PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 91

Physics

1. The electron in a hydrogen atom makes a transition $n_1 \rightarrow n_2$ wher n_1 and n_2 are the principal quantum numbers of the two states .

Assume the Bohr model to be valid the time period of the electron in the initial state is eight times that in the final state . The possible values of n_1 and n_2 are :

A. $n_1 = 6, n_2 = 3$

B. $n_1 = 8, n_2 = 2$

C. $n_1 = n_2 = 1$

D. $n_1 = 8, n_2 = 1$

Answer: A

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2. The ionization energy of 10 times ionized sodium atom is

A. $\frac{13.6}{11}eV$

B. $\frac{13.6}{112}eV$

C. $13.6 \times (11)^2 eV$

D. $13.6eV$

Answer: C

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3. A small block of mass M moves with velocity 5 m/s towards an another block of same mass M placed at a distance of 2 m on a rough horizontal surface . Coefficient of friction between the blocks and ground is 0.25 . Collision between the two blocks is elastic , the separation between the blocks , when both of them come to rest , is (g = $10m/s^2$)

A. 3 m

B. 4 m

C. 2 m

D. 1.5 m

Answer: A

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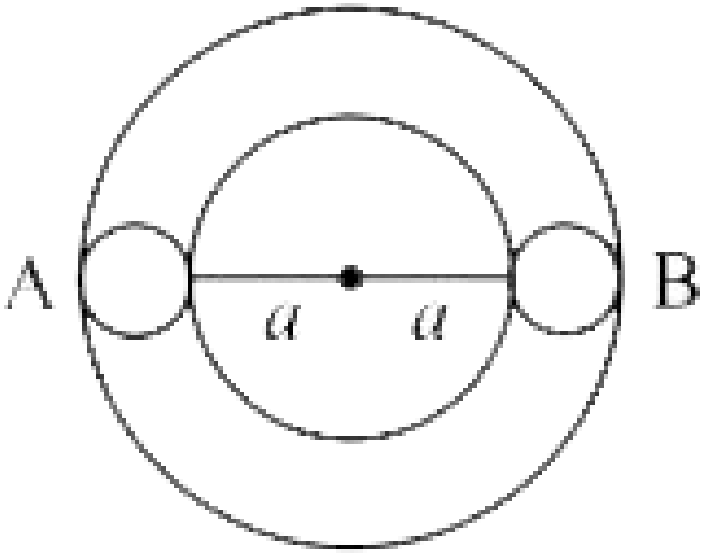
4. Two identical spheres A, B are in a smooth horizontal circular smooth groove at opposite ends of a diameter. A is projected along the groove and it impinges on B in a time interval

T. Let e be the coefficient of restitution, the



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

B. $\frac{\pi t}{e}$

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

D. $\frac{2t}{e}$

Answer: D

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5. A stone of mass 1 kg tied at the end of a string of length 1 m and is whirled in a verticle circle at a constant speed of $3ms^{-1}$. The tension in the string will be 19 N when the stone is $\left(g = 10ms^{-1}\right)$

A. Top of the circle

B. Bottom of the circle

C. Half way down

D. None of these

Answer: A

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6. A magnet of dipole moment $2Am^2$ is deflected through 30° from magnetic meridian. The required deflecting torque is $\left(B_H = 0.4 \times 10^{-4}T\right)$

A. $0.4 \times 10^{-4} Nm$

B. $0.4 Nm$

C. $0.2 \times 10^{-4} Nm$

D. $0.8 Nm$

Answer: A

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7. A mete bridge is used to determine the resistance of an unknown wire by measuring the balance point length l. If the wire is

replaced by another wire of same material but with double the length and half the thickness the balancing point is expected to be

A. $\frac{1}{8l}$

B. $\frac{1}{4l}$

C. $8l$

D. 16l

Answer: C

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8. All the edges of a block with parallel faces are unequal. Its longest edge is twice its shortest edge. The ratio of the maximum to minimum resistance between parallel faces is.

A. 8

B. 4

C. 2

D. 1

Answer: B

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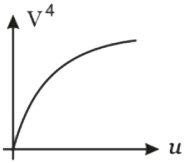
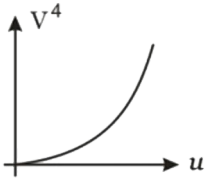
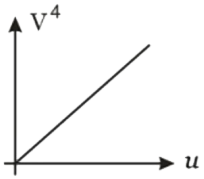
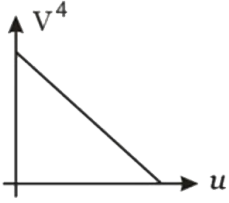
9. If V and u are electric potential and energy density, respectively, at a distance r from a positive point charge, then which of the following graph is correct ?

A. 

B. 

C. 

D. 

Answer: C

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10. The minimum value of effective capacitance that can be obtained by combining 3 capacitors of capacitances 1 pF, 2pF and 4pF is

A. $\frac{4}{7}$ pF

B. 1 pF

C. 2 pF

D. $\frac{7}{4}$ pE

Answer: A

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11. A coil of wire of a certain radius has 600 turns and a self-inductance of $108mH$. The self-inductance of a 2^{nd} similar coil of 500 turns will be

A. 80 mH

B. 75 mH

C. 108 mH

D. 90 mH

Answer: B

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12. A transformer has 230 volts applied to the primary and gives 4.6 V in the secondary. The

secondary is connected to a load which draws a current of 5A. The current in the primary is

A. 0.1

B. 1.0

C. 10

D. 250

Answer: A

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13. If radius of earth is R then the height ' h ' at which value of ' g ' becomes one-fourth is

A. $\frac{R}{8}$

B. R

C. $\frac{3R}{4}$

D. $\frac{R}{2}$

Answer: B

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14. The depth 'd' at which the value of acceleration due to gravity becomes $\frac{1}{n}$ times the value at the earth's surface is (R = radius of earth)

A. $d = R\left(\frac{n}{n-1}\right)$

B. $d = R\left(\frac{n-1}{2n}\right)$

C. $d = R\left(\frac{n-1}{n}\right)$

D. $d = R^2\left(\frac{n-1}{n}\right)$

Answer: C

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15. The spectral energy distribution of the sun has a maximum at 4754Å. If the temperature of the sun is 6050 K, what is the temperature of a star for which this maximum is at 9506Å?

A. 3025 K

B. 2785 K

C. 3240 K

D. 4015 K

Answer: A

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16. The relation between U, P and V for an iodeal gas is U=2+3PV. What is the atomicity of the gas.

A. Monoatomic

B. Diatomic

C. Neither monatomic nor diatomic

D. Either monatomic or diatomic

Answer: C

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17. The pressure P, Volume V and temperature T of a gas in the jar A and the other gas in the jar B at pressure $2P$, volume $V/4$ and temperature $2T$, then the ratio of the number of molecules in the jar A and B will be

A. $1:1$

B. $1:2$

C. $2:1$

D. $4:1$

Answer: D

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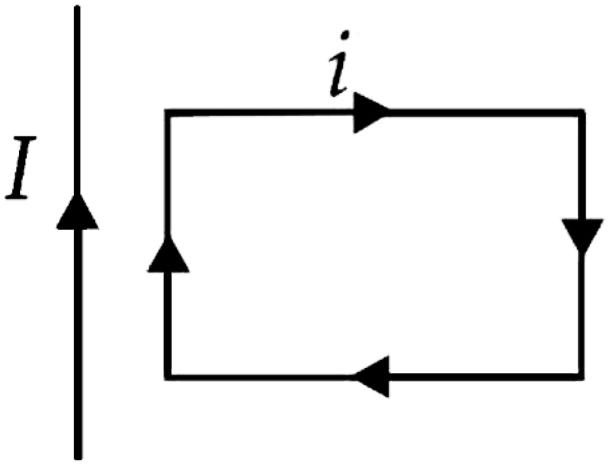
18. A rectangular loop carrying a current i is situated near a long straight wire such that the wire is parallel to one of the sides of the loop and is in the plane of the loop . If steady current I is established in the wire as shown

in the figure ,



A. Rotate about an axis parallel to the wire

B. Move away from the wire

C. Move towards the wire

D. Remain stationary

Answer: C

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19. A magnetic needle lying parallel to a magnetic field requires $Wunits$ of work to turn it through 60°. The torque needed to maintain the needle in this position will be

A. $\sqrt{3}W$

B. W

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

D. 2W

Answer: A

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20. If a car covers $\frac{2}{(5)^{th}}$ of the total distance with v_1 speed and $\frac{3}{(5)^{th}}$ distance with v_2. Then average speed is

A. $\frac{5v_1v_2}{3v_1+2v_2}$

B. $\frac{v_1+v_2}{2}$

C. $\frac{1}{2}\sqrt{v_1v_2}$

D. $\frac{2v_1v_2}{v_1+v_2}$

Answer: A

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21. From a 10 m high building a ston 'A' is dropped, and simultaneously another identical stone 'B' is thrown horizontally with an initial speed of $5ms^{-1}$. Which one of the following statement is true?

A. It is not possible to calculate which one of the two stones will reach the ground first

B. Both the stones ('A' and 'B') will reach the ground simultaneously

C. A' stone reaches the ground earlier than 'B'

D. B' stone reaches the ground earlier than 'A'

Answer: B

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22. The force on a particle of mass $10g$ is $\left(\hat{i}10 + \hat{j}5\right)$ N If it starts from rest what would be its position at time $t = 5s$?

A. $12500\hat{i} + 6250\hat{j}$m

B. $6250\hat{i} + 12500\hat{j}$m

C. $12500\hat{i} + 12500\hat{j}$m

D. $6250\hat{i} + 6250\hat{j}$m

Answer: A

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23. An elevator and its load have a total mass of 800 kg. If the elevator, originally moving downwards at $10ms^{-1}$, is brought to rest with constant deceleration in a distance of 25 m, the tension in the supporting canble will be $(g = 10ms^{-2})$

A. 8000 N

B. 1600 N

C. 9600 N

D. 6400 N

Answer: C

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24. The half-life of tritium is 12.5 years. What mass of tritium of initial mass 64 mg will remain undecayed after 50 years?

A. 32 mg

B. 8 mg

C. 16 mg

D. 4 mg

Answer: D

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25. The half life of $._{92}U^{238}$ against α -decay is 4.5×10^9 years. What is the activity of 1g sample of $._{92}U^{238}$?

A. 4.231×10^4 dps

B. 1.721×10^3 dps

C. 1.235×10^4 dps

D. 5.167×10^3 dps

Answer: C

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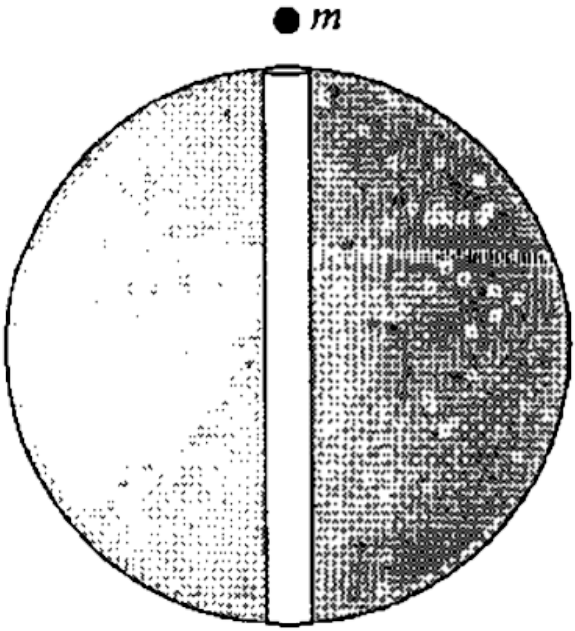
26. A tunnel is made inside earth passing throgh centre of earth. A particle is dropped from the surface of earth. Select the correct

statement :



A. $2\pi\sqrt{\frac{R}{g}}+4\sqrt{\frac{h}{g}}$

B. $2\pi\sqrt{\frac{R}{g}}+4\sqrt{\frac{2h}{g}}$

C. $2\pi\sqrt{\frac{R}{g}}+\sqrt{\frac{h}{g}}$

D. $2\pi\sqrt{\frac{R}{g}}+\sqrt{\frac{2h}{g}}$

Answer: B

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27. Two springs of constants k_1 and k_2 have equal maximum velocities, when executing simple harmonic motion. The ratio of their amplitudes (masses are equal) will be

A. $\left(\frac{k_1}{k_2}\right)^{\frac{1}{2}}$

B. $\left(\frac{k_1}{k_2}\right)$

C. $\left(\frac{k_2}{k_1}\right)$

D. $\left(\frac{k_2}{k_1}\right)^{\frac{1}{2}}$

Answer: D

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28. An earth- orbiting satellite has a solar energy collecting panel with total area $5m^2$ If solar radiations are perpendicular and completely absorbed, the average force associated with the radiation pressure is (Solar constant $= 1.4kWm^{-2}$)

A. $2.33 \times 10^{-3} N$

B. $2.33 \times 10^{-4} N$

C. $2.33 \times 10^{-5} N$

D. $2.33 \times 10^{-6} N$

Answer: C

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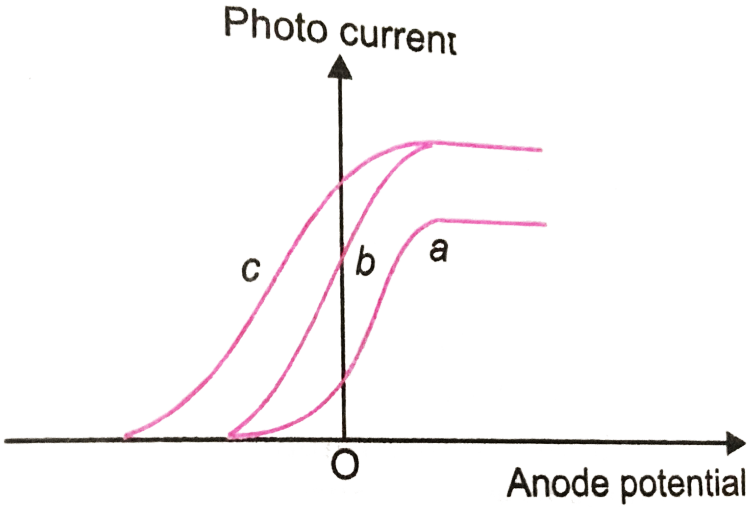
29. The fig. shows the variation of photon current with anode potential for a photo-sensitive surface for three different radiation.

Let I_a, I_b and I_c be the intensities and f_a, f_b and f_c be the frequency for the curves a,b and c respectively.



A. $v_a = v_b$ and $I_a \neq I_b$

B. $v_a = v_c$ and $I_a = I_c$

C. $v_a = v_b$ and $I_a = I_b$

D. $v_b = v_c$ and $I_b = I_c$

Answer: A

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30. A uniform cylinder of length L and mass M having cross-sectional area A is suspended, with its length vertical, from a fixed point by a massless spring such that it is half submerged in a liquid of density σ at equilibrium position.

The extension x_0 of the spring when it is in equlibrium is:

A. Mg/K

B. $\left(M\frac{g}{K}\right)(1 - LA\sigma / M)$

C. $(Mg / K)[1 - (LA\sigma / 2M)]$

D. $MgLA / K\sigma$

Answer: C

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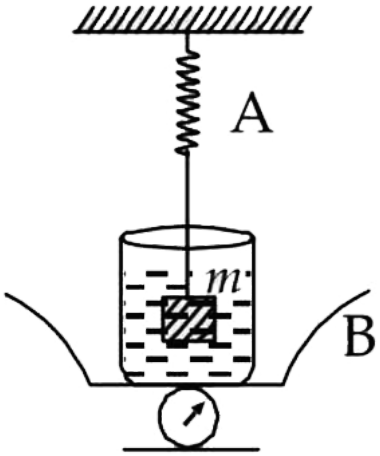
31. The spring balance A reads 2 kg with a block m suspended from it. A balance B reads 5kg when a beaker with liquid is put on the pan of the balance. The two balances are now so arranged that the hanging mass in inside the liquid in the beaker as shown in the figure. In this situation:



A. The balance A will read more than 2 kg

B. The balance B will read less than 5 kg

C. The balance A will read less than 2 kg and B will read more than 5 kg

D. The balance A will read more than 2 kg and B will read less than 5 kg

Answer: C

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32. A biconvex lens of focal length 15 cm is in front of a plane mirror. The distance between the lens and the mirror is 10 cm. A small object is kept at a distance of 30 cm from the lens. The final image is

A. Virtual and at a distance of 16 cm from the mirror

B. Real and at a distance of 16 cm from the mirror

C. Virtual and at a distance of 20 cm from the mirror

D. None of the above

Answer: B

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33. A concave mirror is placed on a horizontal table, with its axis directed vertically upwards. Let O be the pole of the mirror and C its centre of curvature. A point object is placed at

C. It has a real image, also located at C. If the mirror is now filled with water, the image will be.

A. real, and will remain at C

B. real, and located at a point between C and ∞

C. virtual , and located at a point between C and O

D. real , and located at a point between C and O

Answer: D

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34. A uniform cube of mass m and edge a moves on a horizontal surface along the positive x-axis, with initial velocity v_0. Then

A. During motion, $N >$ mg

B. During motion , normal reaction acts on the centre of mass

C. During motion, the normal reaction shifts towards positive x - axis from the centre of mass

D. During motion, normal reaction shifts in the direction of the forces of friction

Answer: C

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35. A disc of mass 4.8 kg and radius 1 m is rolling on a horizontal surface without sliding with angular velocity of 600 rotations/min. What is the total kinetic energy of the disc ?

A. 360 J

B. $1440\pi^2 J$

C. $4000\pi^2 J$

D. $600\pi^2 J$

Answer: A

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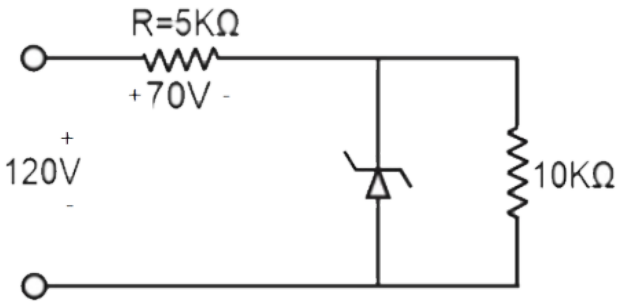
36. For the circuit shown in the figure :



A. Current through Zener diode is 4 mA

B. Current through Zener diode is 9 mA

C. The output voltage is 60 V

D. The output voltage is 40 V

Answer: B

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37. A Ge specimen is dopped with Al. The concentration of acceptor atoms is $\sim 10^{21} atoms/m^3$. Given that the intrinsic concentration of electron hole pairs is $\sim 10^{19}/m^3$, the concentration of electron in the speciman is

A. $10^{17} m^{-3}$

B. $10^{15}m^{-3}$

C. $10^{4}m^{-3}$

D. $10^{2}m^{-3}$

Answer: A

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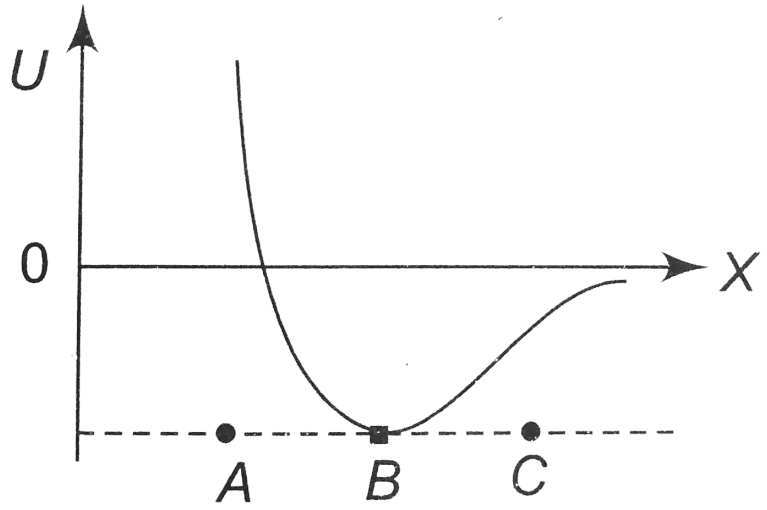

38.

The potential energy U between two molecules as a function of the distance X between them has been shown in the figure. The two molecules are

A. Attracted when x lies between A and B and are repelled when x lies between B

and C

B. Attracted when x lies between B and C and are repelled when x lies between A and B

C. Attracted when they reach B

D. repelled when they reach B

Answer: B

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39. In the relation $\frac{dy}{dt} = 2\omega \sin(\omega t + \phi_0)$, the dimensional formula for $\omega t + \phi_0$ is

A. $[MLT]$

B. $[MLT^0]$

C. $[ML^0T0]$

D. $[M^0L^0T^0]$

Answer: D

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40. In Young's double slit experiment, two wavelength $\lambda_1 = 780nm$ and $\lambda_2 = 520$ nm are used to obtain interference fringes. If the nth bright band due to λ_1 coincides with $(n+1)^{th}$ bright band due to λ_2 then the value of n is

A. 4

B. 3

C. 2

D. 6

Answer: C

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41. Resolving power of telescope increases when

A. wavelength of light decreases.

B. wavelength of light increases.

C. focal length of eye- piece increases

D. focal length of eye - piece decreases.

Answer: A

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42. Two periodic waves of intensities I_1 and I_2 pass through a region at the same time in the same direction. The sum of the maximum and minimum intensities is

A. $I_1 + I_2$

B. $\left(\sqrt{I_1} + \sqrt{I_2}\right)$

C. $\left(\sqrt{I_1} - \sqrt{I_2}\right)^2$

D. $2(I_1 + I_2)$

Answer: D

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43. A car is moving towards a high cliff. The car driver sounds a horn of frequency f. The reflected sound heard by the driver has a frequency $2f$. if v be the velocity of sound, then the velocity of the car, in the same velocity units, will be

A. $\frac{v}{\sqrt{2}}$

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

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

D. $\frac{v}{2}$

Answer: B

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44. A small object of mass of 100 g moves in a circular path . At a given instant velocity of the object is $10\hat{i}ms^{-1}$ and acceleration is

$\left(20\hat{i}+10\hat{j}\right)ms^{-2}$. At this instant of time. the rate of change of kinetic energy of the object is

A. 200kg m^2s^{-2}

B. 300kg m^2s^{-2}

C. 10000kg m^2s^{-2}

D. 20kg m^2s^{-2}

Answer: D

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45. A uniform force of 4 N acts on a body of mass 10 kg for a distance of 2.0 m . The kinetic energy acquired by the body is

A. 16 J

B. 32×10^8 erg

C. 8 J

D. 32 erg

Answer: C

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