PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 62

Physics

1. Radius of ${}_{2}^{4}He$ nucleus is 3 Fermi. The radius of ${}_{82}^{206}Pb$ nucleus will be.

A. 5 fermi

B. 6 fermi

C. 11.16 fermi

D. 8 fermi

Answer: C

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2. Energy E of a hydrogen atom with principle quantum number n is given by $E = \frac{-13.6}{n^2} eV$. The energy of a photon ejected when the electron jumps from $n = 3$ state to $n = 2$ state of hydrogen is approximately

A. 1.5 eV

B. 0.85 eV

C. 3.4 eV

D. 1.9 eV

Answer: D

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3. A body mass M hits normally a rigid wall with velocity v and bounces back with the same velocity. The impulse experienced by the body is:

A. MV

B. 1.5 MV

C. 2 MV

D. zero

Answer: C

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4. Two bodies of different masses $2kg$ and $4kg$ are moving with velocities $2m/s$ and $10m/s$ towards each other due to mutual gravitational attraction. Then the velocity of the centre of mass is

A. $5ms^{-1}$

B. $6ms^{-1}$

C. $8ms^{-1}$

D. zero

Answer: D

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5. A $1kg$ stone at the end of $1m$ long string is whirled in a vertical circle at a constant speed of $4m/s$. The tension in the string is $6N$, when the stone is at $(g = 10m/s^2)$

A. Top of the circle

B. Bottom of the circle

C. Half way down

D. None of the above

Answer: A

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6. A car is moving with speed $20ms^{-1}$ on a circular path of radius 100 m. Its speed is increasing at a rate of $3ms^{-2}$.

The magnitude of the acceleration of the car at that moment is

A. $1m/s^2$

B. $3m/s^2$

C. $4m/s^2$

D. $5m/s^2$

Answer: D

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7. A steady current is set up in a metalic wire of non-uniform cross-section. How is the rate of flow free electrons related

A. $R \propto A^{-1}$

B. $R \propto A$

C. $R \propto A^2$

D. R is independent of A

Answer: A

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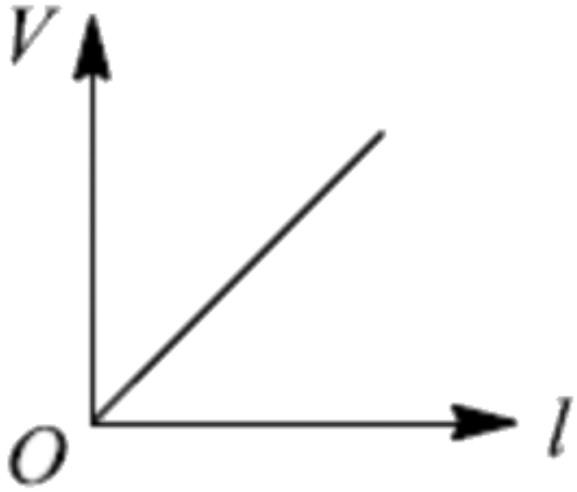
8. The V – I graph for a wire of copper of length L and cross - section area A is shown in the figure below . The slope of

the graph will be



A. Less if the experiment is repeated at a higher temperature

B. More if a wire of silver having the same dimension is used

C. Doubled if the length of the wire is doubled

D. Doubled if length of the wire is halved

Answer: C

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9. If the cyclotron oscillator frequency is 16 MHz, then what should be the operating magnetic field for accelerating the proton of mass $1.67 \times 10^{-27} kg$?

A. $0.334\pi T$

B. $3.34\pi T$

C. $33.4\pi T$

D. $334\pi T$

Answer: A

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10. An induced emf is produced when a magnet is plunged into a coil. The magnitude of the induced emf is independent of

A. The number of turns in the coil

B. The medium of the core of the coil

C. The strength of the magnet

D. The resistance of the coil

Answer: D

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11. Two identical capacitors, have the same capacitance C. One of them is charged to potential V_1 and the other V_2. The negative ends of the capacitors are connected together. When the poistive ends are also connected, the decrease in energy of the combined system is

A. $\frac{C}{4}\left(V_1^2 - V_2^2\right)$

B. $\frac{C}{4}\left(V_1^2 + V_2^2\right)$

C. $\frac{C}{4}(V_1 - V_2)^2$

D. $\frac{C}{4}(V_1 + V_2)^2$

Answer: C

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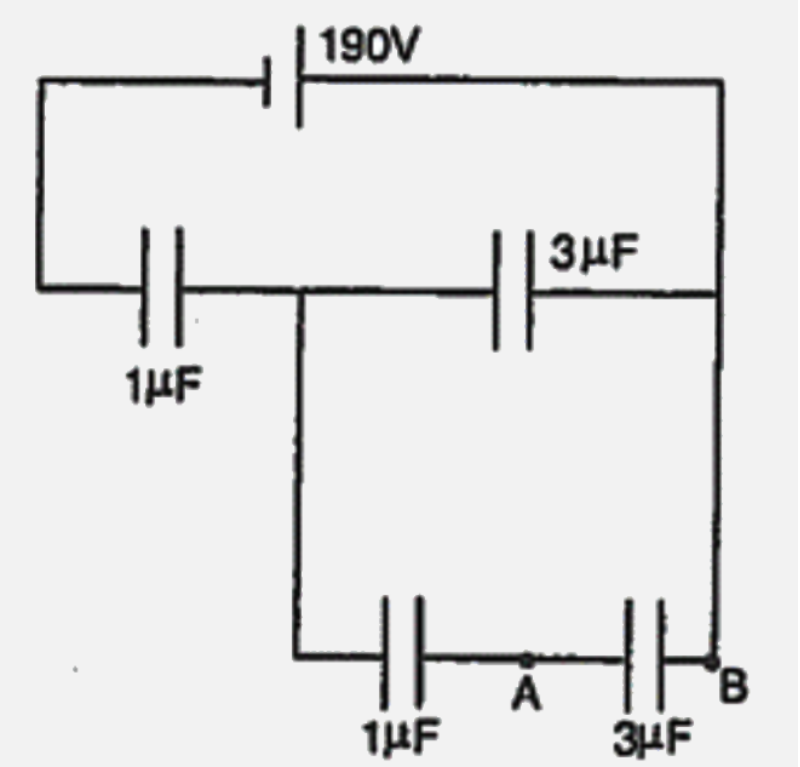
12. In the circuit below, the potential difference between A and B is



A. 10 V

B. 20 V

C. 30 V

D. 40 V

Answer: A

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13. The time period of a satellite of earth is 5 hours. If the separation between the centre of earth and the satellite is increased to 4 times the previous value, the new time period will become-

A. 40 h

B. 20 h

C. 10 h

D. 80 h

Answer: A

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14. A spherical uniform planet is rotating about its axis. The velocity of a point on its equator is V. Due to the rotation of planet about its axis the acceleration due to gravity g at equator is $1/2$ of g at poles. The escape velocity of a particle on the planet in terms of V.

A. $V_e = 2V$

B. $V_e = V$

C. $V_e = V/2$

D. $V_e = \sqrt{3}V$

Answer: A

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15. A black body is at a temperature of 2880 K. The energy of radiation emitted by this object with wavelength between 499 nm and 500 nm isU_1, between 999 nm and 1000 nm is U_2 and between 1499 nm and 1500 nm is U_3. The Wein's constant $b = 2.88 \times 10^6 \text{nm K}$. Then

A. $U_1 = 0$

B. $U_2 = 0$

C. $U_1 = U_2$

D. $U_2 > U_1$

Answer: D

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16. 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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17. In a refrigerator, the low temperature coil of evaporator is at $-23^{\circ}C$ and the compressed gas in the condenser has a temperature of $77^{\circ}C$. The amount of electrical energy spent in freezing 1 kg of water at $0^{\circ}C$ is

A. $134400J$

B. $1344J$

C. $80000J$

D. $3200J$

Answer: A

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18. A current I flows along the length of an infinitely long, straight , thin - walled pipe. Then

A. The magnetic field at all point inside the pipe is the same , but not zero

B. The magnetic field at any point inside the pipe is zero

C. The magnetic field is zero only on the axis of the pipe

D. the magnetic field is different at different points inside the pipe

Answer: B

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19. The cyclotron frequency of an electron gyrating in a magnetic field of $1T$ is approximately:

A. 28 MHz

B. 280 MHz

C. 2.8 GHz

D. 28 GHz

Answer: D

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20. Magnetic susceptibility for a paramagnetic and diamagnetic materials is respectively,

A. small , positive and small , positive

B. Large, positive and small , negative

C. small , positive and small , negative

D. Large, negative and large, positive

Answer: C

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21. If a ball is thrown vertically upwards with a velocity of $40m/s$, then velocity of the ball after $2s$ will be $(g = 10m/s^2)$

A. $15\frac{m}{s}$

B. $20\frac{m}{s}$

C. $25\frac{m}{s}$

D. $28\frac{m}{s}$

Answer: B

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22. The horizontal range and miximum height attained by a projectile are R and H, respectively. If a constant horizontal acceleration $a = g/4$ is imparted to the projectile due to wind, then its horizontal range and maximum height will be

A. $(R + H), \frac{H}{2}$

B. $\left(R + \frac{H}{2}\right), 2H$

C. $(R + 2H), H$

D. $(R + H), H$

Answer: D

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23. A sphere of mass m is rolling without sliding along positive x-axis on a rough horizontal surface of coefficient of friction μ. It elastically collides with a wall and then returns. The correct statement of frictional force (f) acting on the sphere is

A. $f = \mu mg\hat{i}$ before collision and $f = \mu mg\hat{i}$ after collision

B. $f = 0$ before collision and $f = +\mu mg\hat{i}$ after collision

C. $f < \mu mg\hat{i}$ before collision and $f = \mu mg\hat{i}$ after collision

D. $f = \mu mg\hat{i}$ before collision and just after collision

Answer: B

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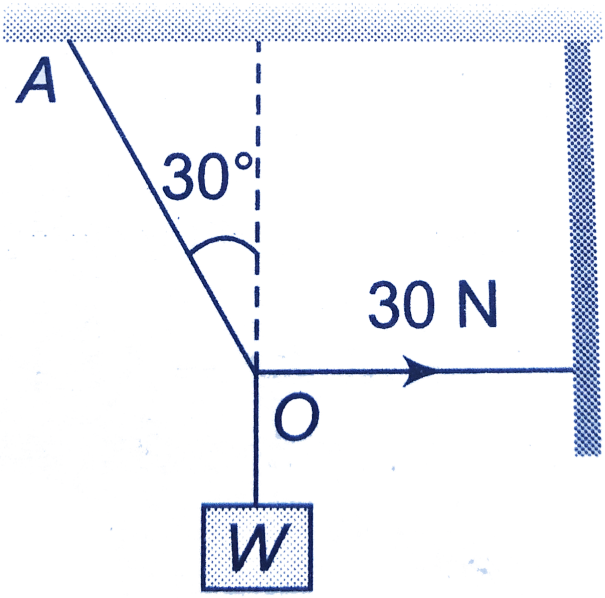
24. As shown in figure the tension in the horizontal cord is $30N$. The weight W and tension in the string OA in

Newton are



A. $30\sqrt{3}, 30$

B. $30\sqrt{3}, 60$

C. $60\sqrt{3}, 30$

D. None of the above

Answer: B

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25. A radioactive nucleus (initial mass number A and atomic number Z) emits 3α-particles and 2 positrons. The ratio of number of neutrons to that of protons in the final nucleus will be

A. $\frac{A-Z-4}{Z-2}$

B. $\frac{A-Z-8}{Z-4}$

C. $\frac{A-Z-4}{Z-8}$

D. $\frac{A-Z-12}{Z-4}$

Answer: C

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26. A nucleus of ${}_{84}^{210}Po$ originally at rest emits α particle with speed v. What will be the recoil speed of the daughter nucleus ?

A. $4V/206$

B. $4V/214$

C. $V/206$

D. $V/214$

Answer: A

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27. The minimum time taken by a spring block system (having time period T) to travel a distance equal to

amplitude of motion is equal to

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

B. $\frac{T}{6}$

C. $\frac{T}{8}$

D. $\frac{T}{10}$

Answer: B

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28. Two springs are joined and attached to a mass of 16 kg. The system is then suspended vertically from a rigid support. The spring constant of the two spring are

k_1 and k_2 respectively. The period of vertical oscillations of the system will be

A. $8\pi\sqrt{\frac{k_1+k_2}{k_1k_2}}$

B. $\frac{\pi}{2}\sqrt{\frac{k_1}{k_2}}$

C. $\sqrt{\frac{k_1+k_2}{8\pi}}$

D. $\pi\sqrt{\frac{k_1-k_2}{2}}$

Answer: A

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29. The photoelectric threshold frequency of a metal is v. When light of frequency 4v is incident on the metal . The maximum kinetic energy of the emitted photoelectrons is

A. 4 hv

B. 3 hv

C. 5 hv

D. $\frac{5}{2}hv$

Answer: B

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30. 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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31. A body of mass m = 10 kg is attached to a wire of length 0.3m. The maximum angular velocity with which it can be rotated in a horizontal circle is (Given, breaking stress of wire $= 4.8 \times 10^7 Nm^{-2}$ and area of cross-section of a wire $= 10^{-6}m^2$)

A. $4rads^{-1}$

B. $8rads^{-1}$

C. $1rads^{-1}$

D. $2rads^{-1}$

Answer: A

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32. Two bodies are in equilibrium when suspended in water from the arms of balance. The mass of one body is 36 g and its density is $9g/cm^3$ If the mass of the other is 46 g, its density in g/cm^3 is

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

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

C. 3

D. 5

Answer: C

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33. The magnifying power of a telescope is 9. When it is adjusted for parallel rays the distance between the objective and eyepiece is $20cm$. The focal lengths of lenses are

A. 18 cm, 2 cm

B. 11 cm, 9 cm

C. 10 cm, 10 cm

D. 15 cm, 5 cm

Answer: A

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34. A ray passes through a prism of angle 60° in minimum deviation position and suffers a deviation of 30°. What is the angle of incidence on the prism

A. 30°

B. 45°

C. 15°

D. 60°

Answer: B

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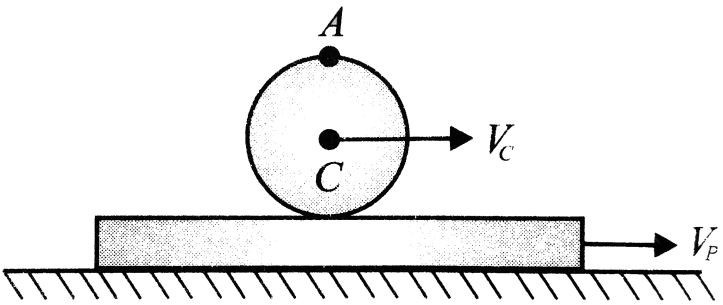
35. In Fig. the velocities are in ground frame and the cylinder is performing pure rolling on the plank, velocity of point $'A'$ would be



A. $2V_C$

B. $2V_C - V_P$

C. $2V_C + V_P$

D. $2(V_C - V_P)$

Answer: B

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36. A particle is at a distance r from the axis of rotation. A given torque τ produces some angular acceleration in it. If the mass of the particle is doubled and its distance from the axis is halved, the value of torque to produce the same angular acceleration is -

A. $\tau/2$

B. τ

C. 2τ

D. 4τ

Answer: A

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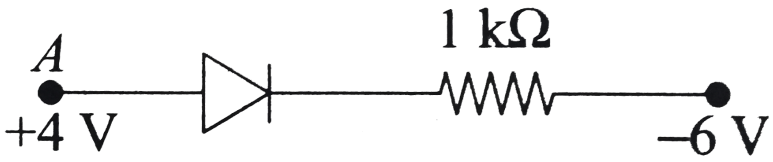
37. Consider the junction diode as ideal. The value of current flowing throgh AB is:



A. $0A$

B. $10^{-2}A$

C. $10^{-1}A$

D. $10^{-3}A$

Answer: B

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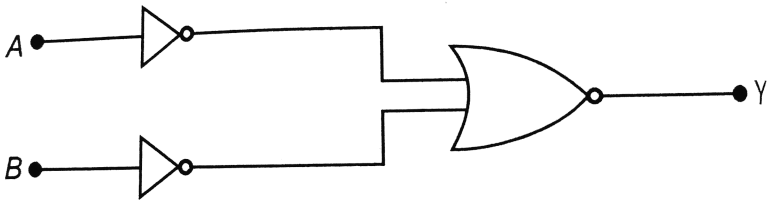
38. Which logic gate is represented by the following combination of logic gates ?



A. NOR

B. NAND

C. AND

D. OR

Answer: C

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39. Two liquid A and B are at $32^\circ C$ and $24^\circ C$. When mixed in equal masses the temperature of the mixture is found to be $28^\circ C$. Their specific heats are in the ratio of

A. $3:2$

B. $2:3$

C. $1:1$

D. $4:3$

Answer: C

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40. If $X = A \times B$ and $\Delta X \Delta A$ and ΔB are maximum absolute error in X ,A and B respectively , then the maximum

relative in X is given by

A. $\Delta X = \Delta A + \Delta B$

B. $\Delta X = \Delta A - \Delta B$

C. $\frac{\Delta X}{X} = \frac{\Delta A}{A} - \frac{\Delta B}{B}$

D. $\frac{\Delta X}{X} = \frac{\Delta A}{A} + \frac{\Delta B}{B}$

Answer: D

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41. For an interference pattern, the maximum and minimum intensity ratio is 64 : 1 , then what will be the ratio of amplitudes ?

A. $8:1$

B. $9:7$

C. $1:8$

D. $7:9$

Answer: B

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42. In Young's double slit experiment slits are separated by 2 mm and the screen is placed at a distance of1.2 m from the slits. Light consisting of two wavelengths 6500Å and 5200Å are used to obtain interference fringes.

The the separation between the fourth bright fringes the two wavelength is

A. $0.312mm$

B. $0.123mm$

C. $0.213mm$

D. $0.412mm$

Answer: A

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43. The path difference between the two waves

$y_1 = a_1 \sin\left(\omega t - \frac{2\pi x}{\lambda}\right)$ and $y(2) = a_2 \cos\left(\omega t - \frac{2\pi x}{\lambda} + \phi\right)$

is

A. $\left(\frac{\lambda}{2\pi}\right)\phi$

B. $\lambda\left(\frac{\phi+\left(\frac{\pi}{2}\right)}{2\pi}\right)$

C. $\frac{2\pi}{\lambda}\left(\phi-\frac{\pi}{2}\right)$

D. $\left(\frac{2\pi}{\lambda}\right)\phi$

Answer: B

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44. If n_1, n_2 and n_3 are the fundamental frequencies of three segments into which a string is divided, then the original fundamental frequency n of the string is given by

A. $\frac{1}{n}+\frac{1}{n_1}+\frac{1}{n_2}+\frac{1}{n_3}$

B. $\frac{1}{\sqrt{n}}=\frac{1}{\sqrt{n_1}}+\frac{1}{\sqrt{n_2}}+\frac{1}{\sqrt{n_3}}$

C. $\sqrt{n} = \sqrt{n_1} + \sqrt{n_2} + \sqrt{n_3}$

D. $n = n_1 + n_2 + n_3$

Answer: A

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45. Work down by static friction on an object :

A. may be positive

B. must be negative

C. must be zero

D. none of these

Answer: A

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