life of neutrons is $700s$, what fraction of neutrons will decay before they travel is distance of $10m$? Given mass of neutron $= 1.676 \times 10^{-27}kg$.

A. 3.96×10^{-6}

B. 3.90×10^{-6}

C. 3.85×10^{-6}

D. 4.86×10^{-6}

Answer: A

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26. A radioactive element decays by $\beta -$ emission. If mass of parent and daughter nuclide are m_1 and m_2 respectively, calculate energy liberated during the emission.

A. $[m_1 - m_2 - 2m_e]c^2$

B. $[m_2 - m_1 - 2m_e]c^2$

C. $[m_e - m_2 - 2m_1]c^2$

D. $[m_2 - m_e - 2m_1]c^2$

Answer: A

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27. A particle is subjected to two simple harmonic motion along x and y-directions according to equations x = 4sin100πt and y = 3sin$100\pi t$ Choose the correct statement –

A. Motion of particle will be on a ellipse

B. Motion of the particle will be on a straight line

C. Particle will execute SHM of amplitude 5

D. Particle will not execute SHM

Answer: B

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28. One end of a long mettalic wire of length L is tied to the ceiling. The other end is tied to massless spring of spring constant K. A mass

M hangs freely from the free end of the spring. The area of cross-section and Young's modulus of the wire are A and Y respectively. If the mass is slightly pulled down and released, it will oscillate with a time period T equal to

A. $2\pi\left(\frac{m}{K}\right)$

B. $2\pi\left[\frac{(YA+KL)m}{YAK}\right]^{\frac{1}{2}}$

C. $2\pi\frac{mYA}{KL}$

D. $2\pi\frac{mL}{YA}$

Answer: B

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29. Given that a photon of light of wavelength $10,000A$ has an energy equal to 1.23 eV. When light of wavelength $5000A$ and intenstiy I_0 falls on a photoelectric cell, the saturation current is $0.40 \times 10^{-6} A$ and the stopping potential is 1.36V, then the work function is

A. 0.43 eV

B. 0.55 eV

C. 1.10 eV

D. 1.53 eV

Answer: C

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30. Light of wavelength 488 nm is produced by an argon laser which is used in the photoelectric effect. When light from this spectral line is incident on the emitter, the stopping (cut - off) potential of photoelectrons is 0.38 V. Find the work

function of the material from which the emitter is made.

A. 1.38 eV

B. 2.55 eV

C. 2.17 eV

D. 2.93 eV

Answer: C

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31. A drop of mercury of radius 2 mm is split into 8 identical droplets. Find the increase in surface energy. Surface tension of mercury $= 0.465 Jm^{-2}$

A. $23.4\mu J$

B. $18.5\mu J$

C. $26.8\mu J$

D. $16.8\mu J$

Answer: A

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32. Mercury is completely filled in a rectangular take of height 72 cm. The atmospheric pressure at the place is 72 cm. of Hg. Find the distance in cm of point of application from bottom of tank of the net force , on the inner surface of the side vertical wall of tank.

A. 32 cm

B. 16 cm

C. 74 cm

D. 42 cm

Answer: A

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33. A convex lens if in contact with concave lens. The magnitude of the ratio of their focal length is $\frac{2}{3}$. Their equivalent focal length is 30 cm. What are their individual focal lengths?

A. $-75, 50$

B. $-10, 15$

C. $75, 50$

D. $-15, 10$

Answer: D

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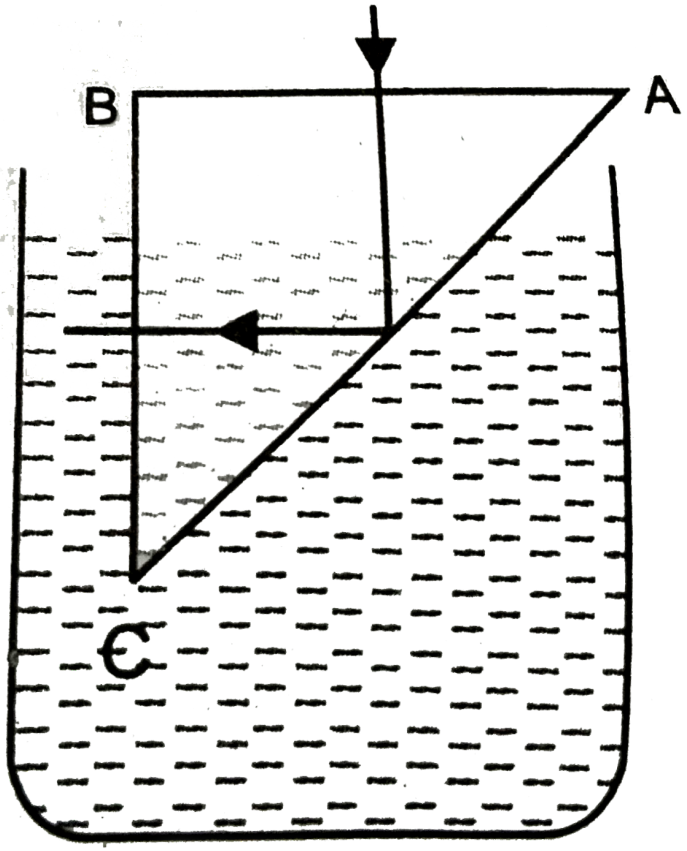
34. A glass prism of refractive index 1.5 is immersed in water (refractive index 4/3). A light beam incident normally on the face AB

is totally reflected to reach the face BC, Fig. if

:



.

A. $\sin\theta \geq \frac{8}{9}$

B. $\sin\theta \geq \frac{2}{3}$

C. $\sin\theta = \frac{\sqrt{3}}{2}$

D. $\frac{2}{3} < \sin\theta < \frac{8}{9}$

Answer: A

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35. A solid sphere of mass M and radius R having tmoment of inertia I about its diameter is recast into a solid dise of radius r and thickness t. The moment of inertia of the disc about an axis passing the edge and

perpendicular to the plane remains I. Then R and r are related as

A. $\frac{2}{\sqrt{15}}R$

B. $\frac{2}{\sqrt{5}}R$

C. $\frac{3}{\sqrt{15}}R$

D. $\frac{\sqrt{3}}{\sqrt{15}}R$

Answer: A

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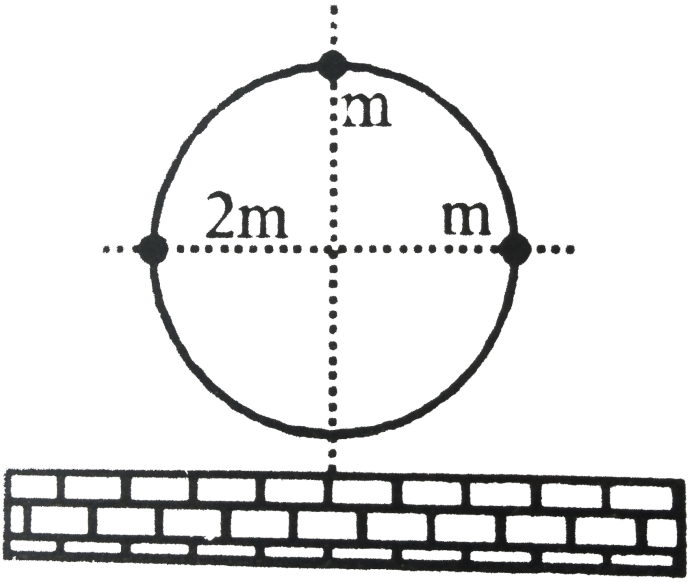
36. A ring mass m and radius R has three particle attached to the ring as shown in the figure. The centre of the centre v_0. Find the kinetic energy of the system. (Slipping is absent).



A. $6mv_0^2$

B. $12mv_0^2$

C. $4mv_0^2$

D. $8mv_0^2$

Answer: A

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37. Which of the following statements is not true ?

A. The resistance of intrinsic semiconductors decreases with increase of temperature

B. Doping pure Si with trivalent impurities give p - type semiconductors

C. The majority carriers in n - type semiconductors are holes

D. A p - n junction can act as a semiconductor diode

Answer: C

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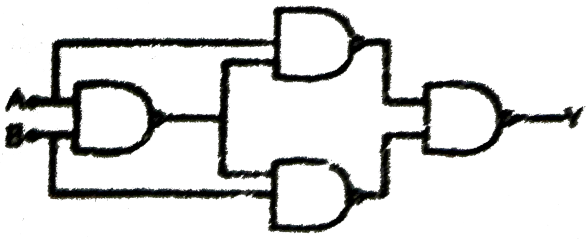
38. Select the outputs Y of the combination of gates shown below for inputs $A = 1, B = 0, A = 1, B = 1$ and $A = 0, B = 0$ respectively :-



A. (0,1,1)

B. (1,0,1)

C. (1,1,1)

D. (1,0,0)

Answer: D

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39. The coefficient of apparent expansion of a liquid when determined using two different vessle A and B are γ_1 and γ_2, respectily. If the coefficient of linerar expansion of vesel A is α.

Find the coefficient of linear expension of the vessel B.

A. $\frac{\alpha\gamma_1 + \gamma_2}{\gamma_1 + \gamma_2}$

B. $\frac{\gamma_1 - \gamma_2}{2\alpha}$

C. $\frac{\gamma_1 - \gamma_2 + \alpha}{3\alpha}$

D. $\frac{\gamma_1 - \gamma_2}{3} + \alpha$

Answer: D

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40. Density of a liquid in CGS system is $0.625 \frac{g}{cm^3}$. What is its magnitude is SI system?

A. 0.625

B. 0.0625

C. 0.00625

D. 625

Answer: D

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41. In YDSE intensity at central maxima is I_0 The ratio $\frac{I}{I_0}$, at path difference $\frac{\lambda}{8}$ on the screen from central maxima , is closed to

A. 0.74

B. 0.8

C. 0.9

D. 0.85

Answer: D

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42. Unpolarized light of intensity I_0 is incident on surface of a block of glass at brewster's angle. In that case, which one of the following statements is true-

A. transmitted light is partially polarized with intensity $\frac{I_0}{2}$

B. transmitted light is completely polarized with intensity less than $\frac{I_0}{2}$

C. reflected light is partially polarized with intensity $\frac{I_0}{2}$

D. reflected light is completely polarized with intensity less than $\frac{I_0}{2}$

Answer: D

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43. A closed organ pipe and an open organ pipe of same length produce 2beats when they are set into viberations simultaneously in their fundamental mode. The length of open organ pipe is now halved and of closed organ

pipe is doubled, the nunber of beats produced wil be

A. 7

B. 4

C. 8

D. 2

Answer: A

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44. A tuning fork of frequency 480 Hz produces 10 beats per second when sounded with a vibrating sonometer string. What must have been the frequency of the string if a slight increase in tension produces lesser beats per second than before

A. 490 Hz

B. 470 Hz

C. 460 Hz

D. 480 Hz

Answer: B

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45. A $0.5kg$ block slides from the point A on a horizontal track with an initial speed $3m/s$ towards a weightless horizontal spring of length $1m$ and force constant $2N/m$. The part AB of the track is frictionless and the part BC has the coefficient of static and kinetic friction as '0.22' and 0.20 respectively. If the distances AB and BD are $2m$ and $2.14m$

respectively, find total distance through which the block moves before it comes to rest completely. `(g=10 m//s^(2)).

A. 2.5 m

B. 4.42 m

C. 4. 24 m

D. 2.44 m

Answer: C

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