



# PHYSICS

## BOOKS - NTA MOCK TESTS

### NTA NEET SET 77

#### Physics

1. An electron and proton have the same de-Broglie wavelength. Then the kinetic energy of the electron is

A. Zero

B. Less than that of a proton

C. More than that of a proton

D. Equal to that of a proton

**Answer: C**



**Watch Video Solution**

2. When electronic transition occurs from higher energy state to lower energy state with energy difference equal to  $\Delta E$  electron volts ,

the wavelength of the line emitted is approximately equal to

A.  $\frac{12375}{\Delta E}$  m

B.  $\frac{12375}{\Delta E}$  nm

C.  $\frac{12375}{\Delta E}$  pm

D.  $\frac{12375}{\Delta E}$  Å

**Answer: D**



**Watch Video Solution**

3. A 10 kg mass travelling 2m /s meets and collides elastically with a 2 kg mass travelling 4 / m s in the opposite direction. Find the final velocities of both objects .

A.  $V_{Af} = 2m / s, V_{Bf} = 3m / s$

B.  $V_{Af} = 0m / s, V_{Bf} = 6m / s$

C.  $V_{Af} = 5m / s, V_{Bf} = 8m / s$

D.  $V_{Af} = 4m / s, V_{Bf} = 2m / s$

**Answer: B**



Watch Video Solution

4. Two bodies of 6 kg and 4 kg masses have their velocity  $5\hat{i} - 2\hat{j} + 10\hat{k}$  and  $10\hat{i} - 2\hat{j} + 5\hat{k}$  respectively. Then, the velocity of their centre of mass is

A.  $5\hat{i} + 2\hat{j} - 8\hat{k}$

B.  $7\hat{i} + 2\hat{j} - 8\hat{k}$

C.  $7\hat{i} - 2\hat{j} + 8\hat{k}$

D.  $5\hat{i} - 2\hat{j} + 8\hat{k}$

**Answer: C**



**Watch Video Solution**

5. A stone of mass  $0.3\text{kg}$  attached to a  $1.5\text{m}$  long string is whirled around in a horizontal circle at a speed of  $6\text{ m/s}$ . The tension in the string is

A.  $10\text{ N}$

B.  $20\text{ N}$

C.  $7.2\text{ N}$

D. None of these

**Answer: C**



**Watch Video Solution**

**6.** A wheel which is initially at rest is subjected to a constant angular acceleration about its axis. It rotates through an angle of  $15^\circ$  in time  $t$  sec. The increase in angle through which it rotates in the next  $2t$  sec is

A.  $90^\circ$

B.  $120^\circ$

C.  $30^\circ$

D.  $45^\circ$

**Answer: B**

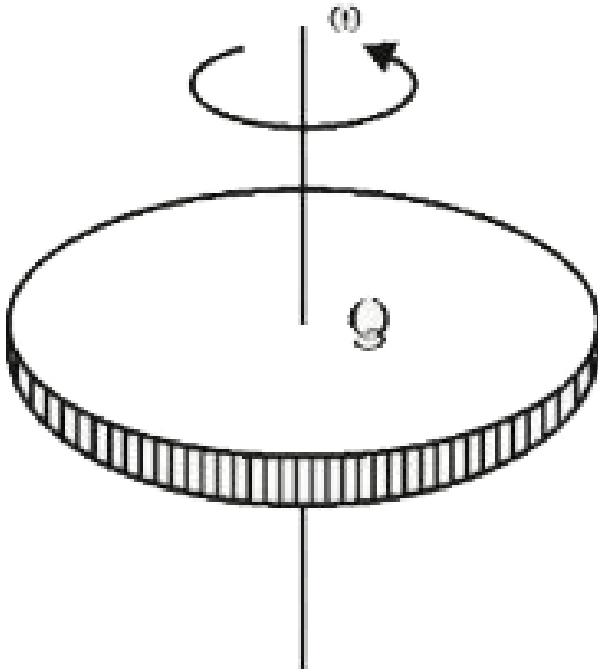


**Watch Video Solution**

7. A non-conducting ring of radius  $R$  has charge  $Q$  distributed unevenly over it. If it rotates with an angular velocity  $\omega$  the



equivalent current will be:



- A.  $\frac{q\omega}{2\pi}$
- B.  $\frac{2\pi}{q\omega}$
- C.  $\frac{q\omega}{2\pi r}$
- D.  $qr\omega$

**Answer: A**



**Watch Video Solution**

8. The length of a wire of a potentiometer is 100 cm, and the e.m.f. of its standard cell is  $E$  volt. It is employed to measure the e.m.f. of a battery whose internal resistance is  $0.5\Omega$ . If the balance point is obtained at  $l = 30$  cm from the positive end, the e.m.f. of the battery is .

where  $i$  is the current in the potentiometer wire.

A.  $\frac{30E}{100.5}$

B.  $\frac{30E}{100 - 0.5}$

C.  $\frac{30(E - 0.5i)}{100}$  ,Where  $i$  is the current in

the potentiometer wire.

D.  $\frac{30E}{100}$

**Answer: D**



**Watch Video Solution**

9. A conducting wheel in which there are four rods of length 25 cm as shown in the figure is rotating with constant velocity 20 rad/s in a uniform magnetic field 8 T . The induced potential difference between its centre and rim will be



A. 4 V

B. 5 V

C. 6 V

D. 5 V

**Answer: D**



**Watch Video Solution**

**10.** Radii of two conducting circular loops are  $b$  and  $a$  respectively, where  $b > a$ . Centres of both loops coincide but planes of both loops are perpendicular each other. The value of mutual inductance for these loops

A.  $\frac{\mu_0 \pi b^2}{2a}$

B. Zero

C.  $\frac{\mu_0 \pi a b}{2(a + b)}$

D.  $\frac{\mu_0 \pi a^2}{2b}$

**Answer: B**

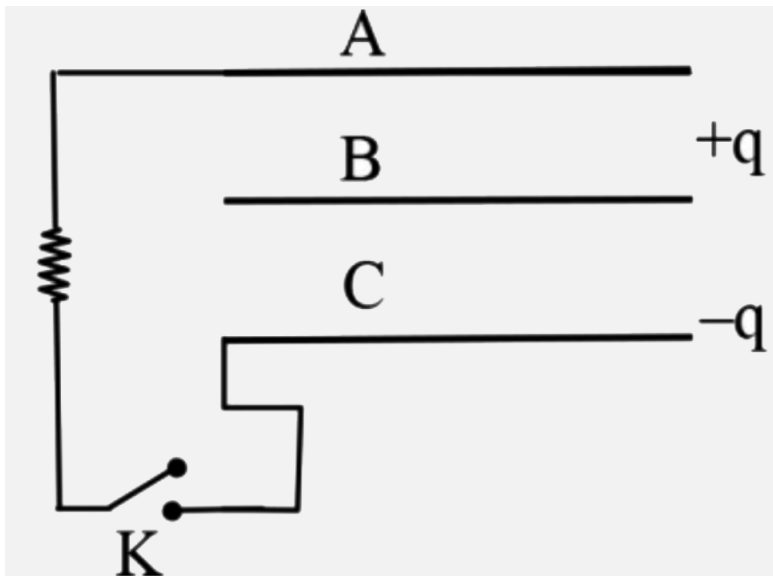


**Watch Video Solution**

**11.** Three identical metal plates of area 'A' are at distance  $d_1$  &  $d_2$  from each other. Metal plate A is uncharged, while plate B & C have respectively charge +q & - q . If metal plates A

&C are connected by switch K through a consumer of unknown resistance. What energy dose the Consumer give out to its surrounding ?

Assume  $d_1 = d_2 = d$



A.  $\frac{q^2 d}{4\epsilon_0 A}$

B.  $\frac{q^2 d}{\epsilon_0 A}$

C.  $\frac{q^2 d}{2\epsilon_0 A}$

D.  $\frac{2q^2 d}{\epsilon_0 A}$

**Answer: A**

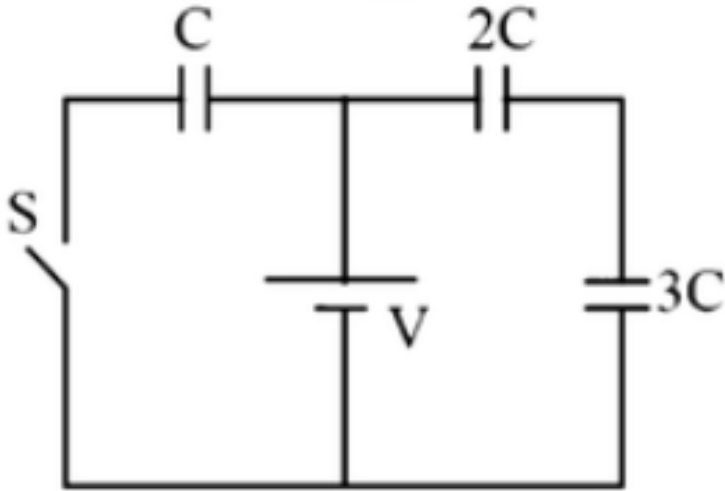


**Watch Video Solution**

**12.** In the given diagram. Find the heat generated on closing the switch S (Initially the



capacitor of capacitance  $C$  is unchanged ) -



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

B.  $CV^2$

C.  $\frac{1}{2}CV^2$

D.  $2CV^2$

**Answer: C**



**Watch Video Solution**

**13.** A small planet is revolving around a very massive star in a circular orbit of radius  $r$  with a period of revolution  $T$ . The gravitational force between the planet and the star is proportional to  $r^{-5/2}$ , then  $T$  will be proportional to

A.  $r^{3/2}$

B.  $r^{5/3}$

C.  $r^{7/4}$

D.  $r^3$

**Answer: C**



**Watch Video Solution**

**14.** The value of  $g$  (acceleration due to gravity) at earth's surface is  $10ms^{-2}$ . Its value in  $ms^{-2}$  at the centre of the earth which is

assumed to be a sphere of radius  $R$  metre and uniform mass density is

A. 5

B. Zero

C. 10

D. 1

**Answer: B**



**Watch Video Solution**

15. Two cylinders P and Q have the same length and diameter and are made of different materials having thermal conductivities in the ratio 2 : 3. These two cylinders are combined to make a cylinder. One end of P is kept at  $100^{\circ}C$  and another end of Q at  $0^{\circ}C$ . The temperature at the interface of P and Q is

A.  $40^{\circ}C$

B.  $50^{\circ}C$

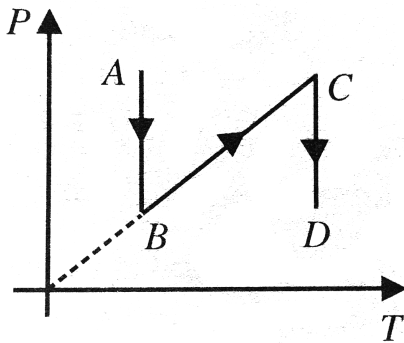
C.  $60^{\circ}C$

D.  $70^\circ C$

**Answer: A**

 **Watch Video Solution**

**16.**  $P - T$  diagram is shown in Fig. Choose the corresponding  $V - T$  diagram.



A. 

B. 

C. 

D. 

**Answer: D**



**Watch Video Solution**

17. An ideal gas is expanding such that  $PT^2 = \text{constant}$ . The coefficient of volume expansion of the gas is:

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

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

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

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

**Answer: C**



**Watch Video Solution**

**18.** A magnetic needle lying parallel to the magnetic field required  $W$  units of work to turn it through an angle  $45^\circ$ . The torque



required to maintain the needle in this position will be

A.  $\sqrt{2}W$

B.  $\frac{1}{\sqrt{3}W}$

C.  $(\sqrt{2} - 1)W$

D.  $\frac{W}{\sqrt{2} - 1}$

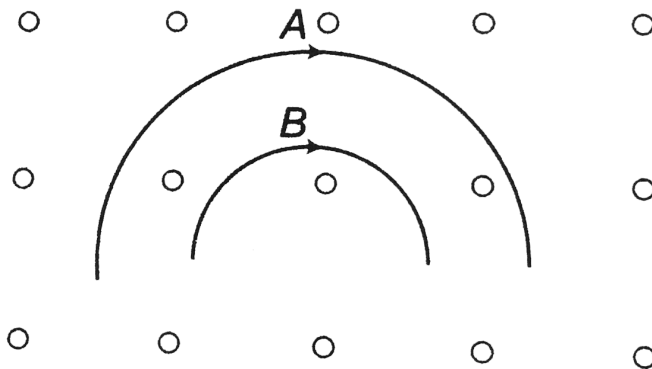
**Answer: D**



**Watch Video Solution**

19. Two particles  $A$  and  $B$  of masses  $m_A$  and  $m_B$  respectively and having the same charge are moving in a plane. A uniform magnetic field exists perpendicular to this plane. The speeds of the particles are  $v_A$  and  $v_B$  respectively and the trajectories are as shown in the figure.

Then,



A.  $m_A v_A < m_B v_B$

B.  $m_A v_A > m_B v_B$

C.  $m_A < m_B$  and  $v_A < v_B$

D.  $m_A = m_B$  and  $v_A = v_B$

**Answer: B**



**Watch Video Solution**

**20.** A circular coil of radius  $10\text{cm}$  and  $100$  turns carries a current  $1\text{A}$ . What is the magnetic moment of the coil?

A.  $3.142 \times 10^4 Am^2$

B.  $10^4 Am^2$

C.  $3.142Am^2$

D.  $3Am^2$

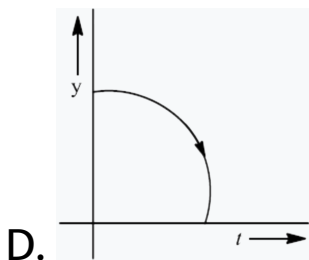
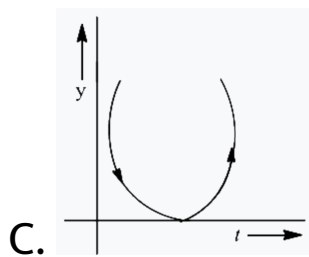
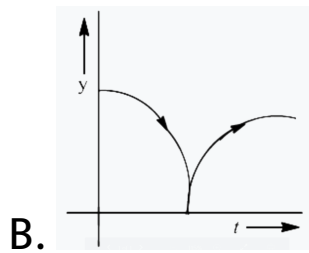
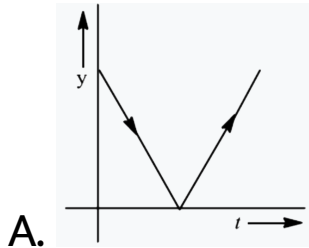
**Answer: C**



**Watch Video Solution**

**21.** A ball is dropped it on a floor and bounces back to a height somewhat less then the

original height. The curve which its motion correctly about  $y$  and  $t$  is



**Answer: B**



**Watch Video Solution**

**22.** The range of a projectile, when launched at an angle of  $15^\circ$  with the horizontal is 1.5 km. what is the range of the projectile, when launched at an angle of  $45^\circ$  to the horizontal with the same speed ?

A. 0.75 km

B. 1.5 km

C. 3.0 km

D. 6.0 km

**Answer: C**



**Watch Video Solution**

**23.** The normal reaction on a body placed in a lift moving up with constant acceleration  $2ms^{-1}$  is 120 N. Mass of the body is (Take  $g = 10ms^{-2}$ )

A. 10 kg

B. 15 kg

C. 12 kg

D. 5 kg

**Answer: A**



**Watch Video Solution**

**24.** A conveyor belt is moving at a constant speed of  $2m/s$ . A box is gently dropped on it. The coefficient of friction between them is



$\mu = 0.5$  . The distance that the box will move relative to belt before coming to rest on it taking  $g = 10\text{m.s}^{-2}$  is:

A. 1.2 m

B. 0.6 m

C. Zero

D. 0.4 m

**Answer: D**



**Watch Video Solution**

25. The following fusion reaction take place  
 ${}^2_1A \rightarrow {}^3_2B + n + 3.27 \text{ MeV}$ . If 2 kg of  ${}^2_1A$  is  
subjected to the above reaction, the energy  
released is used to light a 100 W light a lamp,  
how long will the lamp glow ?

A.  $7 \times 10^3$  years

B.  $3 \times 10^5$  years

C.  $5 \times 10^4$  years

D.  $2 \times 10^6$  years

**Answer: C**



26. In a nuclear reactor  $^{235}\text{U}$  undergoes fission liberating  $200\text{MeV}$  of energy. The reactor has a 10% efficiency and produces  $1000\text{MW}$  power. If the reactor is to function for  $10\text{yr}$ , find the total mass of uranium required.

A. 38470

B. 38490

C. 48490

D. 48470

**Answer: A**



**Watch Video Solution**

**27.** Ratio of kinetic energy at mean position to potential energy at  $A/2$  of a particle performing SHM

A. 2:1

B. 4:1

C. 8:1

D. 1:1

**Answer: B**



**Watch Video Solution**

**28.** The amplitude of a simple pendulum is 10 cm. When the pendulum is at a displacement of 4 cm from the mean position, the ratio of kinetic and potential energies at that point is

A. 5.25

B. 2.5

C. 4.5

D. 7.5

**Answer: A**



**Watch Video Solution**

**29.** Which of the following figure represents the variation of particle momentum and the associated de - Broglie wavelength ?

A. 

B. 

C. 

D. 

**Answer: D**



**Watch Video Solution**

**30.** Two identical metal plates show photoelectric effect. Light of wavelength  $\lambda_A$  falls on plate A and  $\lambda_B$  fall on plate B and

$\lambda_A = 2\lambda_B$ , The maximum KE of the photoelectrons are  $K_A$  and  $K_B$ , respectively,

Which one of the following is true?

A.  $2K_2 = K_1$

B.  $K_1 < \frac{K_2}{2}$

C.  $K_1 > \frac{K_2}{2}$

D.  $2K_1 = K_2$

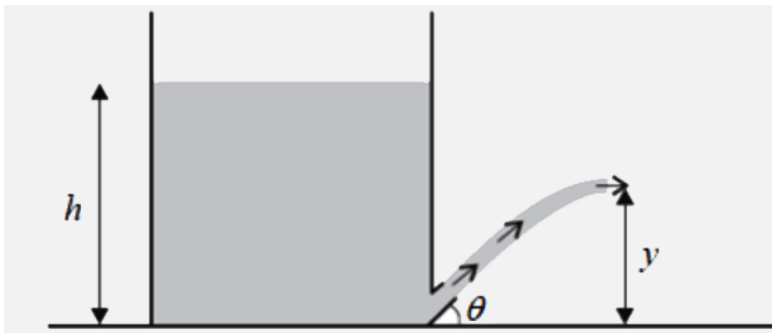
**Answer: B**



**Watch Video Solution**



31. A stream of non-viscous liquid emerges from a very short outlet tube at the base of a large . Open tank , in which the depth of liquid is  $h$ . The tube is at a fixed angle  $\theta$  to the ground as shown in the figure. The maximum height of the stream  $y$  is



A.  $h \sin^2 \theta$

B.  $h \sin 2\theta$

C.  $\frac{1}{2}h \sin \theta$

D.  $h \tan^2 \theta$

**Answer: A**



**Watch Video Solution**

**32.** If 'S' is stress and 'Y' is young's modulus of material of a wire, the energy stored in the wire per unit volume is

A.  $2S^2Y$

B.  $\frac{S^2}{2Y}$

C.  $\frac{2Y}{S^2}$

D.  $\frac{S}{2Y}$

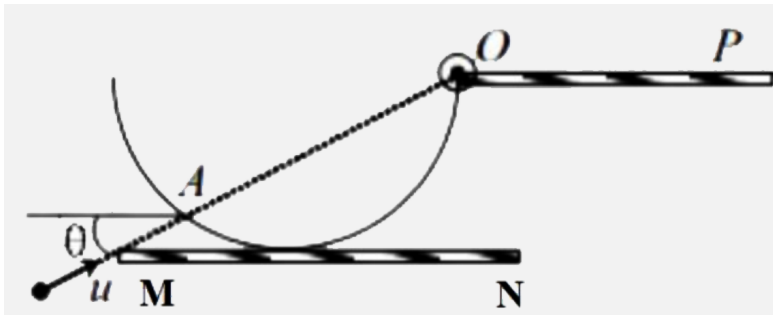
**Answer: B**



**Watch Video Solution**

**33.** The diagram shows a hemispherical shell of mass  $m$  and radius  $R$  is hinged at point of placed on a horizontal surface. A ball of mass strikes the shell at point A ( as shown in the

figure ) moving with velocity  $u$  inclined at an angle  $\theta = \tan^{-1}\left(\frac{1}{2}\right)$  and then it stops . For the given shell to reach horizontal surface OP what minimum speed  $u$  is required ?



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

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

C.  $\frac{gR}{\sqrt{5}}$

D. Not possible

**Answer: D**



**Watch Video Solution**

**34.** Each of the two strings of length  $51.6\text{cm}$  and  $49.1\text{cm}$  are tensioned separately by  $20\text{N}$  force. Mass per unit length of both the strings is same and equal to  $1\text{g}/\text{m}$ . When both the strings vibrate simultaneously, the number of beats is

A. 7

B. 8

C. 3

D. 5

**Answer: A**

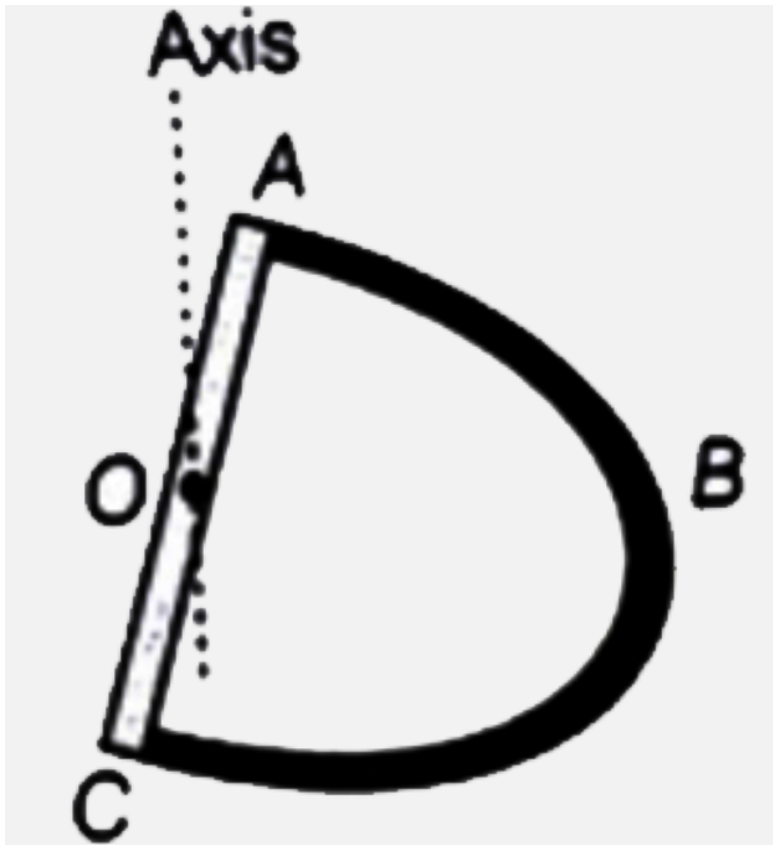


**Watch Video Solution**

**35.** The thin semi-circular part ABC has mass  $m_1$  and diameter AOC has mass  $m_2$ . Here, axis passes through mid-point of diameter and the axis is perpendicular to plane ABC. Here, AO =

OC = R. The moment of inertia of this

Composite system about the axis is



A.  $\frac{m_1 R^2}{2} + \frac{m_2 R^2}{3}$

B.  $\frac{m_1 R^2}{2} + \frac{m_2 R^2}{6}$

$$\text{C. } m_1 R^2 + \frac{m_2 R^2}{3}$$

$$\text{D. } m_1 R^2 + \frac{m_2 R^2}{12}$$

**Answer: C**



**Watch Video Solution**

**36.** A uniform rod of length  $8a$  and mass  $6m$  lies on a smooth horizontal surface. Two point masses  $m$  and  $2m$  moving in the same plane with speed  $2v$  and  $v$  respectively strike the rod perpendicular at distances  $a$  and  $2a$  from the



mid point of the rod in the opposite directions and stick to the rod. The angular velocity of the system immediately after the collision is

A.  $\frac{6v}{32a}$

B.  $\frac{6v}{33a}$

C.  $\frac{6v}{40a}$

D.  $\frac{6v}{41a}$

**Answer: D**



**Watch Video Solution**

37. For a transistor ,  $\alpha_{dc}$  and  $\beta_{dc}$  are the current ratios, then the value of  $\frac{\beta_{dc} - \alpha_{dc}}{\alpha_{dc} \cdot \beta_{dc}}$

A. 1

B. 1.5

C. 2

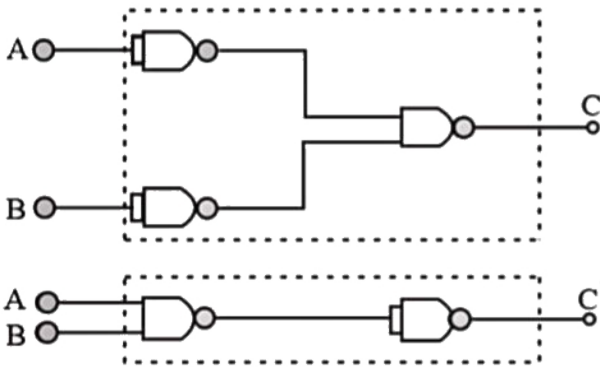
D. 2.5

**Answer: A**



**Watch Video Solution**

**38.** The combination of NAND gates shown here in the figure give output C and C'. C and C' are equivalent to



- A. OR gate and AND gate respectively
- B. AND gate and NOT gate respectively
- C. AND gate and OR gate respectively

D. OR gate and NOT gate respectively

**Answer: A**



**Watch Video Solution**

**39.** A closed gas cylinder is divided into two parts by a piston held tight. The pressure and volume of gas in two parts respectively are  $(P, 5V)$  and  $(10P, V)$ . If now the piston is left free and the system undergoes isothermal process,

then the volumes of the gas in two parts respectively are

A. 4V, 2V

B. 5V, V

C. 2V, 4V

D. 3V, 3V

**Answer: C**



**Watch Video Solution**

40. A substance of mass 4.953 g occupies  $1.5\text{cm}^{-3}$  of volume . The density of the substance (in  $\text{g cm}^{-3}$  ) With correct number of significant figures is

A. 3.3

B. 3.300

C. 3.302

D. 33.0

**Answer: A**



Watch Video Solution

41. The angle between pass axis of polarizer and analyser is  $45^\circ$ . The percentage of polarized light passing through analyser is

A. 75 %

B. 25 %

C. 50 %

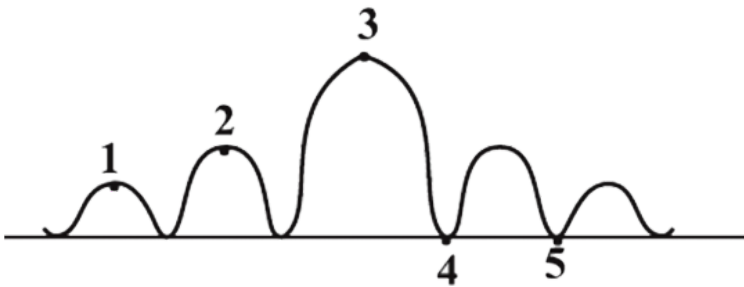
D. 100 %

**Answer: C**





42. The diffraction pattern of a single slit is shown in the figure. The point at which the path difference of the extreme rays is two times the wavelength is



A. point 1

B. point 2



C. point 4

D. points 5

**Answer: D**



**Watch Video Solution**

**43.** Two strings A and B of lengths,  $L_A = 80\text{cm}$  and  $L_B = x\text{cm}$  respectively are used separately in a sonometer. The ratio of their densities ( $\rho_A / \rho_B$ ) is 0.81. The diameter of B is one-half that of A. If the strings have the same

tension and fundamental frequency the value of  $x$  is

A. 33

B. 32

C. 144

D. 130

**Answer: C**



**Watch Video Solution**

44. What is the ratio of velocity of sound in hydrogen ( $\gamma = 7/5$ ) to that in helium ( $\gamma = 5/3$ ) at the same temperature?

A.  $\sqrt{\frac{5}{42}}$

B.  $\sqrt{\frac{5}{21}}$

C.  $\frac{\sqrt{42}}{5}$

D.  $\sqrt{\frac{21}{5}}$

**Answer: C**



**Watch Video Solution**

**45.** A modern 200 W sodium street lamp emits yellow light of wavelength  $0.6 \mu\text{m}$ . Assuming it to be 25% efficient in converting electrical energy to light, the number of photons of yellow light it emits per second is

A.  $1.5 \times 10^{20}$

B.  $6 \times 10^{18}$

C.  $62 \times 10^{20}$

D.  $3 \times 10^{19}$

**Answer: A**



**Watch Video Solution**