PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET TEST 112

Physics

1. Magnetic moment due to the motion of the electron in n^{th} energy state of hydrogen atom is proportional to :

A. n

B. n_0

C. n^5

D. n^3

Answer: A

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2. As par Bohr model, the minimum energy (in eV) required to remove an electron from the

ground state of doubly ionized Li atom $(Z = 3)$ is

A. 1.51

B. 13.6

C. 40.8

D. 122.4

Answer: D

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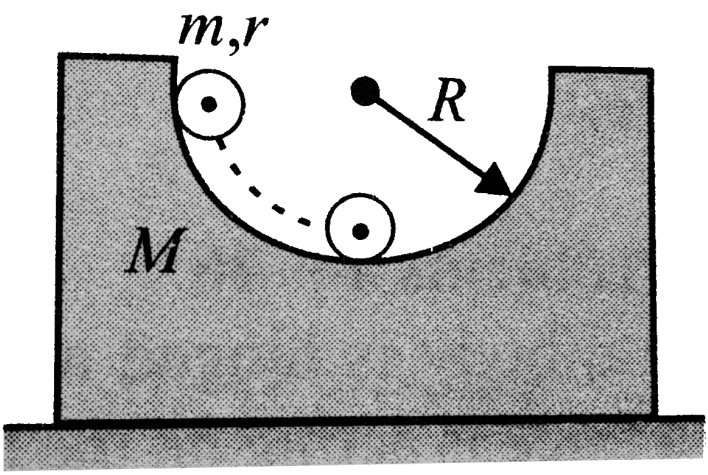
3. A uniform solid cylinder of mass $2kg$ and radius $0.2m$ is released from rest at the top of a semicircular track of radius $0.7m$ cut in a block of mass $M = 3kg$ as shown in Fig. The block is resting on a smooth horizontal surface and the cylinder rolls down without slipping. Based on the above information, answer the following questions:



The distance moved by the block when the cylinder reaches the bottom of the track is

A. $R - r$

B. $\frac{m(R-r)}{M+m}$

C. $\frac{M}{M+m}(R-r)$

D. $\frac{M}{M-m}r$

Answer: B

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4. When two bodies collide elastically, the force of interaction between them is

A. Conservative

B. Non -conservative

C. Either conservative or non - conservativ

D. zero

Answer: A

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5. A solid body rotates about a stationary axis accordig to the law $\theta = 6t - 2t^3$. Here θ, is in radian and t in seconds. Find

(a). The mean values of thhe angular velocity and angular acceleration averaged over the time interval between $t = 0$ and the complete stop.

(b). The angular acceleration at the moment

when the body stops.

Hint: if $y = y(t)$. then mean/average value of y between t_1 and t_2 is $< y \geq \frac{\int_{t_1}^{t_2} y(t)dt}{t_2 - t_1}$

A. $1rads^{-1}$

B. $2rads^{-1}$

C. $3rads^{-1}$

D. $4rads^{-1}$

Answer: D

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6. x_1 and x_2 are susceptibility of a Paramagnetic material at temperatures T_1, K and $T_2 K$ respectively, then

A. $x_1 T_1 = x_2 T_2$

B. $x_1 T_2 = x_2 T_1$

C. $x_1 T_2 = x_2 T_1$

D. $x_1 \sqrt{T_1} = x_2 \sqrt{T_1}$

Answer: B

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7. When a Daniel cell is connected in the secondary circuit of a potentiometer, the balancing length is found to be 540 cm. If the balancing length becomes 500 cm. When the cell is short-circuited with 1Ω, the internal resistance of the cell is

A. 0.08Ω

B. 0.04Ω

C. 1.08Ω

D. 1.45Ω

Answer: A

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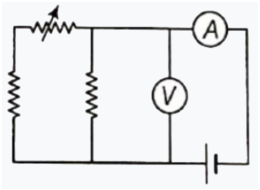
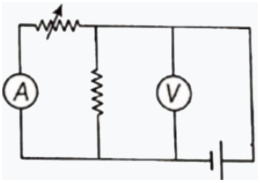
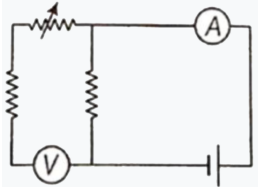
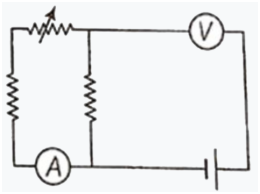
8. Express which of the following set ups can be used to verify ohm's law?

A. 

B. 

C. 

D. 

Answer: B

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9. A current carrying coil is subjected to a uniform magnetic field. The coil will orient so that its plane become

A. Inclined at 45° to the magnetic field

B. Inclined at any arbitrary angle to the magnetic field

C. Parallel to the magnetic field

D. Perpendicular to the magnetic field

Answer: D

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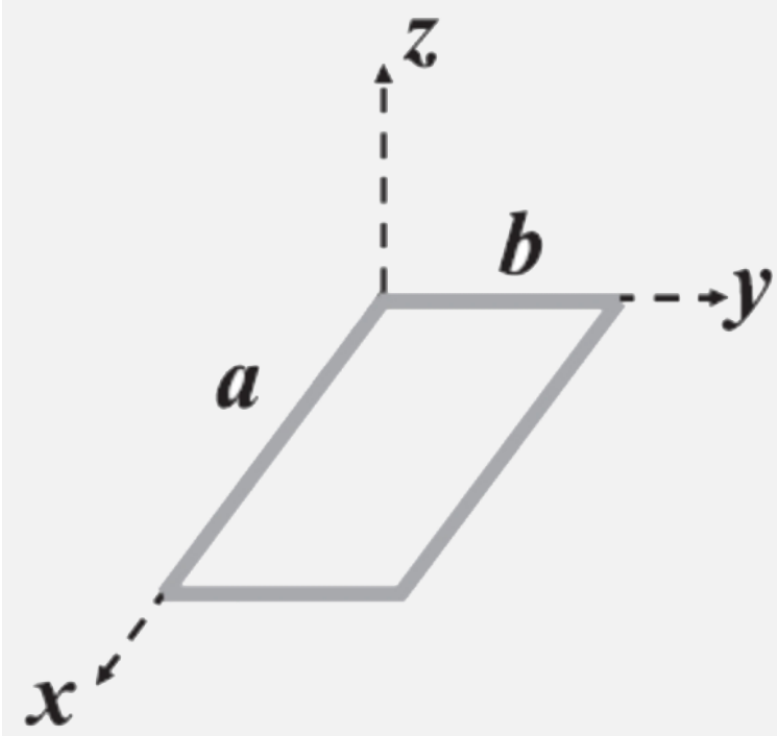
10. A rectangular wire loop with length a and width b lies in the xy-plane as shown. Within the loop, there is a time dependent magnetic field given by $\overrightarrow{B} = c\Big[(x\cos\omega t)\hat{i} + (y\sin\omega t)\hat{k}\Big]$. Here , c and ω are constants. The magnitude of emf

induced in the loop as function of time is



A. $\left|\frac{ab^2c}{2}\omega\cos\omega t\right|$

B. $\left|ab^2c\omega\cos\omega t\right|$

C. $\left|\frac{ab^2c}{2}\omega\sin\omega t\right|$

D. None of the options

Answer: A

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11. Four point charges $-Q, -q, 2q$ and $2Q$ are placed, one at each corner of the square. The relation between Q and q for which the potential at the centre of the square is zero is

A. $Q = -q$

B. $Q = -\frac{1}{q}$

C. $Q = q$

D. $Q = \frac{1}{q}$

Answer: A

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12. Two capacitors of capacitance C are connected in series. If one of them is filled with dielectric substance K, what is the effective capacitance?

A. $\frac{KC}{(1+K)}$

B. $C(K+1)$

C. $\frac{2KC}{(1+K)}$

D. None of these

Answer: A

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13. Calculate the binding energy of the earth-sum system . Mass of the earth $= 6 \times 10^{24}$ kg , mass of the sun $=2 \times 10^{30}$ kg, distance between the earth and the sun $=1.5 \times 10^{11}$

and gravitational constant = 6.6×10^{-11} Nm^2kg^2

A. $8.8 \times 10^{10} J$

B. $8.8 \times 10^{3} J$

C. $5.2 \times 10^{33} J$

D. $2.6 \times 10^{33} J$

Answer: D

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14. A stationary object is released from a point P a distance 3R from the centre of the moon which has radius R and mass M. which one of the following expressions gives the speed of the object on hitting the moon?

A. $\left(\frac{2GM}{3R}\right)^{\frac{1}{2}}$

B. $\left(\frac{4GM}{3R}\right)^{\frac{1}{2}}$

C. $\left(\frac{2GM}{R}\right)^{\frac{1}{2}}$

D. $\left(\frac{GM}{R}\right)^{\frac{1}{2}}$

Answer: B

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15. A bucket full of hot water cools from $75^\circ C$ to $70^\circ C$ in time T_1, from $70^\circ C$ to $65^\circ C$ in time T_2 and from $65^\circ C$ to $60^\circ C$ in time T_3, then

A. $T_1 = T_2 = T_3$

B. $T_1 > T_2 > T_3$

C. $T_1 < T_2 < T_3$

D. $T_1 > T_2 < T_3$

Answer: C

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16. A vessel containing 1 g of oxygen at a pressure of 10 atm a temperature of $47^\circ C$. It is found that because of a leak, the pressure drops to $5/8th$ of its original value and the temperature falls to $27^\circ C$. Find the volume of

the vessel and the mass of oxygen that is leaked out.

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

B. $\frac{1}{48}g$

C. $1g$

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

Answer: A

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17. In Carnot engine, efficiency is 40% at hot reservoir temperature T. For efficiency 50% , what will be the temperature of hot reservoir?

A. $\frac{2T}{5}$

B. $6T$

C. $\frac{6T}{5}$

D. $\frac{T}{5}$

Answer: C

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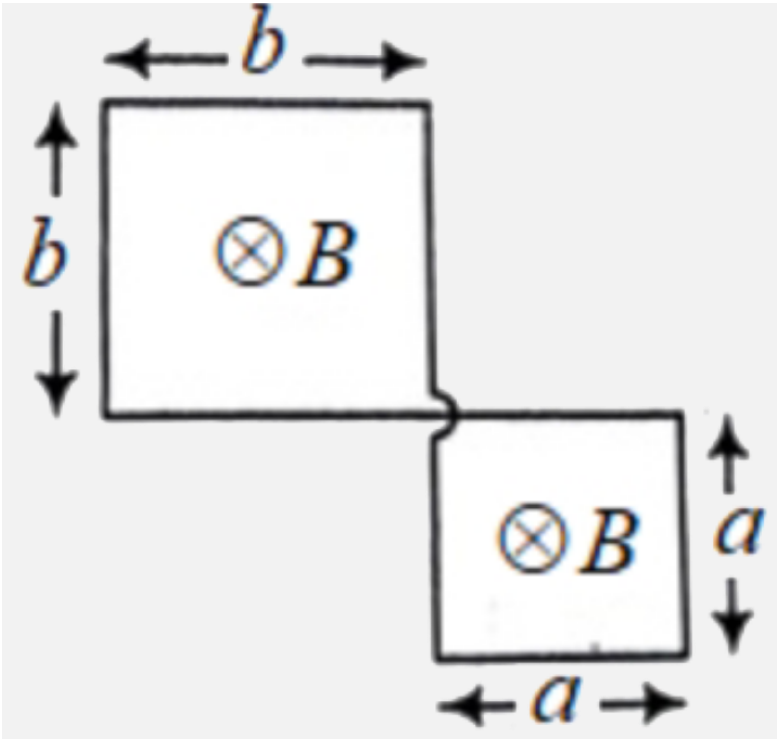
18. A conducting loop (as shown) has total resistance R. A uniform magnetic field $B = \gamma t$ is applied perpendicular to plane of the loop where γ is constant and t is time. The induced current flowing through loop is



A. $\frac{\left(b^2+a^2\right)\gamma t}{R}$

B. $\frac{\left(b^2-a^2\right)\gamma}{R}$

C. $\frac{(b^{-a}\hat{}\,2)\gamma t}{R}$

D. $\frac{\left(b^2+a^2\right)\gamma}{R}$

Answer: B

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19. An electron and a proton have equal kinetic energies. They enter in a magnetic field

perpendicularly, Then

A. Both will follow a circular path with same radius

B. Both will follow a helical path

C. Both will follow a parabolic path

D. All of statements are false

Answer: D

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20. The motion of a particle along a straight line is described by equation : $x = 8 + 12t - t^3$ where x is in metre and t in second. The retardation of the particle when its velocity becomes zero is.

A. $24ms^{-2}$

B. Zero

C. $6ms^{-2}$

D. $12ms^{-2}$

Answer: D

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21. A particle of mass m is projected from the ground with initial linear momentum p (magnitude) such that to have maximum possible range, its minimum kinetic energy will be

A. $\frac{p^2}{2m}$

B. $\frac{p^2}{4m}$

C. $\frac{p^2}{m}$

D. $\frac{p^2}{3m}$

Answer: B

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22. While waiting in a car at a signal, an 80 kg man and his car are suddenly accelerated to a speed of $5ms^{-1}$ due to a rear-end collision by another vehicle. If the time of impact is 0.4s, the average force on the man is

A. 100 N

B. 200 N

C. 500 N

D. 1000 N

Answer: D

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23. The minimum force required to move a body up on an inclined plane is three times the minimum force required to prevent it from sliding down the plane.If the coefficient of

friction between the body and the inclined plane is $\frac{1}{2\sqrt{3}}$ the angle of the inclined plane is

A. 60°

B. 45°

C. 30°

D. 15°

Answer: C

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24. A sample contains $10^{-2}kg$ each of two substances A and B with half lives 4 sec and 8 sec respectively. Their atomic weights are in the ratio $1:2$. Find the amounts of A and B after an interval of 16 seconds.

A.

$$A = 0.625 \times 10^{-4}kg, B = 0.25 \times 10^{-3}kg$$

B.

$$A = 0.25 \times 10^{-3}kg, B = 0.625 \times 10^{-4}kg$$

C. $A = 2.5 \times 10^{-3}kg, B = 6.25 \times 10^{-4}kg$

D. $A = 6.25 \times 10^{-3} kg, B = 2.5 \times 10^{-3} kg$

Answer: D

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25. A neutron collides head-on and elasticity with an atom of mass number A, which is initially at rest. The fraction of kinetic energy retained by neutron is

A. $\left(\frac{A}{A+1}\right)^2 E$

B. $\frac{A}{(A+1)^2}E$

C. $\left(\frac{A-1}{A+1}\right)^2 E$

D. $\frac{(A-1)}{(A+1)^2}E$

Answer: C

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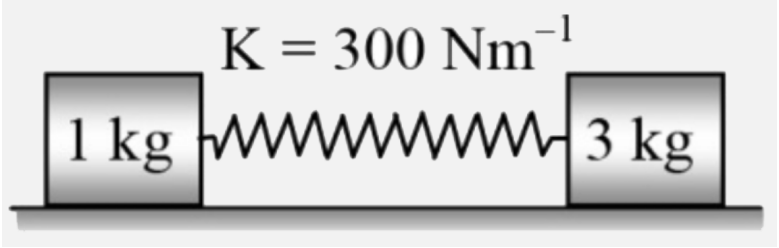
26. Two point masses of 3.0 kg and 1.0 kg are attached to opposite ends of a horizontal spring whose spring constant is $300Nm^{-1}$ as shown in the figure. The natural vibration

frequency of the system is of the order of :



A. 4 Hz

B. 3 Hz

C. 2 Hz

D. 1 Hz

Answer: B

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27. A simple harmonic motion is represented by $x(t) = \sin^2 \omega t - 2\cos^2 \omega t$. The angular frequency of oscillation is given by

A. ω

B. 2ω

C. 4ω

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

Answer: B

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28. About $5\,\%$ of the power of a $100W$ light bulb is converted to visible radiation. What is the average intensity of visible radiation

(a) at a distance of $1m$ from the bulb?

(b) at a distance of $10m$?

Assume that the radiation is emitted isotropically and neglect reflection.

A. $4 \times 10^{-3} Wm^{-2}$

B. $5 \times 10^{-3} Wm^{-2}$

C. $6 \times 10^{-3} Wm^{-2}$

D. $7 \times 10^{-3} Wm^{-2}$

Answer: A

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29. A light beam consists of two types of photons. In one type, each photon has the energy 2 eV and in another type, each photon has energy 3 eV. The light beam is incident on a photoelectric material of work function 1 eV.

The maximum kinetic enregy of emitted photoelectron is

A. 2 eV

B. 3 eV

C. 4 eV

D. 1 eV

Answer: A

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30. In each heart beat, a heart pumps 80 ml blood at an average pressure of 100 ml of Hg. What will be the power output of the herat? (Assume 60 heart beat per minute

A. 1 W

B. 2.75 W

C. 1.06 W

D. 0.5 W

Answer: C

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31. If two wires of same length l and are of the cross-section A with young modulus Y and 2Y connect in series and one end is fixed on roof and another end with mass m makes simple harmonic motion, then the time period is

A. $2\pi\sqrt{\frac{ml}{YA}}$

B. $2\pi\sqrt{\frac{ml}{3YA}}$

C. $2\pi\sqrt{\frac{3ml}{2YA}}$

D. $2\pi\sqrt{\frac{ml}{2YA}}$

Answer: C

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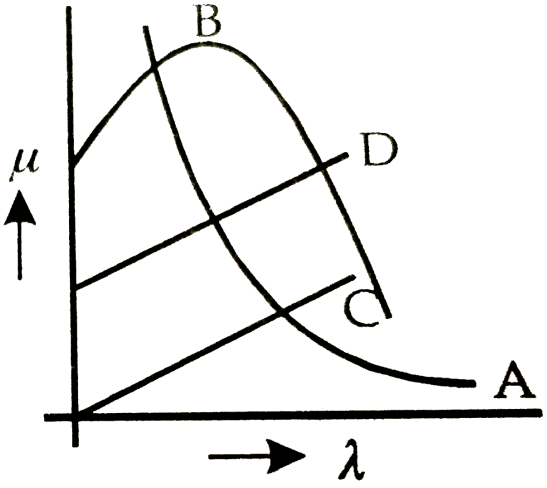
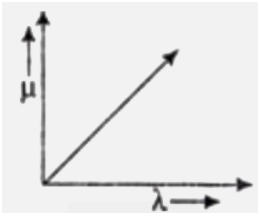
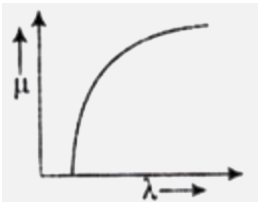
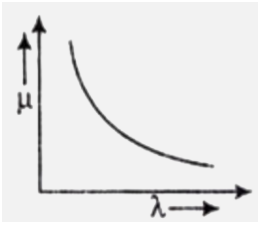
32. The correct curve between refractive index μ and wavelength λ will be



A. 

B. 

C. 

D. 

Answer: D

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33. When the angle of incidence on a material is 60°, the reflected light is completely polarised. The velocity of the refracted ray inside the materials is (in m//sec^(-1))

A. $3 \times 10^8 ms^{-1}$

B. $\sqrt{3} \times 10^8 ms^{-1}$

C. $\frac{3}{\sqrt{2}} \times 10^8 ms^{-1}$

D. $\frac{1}{3} \times 10^8 ms^{-1}$

Answer: B

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34. For a circular cardboard of uniform thickness and mass M, a square disc of the maximum possible are is cut. If the moment of inertia of the square with the moment of inertial of the square with the axis of rotation at the centre and perpendicular to the plane of the disc is $\frac{Ma^2}{6}$, the radius of the circular cardboard is

A. $\sqrt{2}a$

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

C. $2a$

D. $2\sqrt{2}a$

Answer: B

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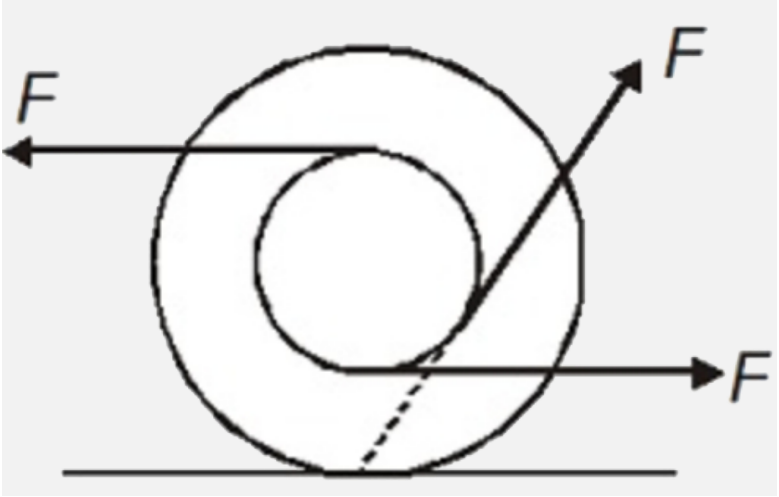
35. Consider the following diagram. In which direction, the motion of the spool of thread (acted upon by three forces shown) kept over a perfectly rough horizontal surface will take

place ?



A. Right side

B. Left side

C. The spool of thread remains in the state of rest

D. Information is insufficient

Answer: B

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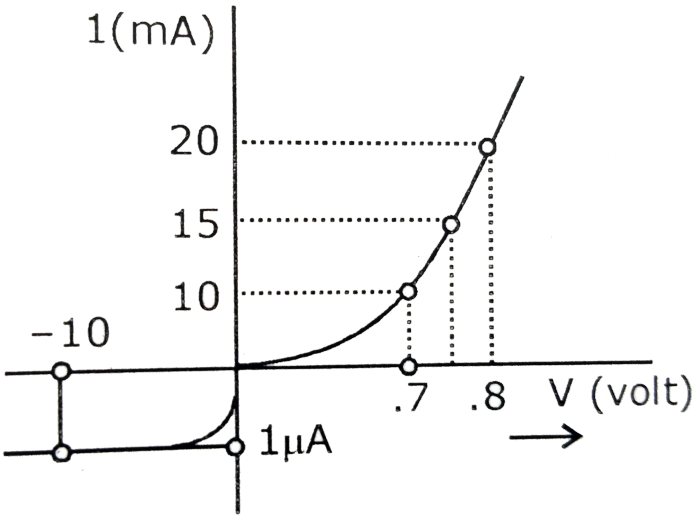
36. The V-I characteristic of a diode is shown in the figure. The ratio of forward to reverse bias resistance is



A. 10

B. 10^{-6}

C. 10^{6}

D. 100

Answer: B

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37. A common emitter amplifier has a voltage gain of 50, an input impedance of 100Ω and an

output impedance of 200 Ω. The power gain of the amplifier is :-

A. 500

B. 1000

C. 1250

D. 100

Answer: C

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38. At constant temperature if the pressure of an ideal gas is increased by 10% then its volume must decrease by

A. 0.0909

B. 0.1

C. 0.05

D. 0.2

Answer: A

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39. The resistance $R = \frac{V}{I}$, where $V = (100 \pm 5.0)V$ and $I = (10 \pm 0.2)A$. Find the percentage error in R.

A. 0.052

B. 0.048

C. 0.07

D. 0.03

Answer: C

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40. In Young's double-slit experiment, if yellow light is replaced by blue light, the interference fringes become

A. Darker

B. Brighter

C. Wider

D. Narrower

Answer: D

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41. A parallel beam of light of wavelength 4000Å passes through a slit of width $5 \times 10^{-3} m$. The angular spread of the central maxima in the diffraction pattern is

A. $1.6 \times 10^{-3} rad$

B. $1.6 \times 10^{-4} rad$

C. $3.2 \times 10^{-3} rad$

D. $3.2 \times 10^{-4} rad$

Answer: B

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42. If in a resonance tube, oil of density higher than that of water is used, then the resonance frequency would

A. Increase

B. Decrease

C. Slightly increase

D. Remain same

Answer: D

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43. Which frequency produces a sound that can be heard by a person?

A. 100 kHz

B. 40 kHz

C. 2 kHz

D. 30 kHz

Answer: C

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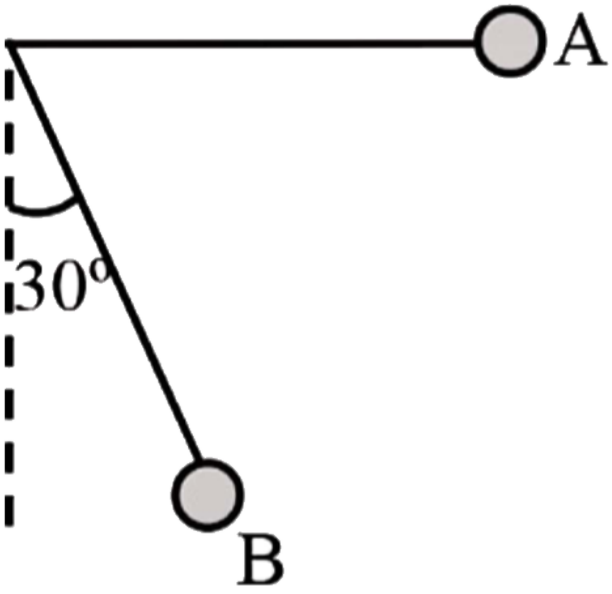
44. A simple pendulum is released from A as shown. If m and 1 represent the mass of the bob and length of the pendulum, the gain kinetic energy at B is



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

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

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

D. $\frac{2}{\sqrt{3}}mgl$

Answer: C

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45. An engine can pull four coaches at a maximum speed of $20ms^{-1}$. The mass of the engine is twice the mass of every coach.

Assuming resistive forces to be proportional to the weight, approximate maximum speeds of the engine, when it pulls 12 and 6 coaches, are

A. $8.5ms^{-1}$ and $15ms^{-1}$ respectively

B. $6.5ms^{-1}$ and $8ms^{-1}$ respectively

C. $8.5ms^{-1}$ and $13ms^{-1}$ respectively

D. $10.5ms^{-1}$ and $15ms^{-1}$ respectively

Answer: A

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