PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 51

Physics

1. The horizontal component of the earth's magnetic field at any place is $0.36 \times 10^{-4} Wbm^{-2}$ If the angle of dip at

that place is 60° then the value of the vertical component of earth's magnetic field will be (in Wbm^{-2})

A. 0.12×10^{-4}

B. 0.24×10^{-4}

C. 0.40×10^{-4}

D. 0.62×10^{-4}

Answer: D

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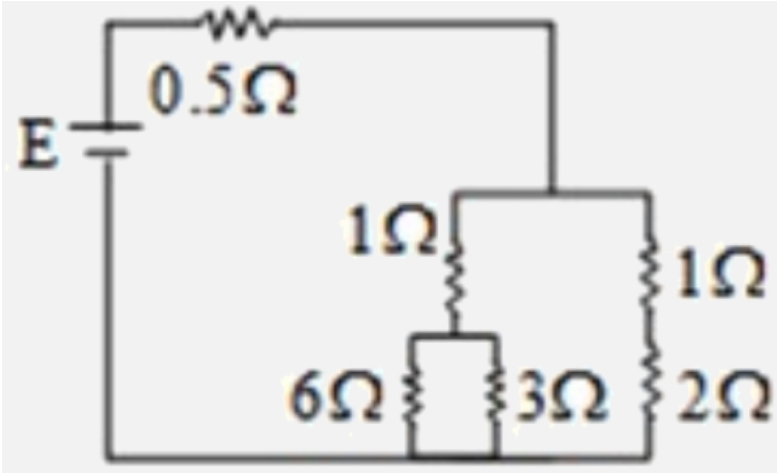
2. In the given circuit diagram , current in 2Ω resistor is 2 A , then the current in 6Ω resistor Will be



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

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

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

D. $2A$

Answer: B

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3. In every experiment with potentiometer in the null point state, the potential difference between the ends of the galvanometer is

A. zero

B. infinite

C. equal to the potential difference of the cell

D. unknown

Answer: A

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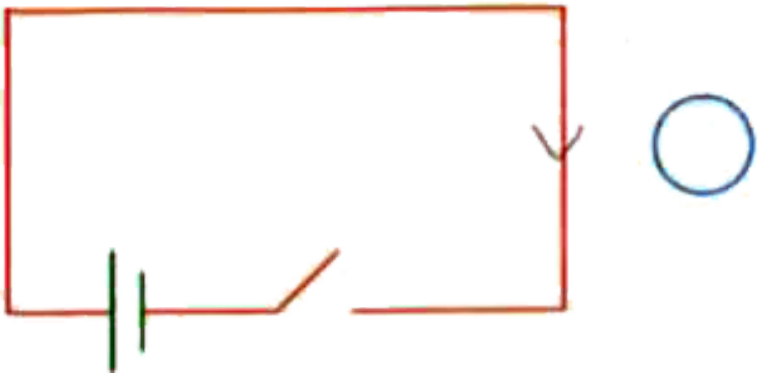
4. Consider the situation shown in figure. If the switch is closed and after some time it is opened again, the closed loop will show



A. an anticlockwise current - pulse

B. a clockwise current - pulse

C. an anticlockwise current - pulse and then a clockwise current - pulse

D. a clockwise current - pulse and then an anticlockwise current - pulse

Answer: D

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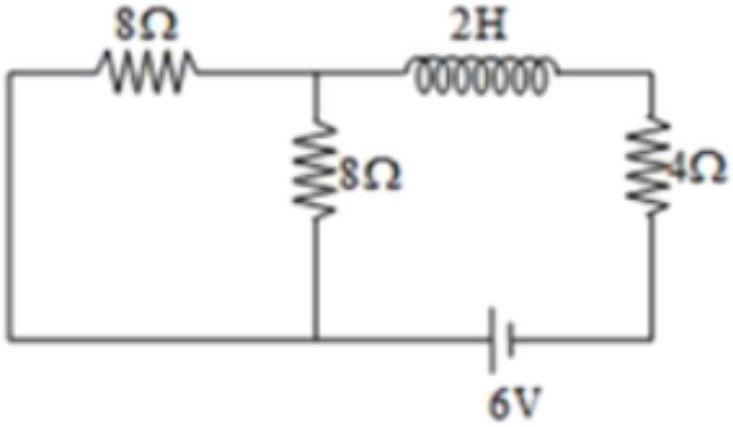
5. In the circuit shown in figure, time constant and steady state current will be



A. 0.25 s , 0.75 A

B. 0.75 s , 0.25 A

C. 0.25 s, 0.25 A

D. 0.5 s , 0.5 A

Answer: A

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6. An electric dipole of dipole moment $\vec{P}$ is placed in a uniform electric field $\vec{E}$ such that $\vec{P}$ is perpendicular to $\vec{E}$ The work done to. turn the dipole through an angle of 180° is

A. zero

B. pE

C. 2pE

D. $\sqrt{2}pE$

Answer: A

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7. A parallel plate air capacitor is connected to a battery. After charging fully, the battery is disconnected and the plates are pnlled apart to increase their separation. Which of the following statements is correct ?

A. increase in the stored energy

B. decrease in the potential difference

C. decrease in the electric field

D. increase in the capacitance

Answer: A

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8. An electron files into a homogeneous magnetic field of 10^{-3} perpendicular to the force lines. The velocity of the electron is

$v = 4 \times 10^7 ms^{-1}$ what is the tangential acceleration of electron in the magnetic field ?

A. $7 \times 10^{15} ms^{-2}$

B. $7 \times 10^{13} ms^{-2}$

C. $7 \times 10^{14} ms^{-2}$

D. zero

Answer: D

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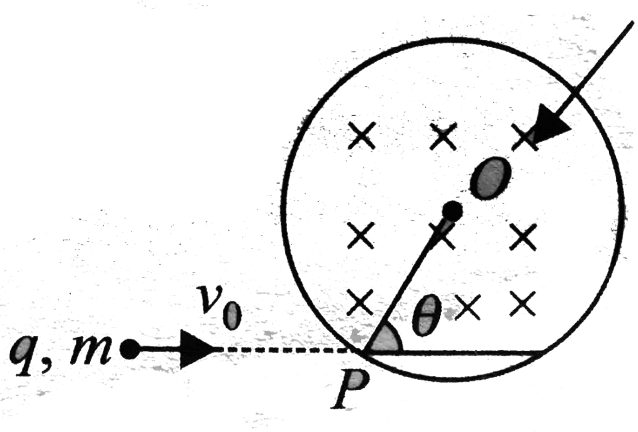
9. A particle of charge q and mass m is projected with a velocity v_0 toward a circular region having uniform magnetic field B perpendicular and into the plane of paper from point P as shown in Fig. 1.136. R is the radius and O is the center of the circular region. If the line OP makes an angle θ with the direction of v_0 then the value of v_0 so that

particle passes through O is



A. $\frac{qBR}{m \sin \theta}$

B. $\frac{qBR}{2m \sin \theta}$

C. $\frac{2qBR}{m \sin \theta}$

D. $\frac{3qBR}{2m \sin \theta}$

Answer: B

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10. Solar radiation emitted by sun resembles that emitted by a body at a temperature of $6000K$ Maximum intensity is emitted at a wavelength of about $4800A^{\circ}$ If the sun was cooled down from $6000K$ to $3000K$ then the peak intensity would occurs at a wavelength of

.

A. $6000Å$

B. $9600Å$

C. 2400Å

D. 19200Å

Answer: B

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11. The pressure of given mass of a gas in a thermodynamic system is changed in such a way that 20 joule of heat is released from the gas and 8 joule of work is done on the gas. If

the initial internal energy of the gas was 30 joule then final internal energy will be

A. 2 J

B. 42 J

C. 18 J

D. 58 J

Answer: C

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12. An ideal refrigerator has a freezer at a temperature of $-13^{\circ}C$. The coefficient of performance of the engine is 5. The temperature of the air (to which heat is rejected) will be

A. $325^{\circ}C$

B. $325K$

C. $39^{\circ}C$

D. $320^{\circ}C$

Answer: C

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13. An ideal diatomic gas occupies a volume V_1 at a pressure P_1 The gas undergoes a process in which the pressure is proportional to the volume . At the end of process the root mean square speed of the gas molecules has doubled From its initial value then the heat supplied to the gas in the given process is

A. $7P_1V_1$

B. $8P_1V_1$

C. $9P_1V_1$

D. $10P_1V_1$

Answer: C

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14. If a bimetallic strip is heated it will

A. bend towards the metal with lower thermal expansion coefficient

B. bend towards the metal with higher thermal expansion coefficient

C. not bend at all

D. twist itself into a helix

Answer: A

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15. Ice point and steam point on a particular scale reads 10° and 80° respectively . The

temperature on $.^\circ F$ Scale when temperature on new scale is 45° is

A. $50^\circ F$

B. $112^\circ F$

C. $122^\circ F$

D. $138^\circ F$

Answer: C

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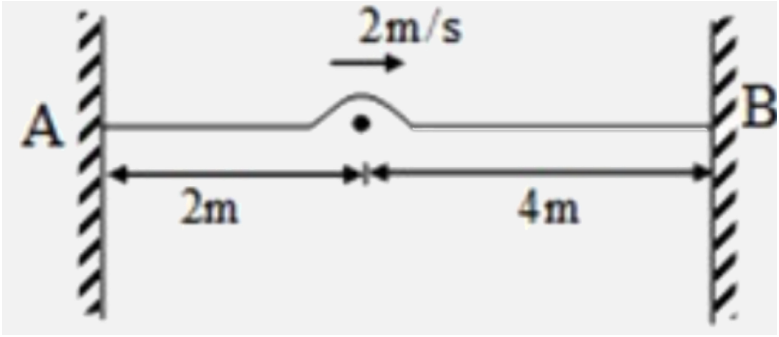
16. A string is tied at two rigid supports . A pulse is generated on the string as shown in figure . Minimum time after which string will regain its shape as shown in figure (Neglect the time during reflection)



A. 2 s

B. 4 s

C. 6 s

D. none of these

Answer: C

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17. Motion of the particle is non uniform when

A. direction of velocity changes

B. magnitude of velocity changes

C. speed changes

D. all of the above

Answer: D

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18. A projectile is given an initial velocity of $\left(\hat{i}+2\hat{j}\right)$ The Cartesian equation of its path is $\left(g=10ms^{-1}\right)$ (Here , $\hat{i}$ is the unit vector along horizontal and $\hat{j}$ is unit vector vertically upwards)

A. $y=2x-5x^2$

B. $y=x-5x^2$

C. $4y = 2x - 5x^2$

D. $y = 2x - 25x^2$

Answer: A

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19. The force of kinetic friction does not depend on

A. the relative velocity of the two surfaces in contact.

B. nature of the surface in contact.

C. normal reaction on the moving body

D. all of the above

Answer: A

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20. A sphere of mass m moves with a velocity 2v and collides inelastically with another identical sphere of mass m. After collision the first mass moves with velocity v in a direction

perpendicular to the initial direction of motion . Find the speed of the second sphere after collision .

A. v

B. $v\sqrt{5}$

C. $\frac{2}{\sqrt{3}}v$

D. $\frac{v}{\sqrt{3}}$

Answer: B

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21. As observed in the laboratory system , a 6 MeV proton is incident on a stationary 12 C target. The velocity of centre of mass of the system is (Take mass of proton to be 1 amu)

A. $2.6 \times 10^6 ms^{-1}$

B. $6.2 \times 10^6 ms^{-1}$

C. $10 \times 10^6 ms^{-1}$

D. $10 ms^{-1}$

Answer: A

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22. An object is project with a speed $10ms^{-1}$ at an angle of 30° with the horizontal. It breaks into n equal fragments during its motion . One fragment strikes the ground at a distance of $\sqrt{3}m$ from the point of projection. The centre of mass of the remaining fragments strikes the ground at a distance of $7\sqrt{3}m$ from the point of projection . If all fragments strike the ground at the same time , Find the value of n.

A. 2

B. 3

C. 4

D. 525

Answer: B

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23. A ball moving with a velocity v hits a massive wall moving towards the ball with a velocity a. An elastic impact lasts for time $\triangle t$

A. the average elastic force acting on the ball is $\frac{m(u+v)}{\Delta t}$

B. the average elastic force acting on the ball is $\frac{2m(u+v)}{\Delta t}$

C. the kinetic energy of the ball increases by mu (u +v)

D. the kinetic energy of the ball remains the same after the collision .

Answer: B

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24. A point on the periphery of a rotating disc has its acceleration vector making angle of 30° with the velocity . The ratio $(a_c / a_t (a_c$ "is centripetal acceleration and a_1 is tangential acceleration ") equals

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

B. $\frac{\sqrt{3}}{2}$

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

D. $\sqrt{3}$

Answer: C

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25. The work done to take a particle of mass m from surface of earth to a height equal to 2R is

A. 2mgR

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

C. 3mgR

D. $\frac{2mgR}{3}$

Answer: D

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26. A satellite which is geostationary in a particular orbit is taken to another orbit. Its distance from the centre of earth in new orbit is 2 times that of the earlier orbit. The time period in the second orbit is

A. 24 h

B. 48 h

C. $48\sqrt{2}h$

D. $\frac{48}{\sqrt{2}}h$

Answer: C

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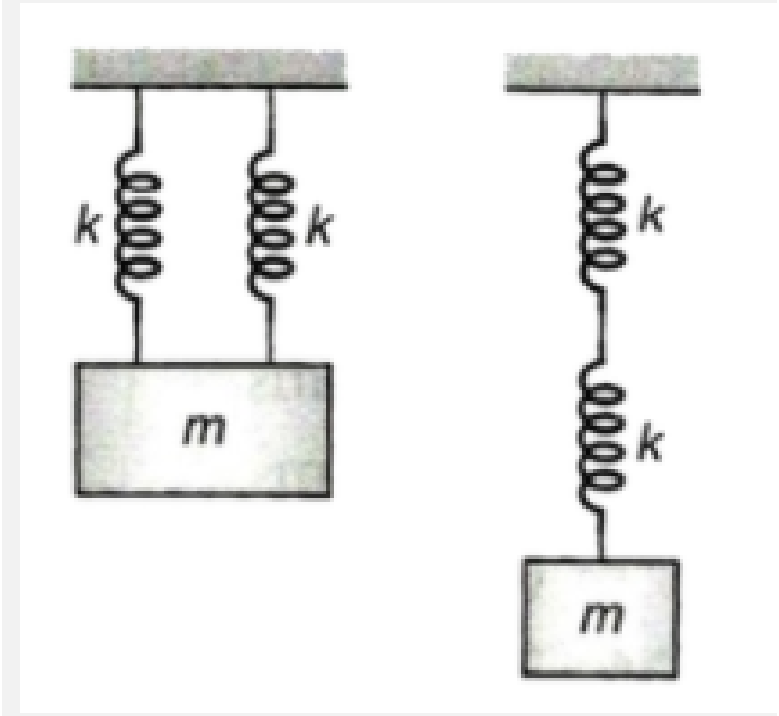
27. Two identical springs are connected in series and parallel as shown in the figure . If f_s and f_p are frequencies of arrangements,

what is $\frac{f_s}{f_p}$?



A. $1:2$

B. $2:1$

C. $1:3$

D. $3:1$

Answer: A

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28. A particle moves such that its acceleration is given by $a = -\beta(x-2)$ Here β is positive constant and x is the position form origin. Time period of oscillation is

A. $2\pi\sqrt{\beta}$

B. $2\pi\sqrt{\frac{1}{\beta}}$

C. $2\pi\sqrt{\beta+2}$

D. $2\pi\sqrt{\frac{1}{\beta+2}}$

Answer: B

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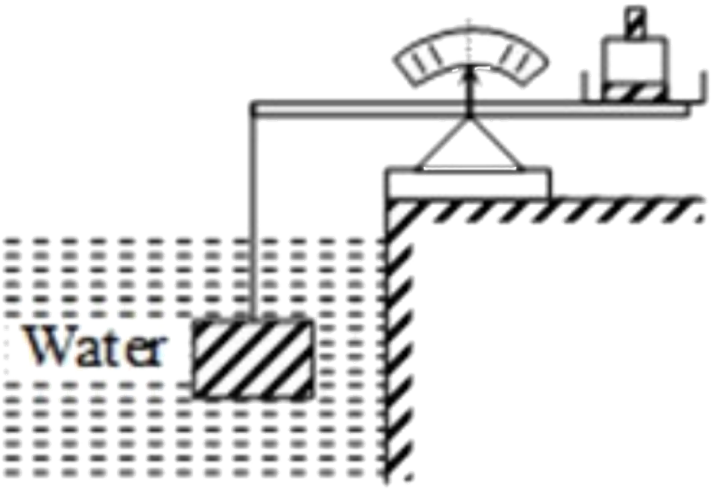
29. The volume of brick is 2.197L. The submerged brick is balanced by a 2.54 kg mass

on the beam scale. The weight of the brick is



A. 46 N

B. 50 N

C. 56 N

D. 72 N

Answer: A

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30. In a capillary tube , water rises to a height of 4 cm If its cross section area were one forth , the water would have to rises a height of

A. 2 cm

B. 4 cm

C. 8 cm

D. 16 cm

Answer: C

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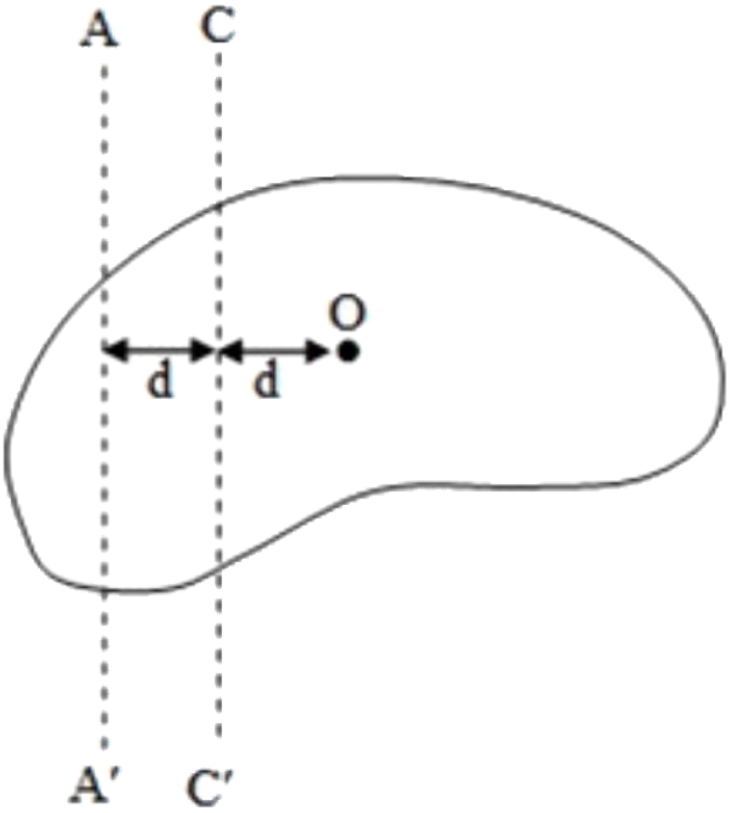
31. The figure shows a body of arbitrary shape. O is the center of mass of the body and mass of the body is M. If $I_{CC'} = I_0$ then $I_{AA'}$ will be

equal to



A. $I_{CC'} + Md^2$

B. $I_{CC'} - Md^2$

C. $I_{CC'} + 3Md^2$

D. $I_{CC'} + 4Md^2$

Answer: C

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32. A man of mass M stands at one end of a plank of length L Which lies at rest on a frictionless surface . The man walks to the other end of the plank. If the mass of the plank is 3M, the distance that the man moves relative to the ground is

A. $\frac{L}{4}$

B. $\frac{3L}{4}$

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

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

Answer: B

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33. The path of the scattered α – particles is

A. Circular

B. Parabolic

C. Elliptical

D. Hyperbolic

Answer: D

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34. A hydrogen atom is in 5^{th} excited state. When the electron jumps to ground state the velocity of recoiling hydrogen atom is

..... m/s and the energy of the photon is ..... eV.

A. $1.1ms^{-1}$

B. $4.2ms^{-1}$

C. $8.4ms^{-1}$

D. $11.2ms^{-1}$

Answer: B

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35. The energy of a hydrogen atom in the ground state is $-13.6eV$. The eneergy of a He^+ ion in the first excited state will be

A. $-13.6eV$

B. $14.4eV$

C. $-6.8eV$

D. $-27.2eV$

Answer: A

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36. Radiation of frequency 1.5 times the threshold frequency is incident on a photosensitive material. If the frequency of incident radiation is halved and the intensity is doubled, the number of photoelectron ejected per second becomes:

A. 4 times the original current

B. 2 times the original current

C. half the original current

D. zero times the original current

Answer: D

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37. What is the force exerted by a photon of intensity $1.4kWm^{-2}$ if it falls on a perfect absorber of radius 2 m ?

A. $58.66 \times 10^{-6}N$

B. $10^{8}N$

C. $8.35 \times 10^{4}N$

D. $8.8 \times 10^{-8}N$

Answer: A

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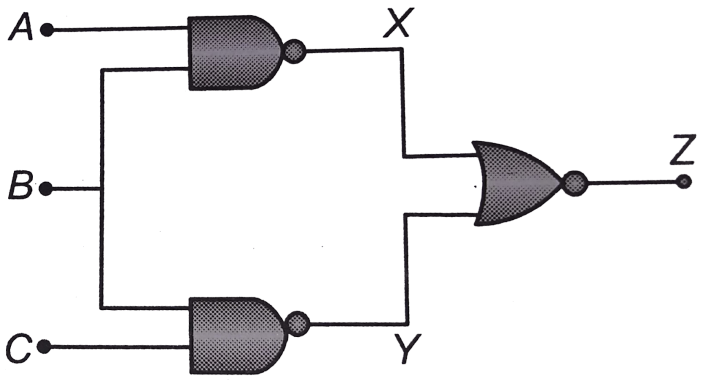
38. The figure shows two $NAND$ gates followed by a NOR gate. The system is equivalent to the following logic gate



A. OR

B. AND

C. NAND

D. None of these

Answer: B

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39. The current gain α of a transistor in common base mode is 0.995 . Its gain .. in the common emitter mode is

A. 200

B. 99

C. 199

D. None of these

Answer: C

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40. The emitter-base junction of a transistor is .....biased while the collector-base junction is.....biased

A. Forward, Forward

B. Forward, Reverse

C. Reverse, Forward

D. Reverse , Reverse

Answer: B

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41. In NPN transistor, 10^{10} electrons enters in emitter region in 10^{-6}sc. If 2% electrons are lost in base region then collector current and

current amplification factor (β) respectively are

A. 1.57 mA, 49

B. 1.92 mA , 70

C. 2 mA , 25

D. 2.25 mA , 100

Answer: A

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42. When a picture drawn on paper is seen through a slab of a transparent material of thickness 5 cm, it appears to be raised by 1.5 cm. The critical angle at the boundary of this transparent material and air is -

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

B. $\sin^{-1}\left(\frac{5}{7}\right)$

C. $\sin^{-1}\left(\frac{6}{11}\right)$

D. $\sin^{-1}\left(\frac{7}{10}\right)$

Answer: D

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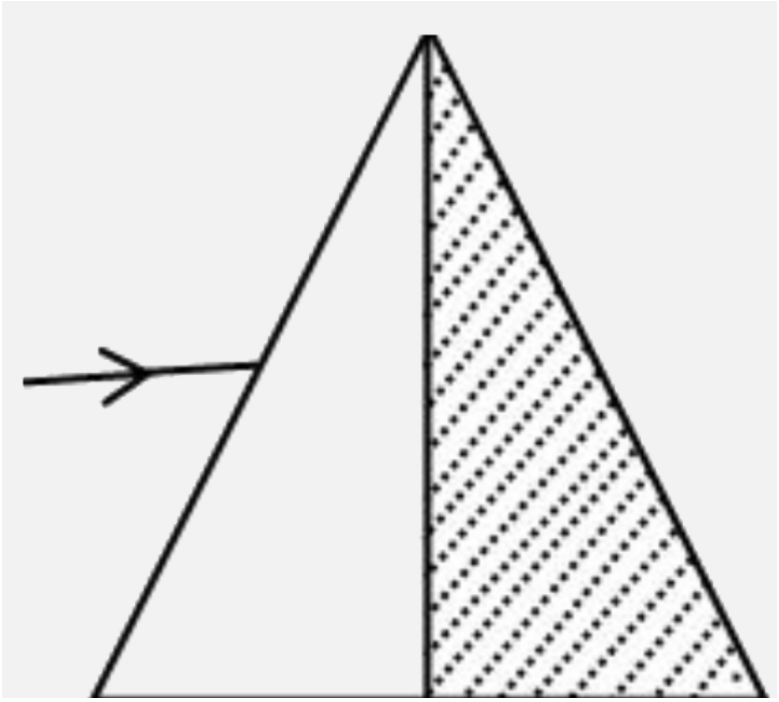
43. A ray of light when incident upon a prism surface a minimum deviation of 39° If the shaded half portion of the prism is removed, then the same ray will -



A. suffer a deviation of 19.5°

B. suffer a deviation of 39°

C. not suffer any deviation

D. will be totally internally reflected

Answer: A

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44. Angular width of central maximum in diffraction at a single slit is..... .

A. $\frac{\lambda}{a}$

B. $\frac{2\lambda}{a}$

C. $\frac{2a}{\lambda}$

D. $\frac{2a}{3\lambda}$

Answer: B

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45. When unpolarised light beam is incident from air onto glass ($n = 1.5$) at the polarising angle

A. reflected light is polarised 100%

B. reflected & refracted beams are partially polarized

C. reflected & refracted beams are completely polarised

D. refracted light is polarised 100%

Answer: A

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