PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 55

Physics

1. A magnetic needle is kept in a non uniform magnetic field . It experiences

A. a force and a torque

B. a force but not a torque

C. a torque but not a force

D. neither a force nor a torque

Answer: A

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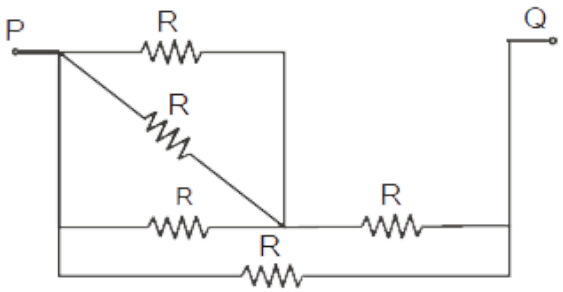
2. The equivalent resistance between the terminal point P and Q is 4Ω in the given circuit, then find out the resistance of R in

ohms



A. 7

B. 4

C. 2

D. 5

Answer: A

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3. In an experiment to determine the internal resistance of a cell with potentiometer, the balancing length is 165 cm. When a resistance of 5 ohm is joined in parallel with the cell the balancing length is 150 cm. The internal resistance of cell is

A. 5Ω

B. 1.5Ω

C. 1Ω

D. 0.5Ω

Answer: D

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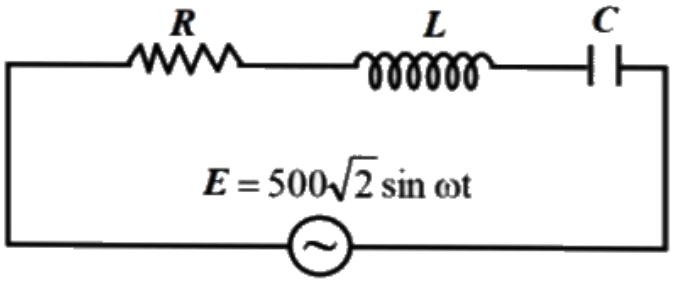
4. In the series $L-C-R$ circuit shown in the figure, the rms voltage across the resistor and inductor are 400 V and 700 V respectively. If the applied voltage is $E=500\sqrt{2}\sin(\omega t)$,

then the peak voltage across the capacitor is



A. 1200 V

B. $1200\sqrt{2}V$

C. 400 V

D. $400\sqrt{2}V$

Answer: D

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5. A solenoid has an inductance of 50 mH and a resistance of 0.025Ω. If it is connected to a battery, how long will it take for the current to reach one half of its final equilibrium value?

A. 1.38 s

B. 1.2 s

C. 6.32 s

D. 0.23 s

Answer: A

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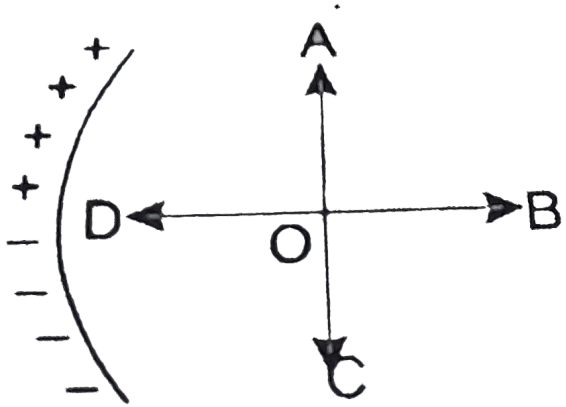
6. The linear charge density on upper half of semi-circular section of ring is λ and that at lower half is $-\lambda$. The direction of electric field at centre O of ring is :



A. along OA

B. along OB

C. along OC

D. along OD

Answer: C

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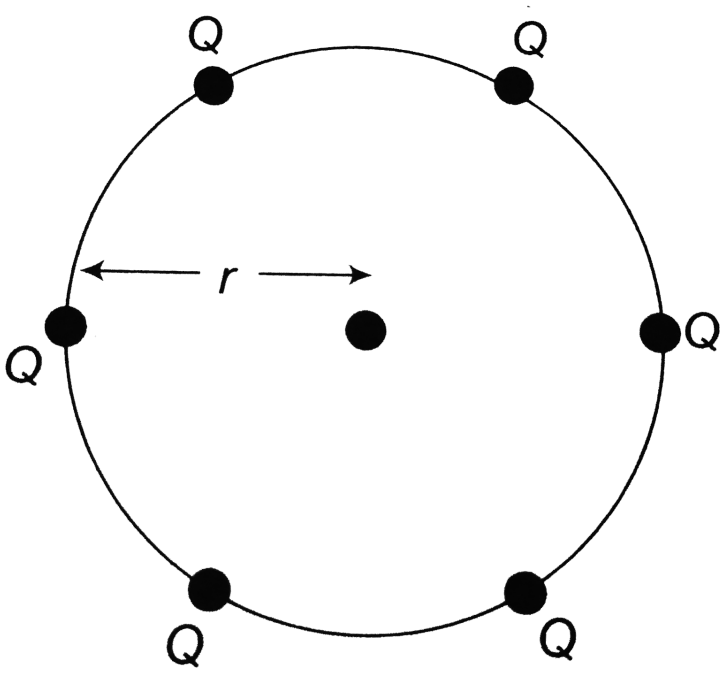
7. A point charge is surrounded symmetrically by six identical charges at distance r as shown in the figure How much work is done by the froces of electrostatic repulsion when the

point charge at the centre is removed to infinity ?



A. zero

B. $\frac{8q^2}{4\pi\varepsilon_0 r}$

C. $\frac{8q}{4\pi\varepsilon_0 r}$

D. $\frac{64q^2}{4\pi\varepsilon_0 r}$

Answer: B

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8. A square loop ABCD , carrying a current I, is placed near and coplanar with a long straight conductor XY carrying a current I.

A. there is no net force on the loop

B. the loop will be attracted by the conductor only if the current in the loop flows clockwise

C. the loop will be attracted by the conductor only if the current in the loop flows anticlockwise

D. the loop will always be attracted by the conductor

Answer: B

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9. In a cyclotron, if a deuteron can gain an energy of 40 MeV, then a proton can gain an energy of

A. 40 MeV

B. 60 MeV

C. 20 MeV

D. 80 MeV

Answer: D

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10. If Wien's constant b = 0.3 cm K, then the temperature of the Sun having a maximum intensity of radiation at 5000Å wavelength is

A. 5000 K

B. 6000 K

C. 4000 K

D. 7000 K

Answer: B

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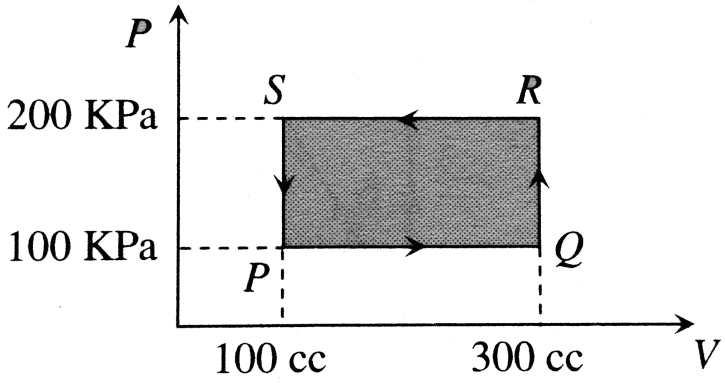
11. A thermodynamic system is taken through the cyclic $PQRSP$ process. The net work done by the system is



A. 20 J

B. $-20J$

C. 400 J

D. $-374J$

Answer: B

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12. Suppose ideal gas equation follows $VP^3 = con\tan t.$ Initial temperature and volume of the gas are T and V respectively. If gas expand to $27V$ temperature will become

A. T

B. 9T

C. 27T

D. $\frac{T}{9}$

Answer: B

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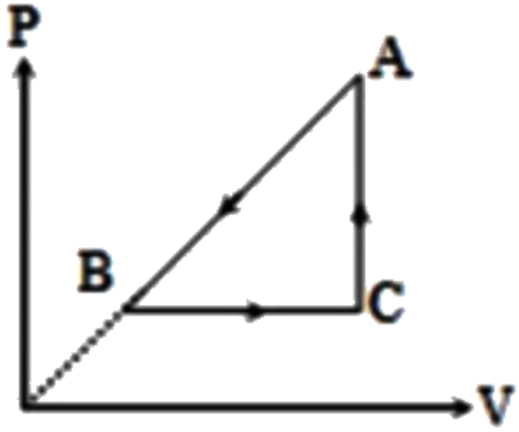
13. P - V diagram of cyclic process ABCD is as shown in figure . Choose the correct

statement



A. $\Delta Q_{A \to B}$ is negative

B. $\Delta U_{B \to C}$ is positive

C. ΔW_{CAB} is negative

D. all of these

Answer: D

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14. A clock which keeps correct time at $20^\circ C$ has a pendulum rod made of brass . How many seconds will it gain or lose per day when temperature falls to $0^\circ C$? $[\alpha = 18 \times 10^{-6}/^\circ C]$

A. 155.5 s

B. 15.55 s

C. 25.55 s

D. 18.55 s

Answer: B

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15. A mixture of 250 g of water and 200 g of ice at $0^\circ C$ is kept in a calorimeter which has a water equivalent of 50 g. If 200 g of steam at $100^\circ C$ is passed through this mixture, calculate the final temperature and the weight of the contents of the calorimeter.

A. 450 g

B. 622 g

C. 572 g

D. 650 g

Answer: C

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16. The linear density of a vibrating string is $1.3 \times 10^{-4} kg/m$ A transverse wave is propagating on the string and is described by

the equation $y = 0.021 \sin(x + 30t)$ where x and y are measured in meter and tt in second the tension in the string is :-

A. 0.12 N

B. 0.48 N

C. 1.20 N

D. 4.80 N

Answer: A

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17. A particle starts from rest with uniform acceleration a. Its velocity after 'n' second is 'v'. The displacement of the body in the last two second is

A. $\frac{2v(n+1)}{n}$

B. $\frac{v(n+1)}{n}$

C. $\frac{v(n-1)}{n}$

D. $\frac{2v(n-1)}{n}$

Answer: D

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18. A ball is projected upwards from the top of a tower with a velocity $50ms^{-1}$ making an angle 30° with the horizontal. The height of tower is 70m. After how many seconds from the instant of throwing, will the ball reach the ground. $(g = 10ms^{-2})$

A. 3 s

B. 5 s

C. 7 s

D. 9 s

Answer: C

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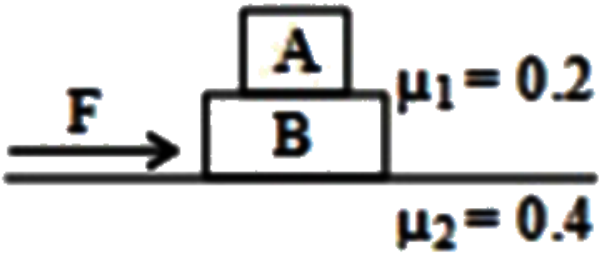
19. In the figure , $m_A = 2kg$ and $m_b = 4kg$

For what minimum value of F A starts slipping over B $\left(g = 10ms^{-2}\right)$?



A. 24 N

B. 36 N

C. 12 N

D. 20 N

Answer: B

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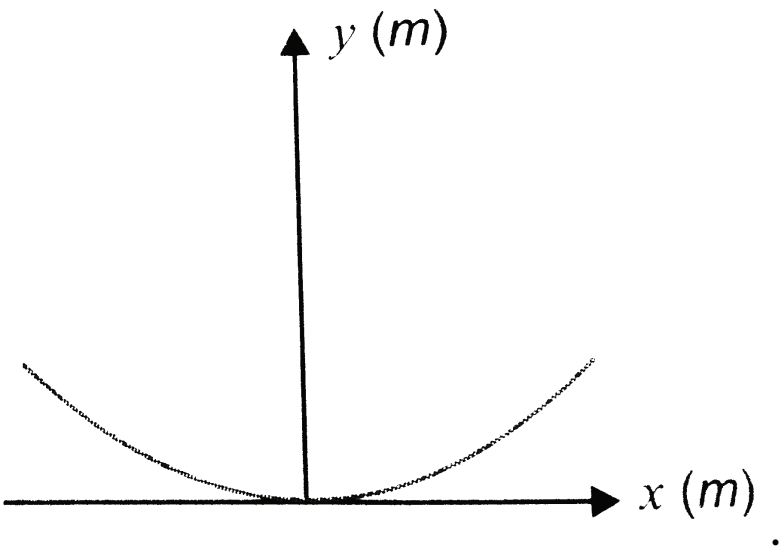
20. A parabolic bow1 with its bottom at origin has the shape $y = \frac{x^2}{20}$ where x and y are in metre The maximum height at which a small mass m can be placed on the bowl without

slipping is (coeff of static friction 0.5



A. 2.5 m

B. 1.25 m

C. 1.0 m

D. 4.0 m

Answer: B

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21. Which of the following statement is true for collisions-

A. momentum is conserved in elastic collisions but not in inelastic collisions.

B. total kinetic energy is conserved in elastic collisions but momentum is not conserved.

C. total kinetic energy is not conserved in inelastic collisions but momentum is conserved

D. total kinetic energy and momentum both are conserved in all types of collisions.

Answer: C

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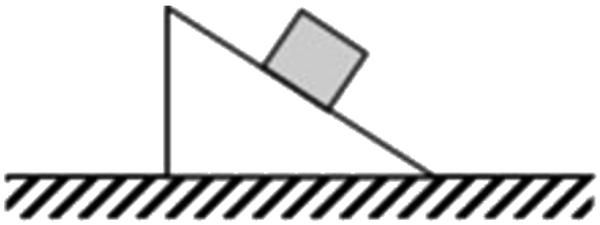
22. In the shown figure, if all the surface are smooth and the two masses are allowed to move then center of mass of the system will move



A. upwards

B. downwards

C. leftwards

D. rightwards

Answer: B

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23. A child is standing at one end of a long trolley moving with a speed v on a smooth horizontal track. If the child starts running towards the other end of the trolley with a speed u, the centre of mass of the system (trolley + child) will move with a speed :

A. zero

B. (v +u)

C. (v - u)

D. v

Answer: D

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24. A molecule of mass m moving at a velocity v impinges elastically on the wall at an angle a with the wall. Then

A. the impulsive reaction of the wall is $2mv\cos\alpha$

B. the impulsive reaction of the wall is $2mv\sin\alpha$

C. the impulsive reaction of the wall is nonzero

D. given data is insufficient to calculate impulsive reaction of the wall

Answer: B

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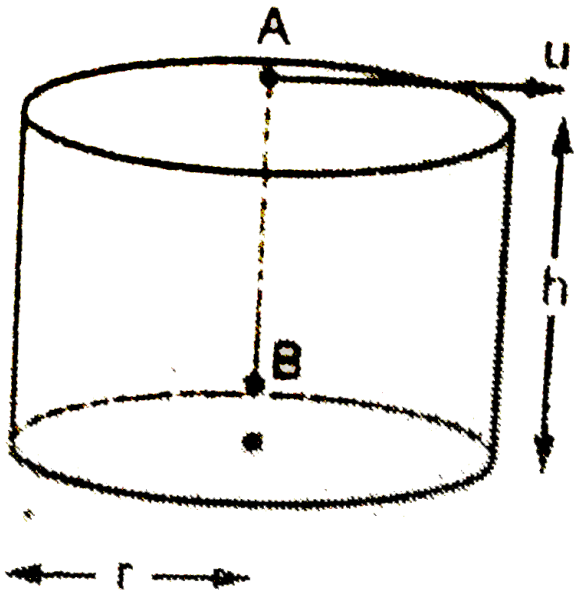

25.

A hollow vertical cylinder of radius r and height h has a smooth internal surface. A small particle is placed in contact with the inner side of the upper rim, at point A, and given a horizontal speed u, tangentical t the

rim. it leaves the lower rim at point B, vertically below A. If n is an integer then

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

B. $\frac{v_0}{\sqrt{2gh}}$

C. $\frac{2\pi R}{h}$

D. $\frac{v_0}{2\pi R}\left(\sqrt{\frac{2h}{g}}\right)$

Answer: D

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26. The acceleration of a body due to the attraction of the earth (radius R) at a distance 2R form the surface of the earth is (g=acceleration due to gravity at the surface of the earth)

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

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

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

D. g

Answer: A

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27. Two bodies of mass m_1 and m_2 are initially at rest placed infinite distance apart. They are then allowed to move towards each other under mutual gravitational attaction. Show that their relative velocity of approach at separation r betweeen them is

$$v = \frac{\sqrt{2G(m_1 + m_2)}}{r}$$

A. $\sqrt{\frac{2G(m_1 + m_2)}{r}}$

B. $\sqrt{\frac{2Gm_1m_2}{(m_1+m_2)r}}$

C. $\sqrt{\frac{G(m_1+m_2)}{r}}$

D. $\sqrt{\frac{Gm_1m_2}{(m_1+m_2)r}}$

Answer: A

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28. A particle moves such that its acceleration a is given by a = -bx , where x is the

displacement from equilibrium positionand is a constant. The period of oscillation is

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

B. $\frac{2\pi}{\sqrt{b}}$

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

D. $2\sqrt{\frac{\pi}{b}}$

Answer: B

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29. The displacement of two identical particles executing SHM are represented by equations.

$x_1 = 4\sin\left(10t + \frac{\pi}{6}\right)$ and $x_2 = 5\cos \varepsilon t$

For what value of epsilon of both the particles is same?

A. 16 unit

B. 6 unit

C. 4 unit

D. 8 unit

Answer: D

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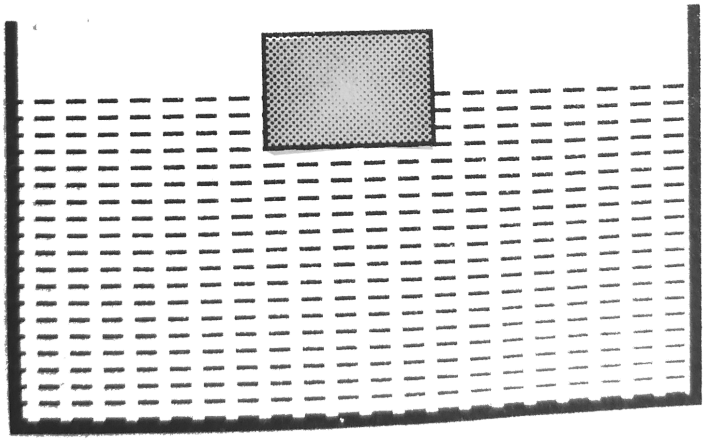
30. A cubical block is floating in a liquid with half of its volume immersed in the liquid. When the whole system accelerates upwards with acceleration of $g/3$, the fraction of volume immersed in the liquid will be



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

B. $\frac{3}{8}$

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

D. $\frac{3}{4}$

Answer: A

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31. In a capillary tube experiment, a vertical 30 cm long capillary tube is dipped in water. The water rises up to a height of 10 cm due to

capillary action. If this experiment is conducted in a freely falling elevator, the length of te water column becomes

A. 30 cm

B. greater than 10 cm

C. equal to 10 cm

D. less than 10 cm

Answer: D

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32. A square plate is kept in YZ plane. Then according to perpendicular axis theorem

A. $I_Z = I_X + I_Y$

B. $I_X = I_Y + I_Z$

C. $I_Y = I_X + I_Z$

D. All of the above

Answer: B

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33. A shell of mass $20kg$ at rest explodes into two fragments whose masses are in the ratio $2:3$. The smaller fragment moves with a velocity of $6m/s$. The kinetic energy of the larger fragment is

A. 96 J

B. 216 J

C. 144 J

D. 360 J

Answer: A

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34. An electron in H atom makes a transition from $n = 3 \rightarrow n = 1$. The recoil momentum of the H atom will be

A. $6.45 \times 10^{-27} Ns$

B. $6.8 \times 10^{-27} Ns$

C. $6.45 \times 10^{-24} Ns$

D. $6.8 \times 10^{-24} Ns$

Answer: A

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35. When an electron revolves around the nucleus, then the ratio of magnetic moment to angular momentum is

A. $\frac{e}{2m}$

B. $\frac{2e}{m}$

C. $\frac{e}{m}$

D. $\left(\frac{e}{m}\right)^2$

Answer: A

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36. A radioactive sample at any instant has its disintegration rate 5000 disintegrations per minute After 5 minutes , the rate is 1250 disintegration per minute. Then , the decay constant (per minute)

A. 0.8 In2

B. 0.4 In2

C. 0.2 In2

D. 0.1 In2

Answer: B

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37. When a metallic surface of threshold wavelength 4λ is illuminated with light of wavelength λ the stopping potential is V. When the same surface is illuminated by the light of wavelength 2λ Stopping potential is

$\frac{V}{3}$ Threshold wavelength for the metallic surface is

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

B. 2λ

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

D. 4λ

Answer: C

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38. If an electron and a photon propagate in the form of waves having the same wavelength , it implies that they have the same

A. energy

B. momentum

C. velocity

D. angular momentum

Answer: B

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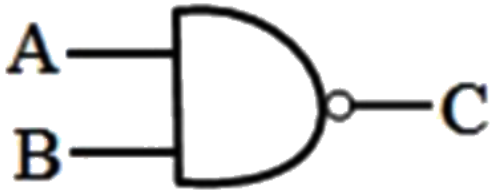
39. For given logic gate truth table is



A.

A	0	0	1	1
B	1	0	1	0
C	0	0	1	0

B.

A	0	0	1	1
B	1	0	1	0
C	1	0	1	1

C.

A	0	0	1	1
B	1	0	1	0
C	1	1	0	1

D.

A	0	0	1	1
B	1	0	1	0
C	0	1	0	0

Answer: C

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40. In a transistor

A. emitter is more highly doped than collector

B. collector is more highly doped than emitter

C. both are equally doped

D. None of these

Answer: A

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41. A transistor is used as an amplifier in CB mode with a load resistance of $5k\Omega$ the current gain of amplifier is 0.98 and the input resistance is 70Ω, the voltage gain and power gain respectively are

A. 70,68.6

B. 80,75.6

C. 60,66.6

D. 90,96.6

Answer: A

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42. A crown glass prism of refracting angle 6° is to be used for deviation without dispersion with a flint glass of angle of prism α . Given : for crown glass $\mu_r = 1.513$ and $\mu_v = 1.523$,

for flint glass $\mu_r = 1.645$ and $\mu_v = 1.665$.

Find α

A. 3°

B. 4°

C. 4.5°

D. 5°

Answer: A

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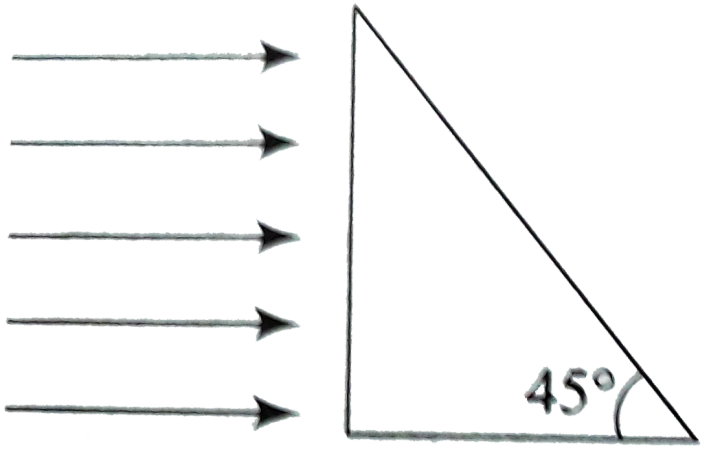
43. A beam of light consisting of red, green, and blue colors is incident on a right-angled prism. The refractive indices of the material of the prism for the above red, green and blue wavelengths are 1.39, 1.44 and 1.47, repectively. The prism will



A. separate red colour from green and blue colours.

B. separate blue colour from red and green colours

C. separate green colour from red and green colours

D. separate all the three colours from one another

Answer: A

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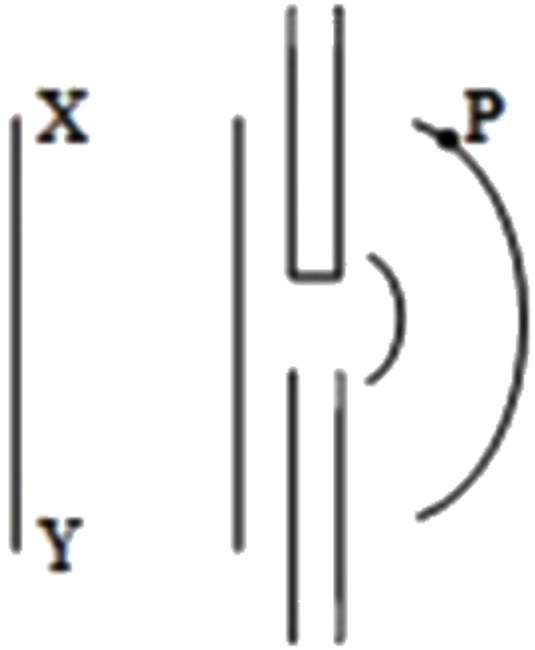
44. A monochromatic plane wave of speed c and wavelength λ is diffracted at a small aperture . The diagram illustrates successive wavefront. After what time will some portion

of the wavefront XY reach P ?



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

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

C. $\frac{3\lambda}{c}$

D. $\frac{4\lambda}{c}$

Answer: C

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45. The contrast in the fringes in any interference pattern depends on:

A. Fringe width

B. wavelength

C. Intensity ratio of the sources

D. Distance between the sources

Answer: C

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