PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 26

Physics

1. The relation between time t and distance x is $t = ax^2 + bx$ where a and b` are constants. The acceleration is

A. $-2abv^2$

B. $2bv^3$

C. $-2av^3$

D. $2av^2$

Answer: C

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2. The radiation having the least wavelength out of the following options is

A. γ - rays

B. β - rays

C. α - rays

D. X - rays

Answer: A

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3. A parallel plate capacitor of capacitance C is connected to a battery and is charged to a potential difference V. Another capacitor of

capacitance 2C similarly charged to a potential difference 2V. The charging battery is now disconnected and the capacitors are connected in parallel to each other in such a way that the positive terminal of one is connected to the negative terminal of the other. The final energy of the configuration is

A. zero

B. $\frac{25}{6}CV^2$

C. $\frac{9}{2}CV^2$

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

Answer: D

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4. Water enters through end A with a speed v_1 and leaves through end B with a speed v_2 of cylindrical tube AB. The tube is always completely filled with water. In case I the tube is horizontal, in case II it vertical with the end A upward and in case III it is vertical with the end B upward. We have $v_1 = v_2$for

A. case I

B. case II

C. case III

D. each case

Answer: D

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5. The thermistors are usually made of

A. metal with low temperature coefficient of resistivity

B. metals with high temperature coefficient of resistivity

C. metal oxides with high temperature coefficient of resistivity

D. semiconducting materials having low temperature coefficient of resistivity

Answer: C

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6. An isolated particle of mass m is moving in horizontal planexy along the x-axis, at a certain height above the ground. It suddenly explodes into two fragment of masses $m/4$ and $3m/4$. An instant later, the smaller fragment is at $y = +15$ cm. The larger fragment at this instant is at

A. $y = -5cm$

B. $y = +20cm$

C. $y = +5cm$

D. $y = -20cm$

Answer: A

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7. A body A of mass M while falling vertically downwards under gravity brakes into two parts, a body B of mass $\frac{1}{3}$ M and a body C of mass $\frac{2}{3}$ M. The center of mass of bodies B and C taken together shifts compared to that of body A towards

A. depends on height of breaking

B. does not shift

C. body C

D. body B

Answer: B

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8. The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength

shorter than $2480nm$ is incident on it. The band gap in (eV) for the semiconductor is.

A. 0.9

B. 0.7

C. 0.5

D. 1.1

Answer: C

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9. A particle executes simple harmonic motion with a frequency. (f). The frequency with which its kinetic energy oscillates is.

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

B. f

C. 2f

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

Answer: C

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10. Electrons with de- Broglie wavelength λ fall on the target in an X- rays tube . The cut off wavelength of the emitted X- rays is

A. $\lambda_0 = \frac{2m\lambda^2 c}{h}$

B. $\lambda_0 = \frac{2h}{mc}$

C. $\lambda_0 = \frac{2m^2c^2\lambda^3}{h^2}$

D. $\lambda_0 = \lambda$

Answer: A

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11. In the ideal double-slit experiment, when a glass-plate (refractive index 1.5) of thickness t is introduced in the path of one of the interfering beams (wavelength λ), the intensity at the position where the central maximum occurred previously remains unchanged. The minimum thickness of the glass-plate is

A. 2λ

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

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

D. λ

Answer: A

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12. The given truth table relates Y to A and B.

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

Then, Y is given by

A. $A + B$

B. AB

C. $\overline{AB}$

D. $\overline{A+B}$

Answer: D

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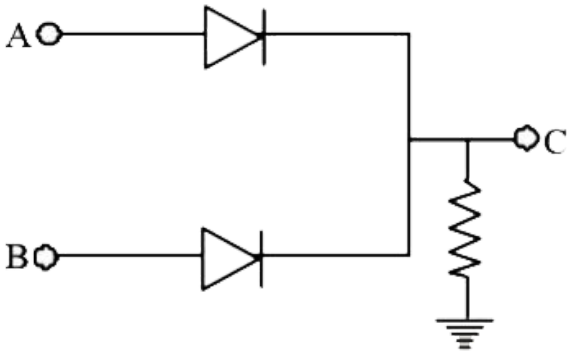
13. In the circuit below, A and B represent two inputs and C represents the output.



The circuit represents

A. OR gate

B. NOR gate

C. AND gate

D. NAND gate

Answer: A

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14. A whistle producing sound waves of frequencies $9500Hz$ and above is approaching a stationary person with speed vms^{-1}. The velocity of sound in air is $300ms^{-1}$. If the person can hear frequencies upto a maximum of $10,000Hz$.The maximum value of v upto which he can hear whistle is

A. $30\ \mathrm{ms}^{-1}$

B. $15\sqrt{2}ms^{-1}$

C. $\frac{15}{\sqrt{2}}ms^{-1}$

D. $15ms^{-1}$

Answer: D

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15. The maximum kinetic energy of electrons emitted in the photoelectric effect is linearly dependent on the ..... Of the incident radiation .

A. amplitude

B. period

C. wavelength

D. frequency

Answer: D

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16. Two concentric spherical conducting shells of radii R and 2R are carrying charges q and 2q, respectively. Both are now connected by a

conducting wire. Find the change in electric potential (inV) on the outer shell.

A. zero

B. $\frac{3kQ}{2R}$

C. $\frac{kQ}{R}$

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

Answer: A

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17. When the current changes from $+2A$ to $-2A$ in $0.05s$, and emf of $8V$ is induced in a coil. The coefficient of self-induction of the coil is

A. 0.2 H

B. 0.4 H

C. 0.8 H

D. 0.1 H

Answer: D

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18. Which of the following parameters does not characterize the thermodynamic state of matter?

A. Temperature

B. Pressure

C. Work

D. Volume

Answer: C

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19. In Young's double slit experiment, the separation between the slits is halved and the distance between the slits and the screen is doubled. The fringe width is

A. remain the same

B. be halved

C. be doubled

D. be quadrupled

Answer: D

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20. A coil is suspended in a uniform magnetic field, with the plane of the coil parallel to the magnetic lines of force. When a current is passed through the coil it starts oscillating, It is very difficult to stop. But if an aluminium plate is placed near to the coil, it stops. This is due to :

A. induction of electrical charge on the plate.

B. shielding of magnetic lines of force as aluminium is a paramagnetic material.

C. electromagnetic induction in the aluminium plate giving rise to electromagnetic damping.

D. development of air current when the the plate is placed.

Answer: C

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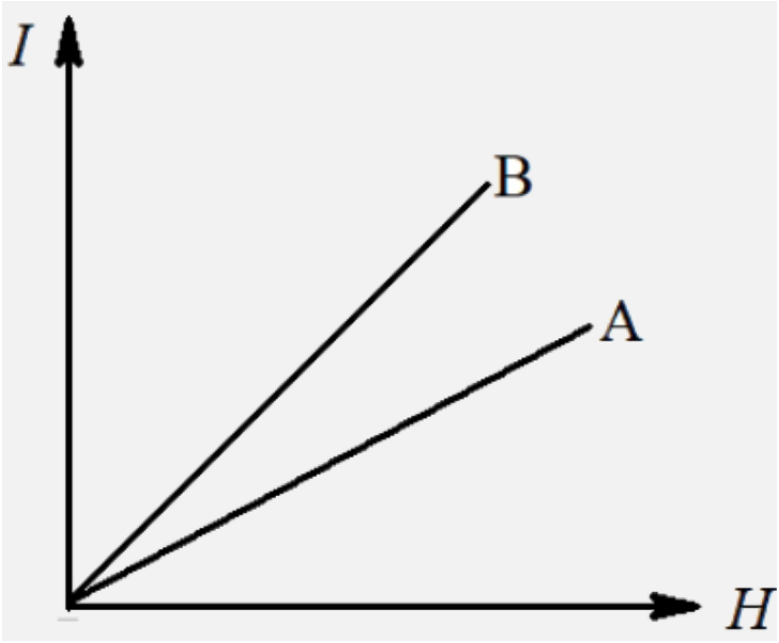
21. The following figure shows the variation of intensity of magnetisation I versus the applied magnetic field intensity H, for two magnetic materials A and B



Which of the material have a larger susceptibility for a given field at constant temperature?

A. Material B

B. Material B and Material A have the same susceptibility

C. Material A

D. None of these

Answer: A

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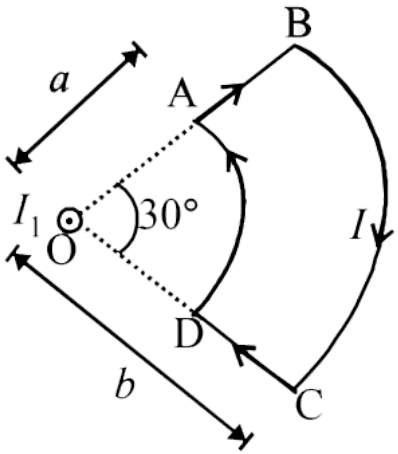
22. A current loop $ABCD$ is held fixed on the plane of the paper as shown in figure. The arcs $BC(radius = b)$ and $DA(radius = a)$ of the loop are joined by two straight wires AB and CD at the origin O is 30^(@) . $A \neg herstraightth \in wirewithsteadycurrent$ I_(1)` flowing out of the plane of the paper is kept at the origin .



The magnitude of the magnetic field (B) due to the loop $ABCD$ at the origin (o) is :

A. Zero

B. $\frac{\mu_0 I(b-a)}{24ab}$

C. $\frac{\mu_0 l}{4\pi}\left[\frac{b-a}{ab}\right]$

D. $\frac{\mu_0 l}{4\pi}\left[2(b-a)+\frac{\pi}{3}(a+b)\right]$

Answer: B

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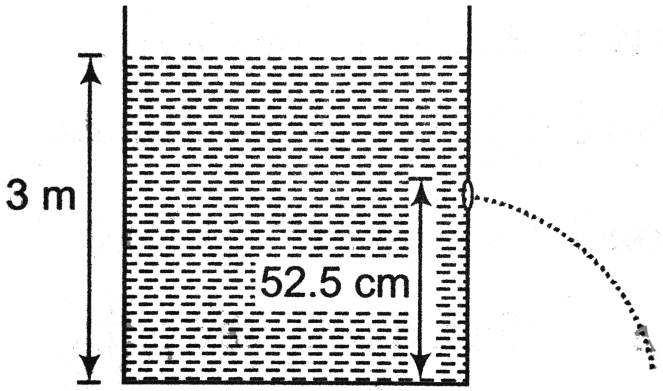
23. Water is filled in a cylindrical container to a height of $3m$. The ratio of the cross-sectional area of the orifice and the beaker is 0.1. The square of the speed of the liquid coming out

from the orifice is $\left(g = 10m/s^2\right)$.



A. $50m^2s^{-2}$

B. $54m^2s^{-2}$

C. $51m^2s^{-2}$

D. $52m^2s^{-2}$

Answer: A

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24. If the distance between the earth and the sun were half its present value, the number of days in a year would have been

A. 64.5

B. 129

C. 182.5

D. 730

Answer: B

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25. A spot light S rotates in a horizontal plane with a constant angular velocity of $0.1 rad/s$. The spot of light P move along the wall at a disatnce $3m$. What is the velocity of the spot P when $\theta = 45^\circ$?

A. $0.3\ \mathrm{ms}^{-1}$

B. $0.2\ \mathrm{ms}^{-1}$

C. $0.6\ \mathrm{ms}^{-1}$

D. $0.1\ \mathrm{ms}^{-1}$

Answer: A

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26. If a current is passed through a spring then the spring will

A. expand

B. compress

C. remainss same

D. none of these

Answer: B

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27. If the mass defect of $._5 B^{11}$ is 0.081 u, its average binding energy (in MeV) is

A. 8.60 MeV

B. 6.85 MeV

C. 6.60 MeV

D. 5.86 MeV

Answer: B

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28. The time taken by a photoelectron to come out after the photon strikes is approximately

A. $10^{-1}s$

B. $10^{-4}s$

C. $10^{-10}s$

D. $10^{-16}s$

Answer: C

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29. On applying a constant torque, a wheel at rest, turns through 400 radian in $10s$. Find angular acceleration. If same torque continues to act, what will be angular veclocity of the wheel after $20s$ from stars ?

A. $160\ \mathrm{rad\ s^{-1}}$

B. $150\ \mathrm{rad\ s^{-1}}$

C. $120\ \mathrm{rad\ s^{-1}}$

D. $130\ \mathrm{rad\ s^{-1}}$

Answer: A

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30. Two stars radiate maximum energy at wavelengths $3.6 \times 10^{-5} cm$ and $4.8 \times 10^{-5} cm$ respectively. The ratio of their temperature is

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

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

C. $\frac{3}{5}$

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

Answer: D

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31. When $p-n$ junction diode is forward biased then

A. the depletion region is reduced and barrier height is increased

B. the depletion region is widened and barrier height is reduced

C. both the depletion region and battier height are reduced

D. both the depletion region and barrier height are increased

Answer: C

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32. The angle of incidence at which reflected light is totally polarized for reflection from air to glass (refractive index n),

A. $\sin^{-1}(\mu)$

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

C. $\tan^{-1}\left(\frac{1}{\mu}\right)$

D. $\tan^{-1}(\mu)$

Answer: D

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33. Two sources of equal emf are connected to an external resistance R. The internal resistance of the two sources are R_1 and $R_2(R_1 > R_1)$. If the potential difference across the source having internal resistance R_2 is zero, then

A. $R = \dfrac{R_1 R_2}{R_1 + R_2}$

B. $R = \left(\dfrac{R_1 R_2}{R_2 - R_1}\right)$

C. $R = R_2\left(\dfrac{R_1 + R_2}{(R_2 - R_1)}\right)$

D. $R = R_2 - R_1$

Answer: D

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34. A body is moved along a straight line by a machine delivering constant power . The distance moved by the body is time t is proptional to

A. $t^{3/4}$

B. $t^{3/2}$

C. $t^{1/4}$

D. $t^{1/2}$

Answer: B

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35. A ray of light is incident normally on one of the faces of a prism of apex angle 30 degree and refractive index sqrt2. The angle of deviation of the ray is...degrees.

A. 30°

B. 45°

C. 15°

D. none of these

Answer: C

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36. A monoatomic ideal gas, initially at temperature T_1, is enclosed in a cylinder fitted with a friction less piston. The gas is

allowed to expand adiabatically to a temperature T_2 by releasing the piston suddenly. If L_1 and L_2 are the length of the gas column before expansion respectively, then $\frac{T_1}{T_2}$ is given by

A. $(L_1 / L_2)^{2/3}$

B. (L_1 / L_2)

C. (L_2 / L_1)

D. $(L_2 / L_1)^{2/3}$

Answer: D

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37. A particle of mass $0.5kg$ travels in a straight line with velocity $v = ax^{3/2}$ where $a = 5m^{-1/2}s^{-1}$. What is the work done by the net force during its displacement from $x = 0$ to $x = 2m$?

A. 50 J

B. 10 J

C. 20 J

D. 30 J

Answer: A

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38. Identify the pair whose dimensions are equal

A. torque and work

B. stress and energy

C. force and stress

D. force and work

Answer: A

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39. The maximum velocity a particle, executing simple harmonic motion with an amplitude 7 mm, 4.4 m//s. The period of oscillation is.

A. 100 s

B. 0.01 s

C. 10 s

D. 0.1 s

Answer: B

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40. One mole of ideal monoatomic gas $(\gamma = 5/3)$ is mixed with one mole of diatomic gas $(\gamma = 7/5)$. What is γ for the mixture? γ Denotes the ratio of specific heat at constant pressure, to that at constant volume

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

B. $\frac{23}{15}$

C. $\frac{35}{23}$

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

Answer: A

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41. A vessel contains 1 mole of O_2 gas (molar mass 32) at a temperature T. The preesure of the gas is p. An identical vessel containing one mole of He gas (molar mass 4) at temperatuer 2T has a pressure of

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

B. p

C. 2p

D. 8p

Answer: C

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42. A solid cylinder of mass 10 kg and radius 15 cm is rolling perfectly on a plane of inclination 30°. The coefficient of static friction,

$\mu_s = 0.25$ (i) Find the force of friction acting on the cylinder. (ii) What is the work done against friction during rolling ?

A. 0

B. $\frac{25\sqrt{3}}{2}J$

C. $\frac{50\sqrt{3}}{2}J$

D. $\frac{75\sqrt{3}}{2}J$

Answer: A

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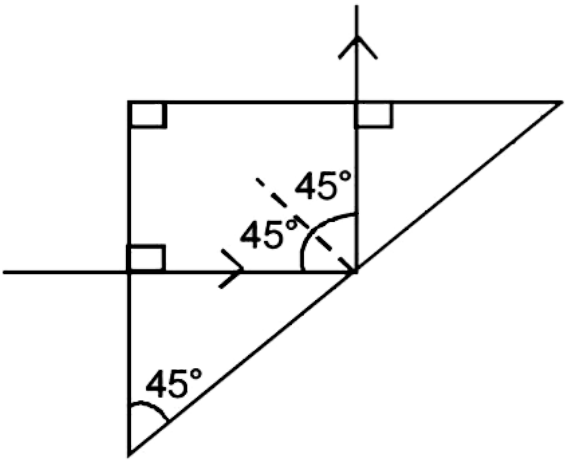
43. A light ray is incident perpendicularly to one face of a 90° prism and is totally internally reflected at the glass-air interface. If the angle of reflection is 45°, we conclude that the refractive index n



A. $n < \frac{1}{\sqrt{2}}$

B. $n > \frac{1}{\sqrt{2}}$

C. $n < \sqrt{2}$

D. $n > \sqrt{2}$

Answer: D

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44. A marble block of mass 2 kg lying on ice when given a velocity of $6m/s$ is stopped by friction in 10s. Then the coefficient of friction is

A. 0.01

B. 0.02

C. 0.03

D. 0.06

Answer: D

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45. If M is the mass of the earth and R its radius, then ratio of the gravitational acceleration and the gravitational constant is

A. $\frac{R^2}{M}$

B. $\frac{M}{R^2}$

C. MR^2

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

Answer: B

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