



PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET TEST 103

Physics

1. when a hydrogen atom is raised from the ground state to an excited state

- A. Potential energy increases and kinetic energy decreases
- B. Kinetic energy increases and potential energy decreases
- C. Both KE and PE increases
- D. Both KE and PE decreases

Answer: A



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2. The de-Broglie wavelength of an electron in the ground state of the hydrogen atom is

A. πr^2

B. $2\pi r$

C. πr

D. $\sqrt{2\pi r}$

Answer: B



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3. A shell of mass m moving with velocity v suddenly breaks into 2 pieces. The part having mass $m/4$ remains stationary. The velocity of the other shell will be

A. v

B. $2v$

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

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

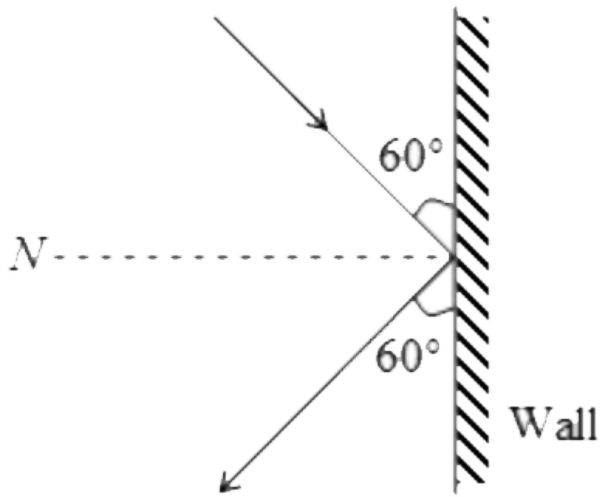
Answer: D



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4. A 3 kg ball strikes a heavy rigid wall with a speed of 10ms^{-1} at an angle of 60° with the wall. It gets reflected with the same speed at 60° with the wall. If the ball is in contact with the wall for 0.2s , the average force exerted on

the ball by the wall is



A. $300N$

B. zero

C. $150\sqrt{3}N$

D. $150 N$

Answer: C



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5. A particle moves in a circular path of radius $0.5m$ at a speed that uniformly increases. Find the angular acceleration of particle if its speed changes from $2.0m/s$ to $4.0m/s$ in $4.0s$

A. 1rads^{-2}

B. 2rads^{-2}

C. 4rads^{-2}

D. 0rads^{-2}

Answer: A



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6. The vertical component of earth's magnetic field at a place is $\sqrt{3}$ times the horizontal component the value of angle of dip at this place is

A. 60°

B. 45°

C. 30°

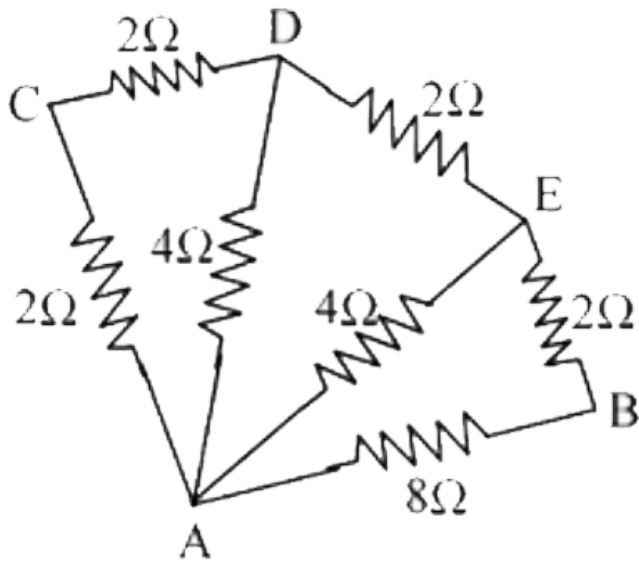
D. 15°

Answer: A



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7. What is the equivalent resistance between A and B in the given circuit ?



A. $\frac{3}{8}\Omega$

B. $\frac{8}{3}\Omega$

C. 2Ω

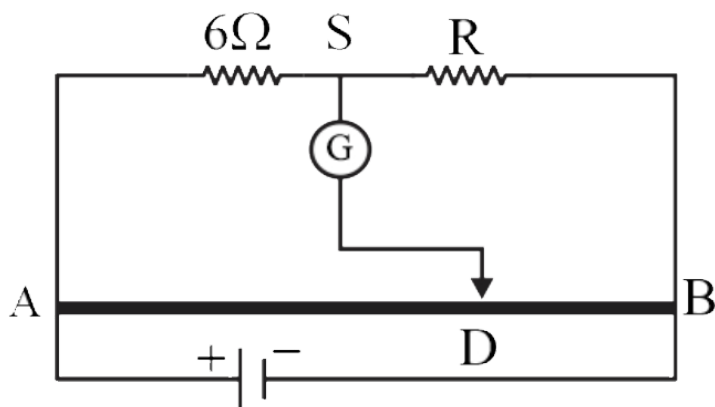
D. 4Ω

Answer: B



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8. The metre bridge wire AB shown in the adjoin figure is 100 cm long when $AD = 30$ cm, no deflection occurs in the galvanometer. The value of R is



A. 6Ω

B. 9Ω

C. 14Ω

D. 15Ω

Answer: C



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9. An oscillator circuit contains an inductor 0.05 H and a capacitor of capacity $80\mu\text{F}$. When the maximum voltage across the capacitor is

200 V, the maximum current (in amperes) in the circuit is

A. 4

B. 8

C. 10

D. 16

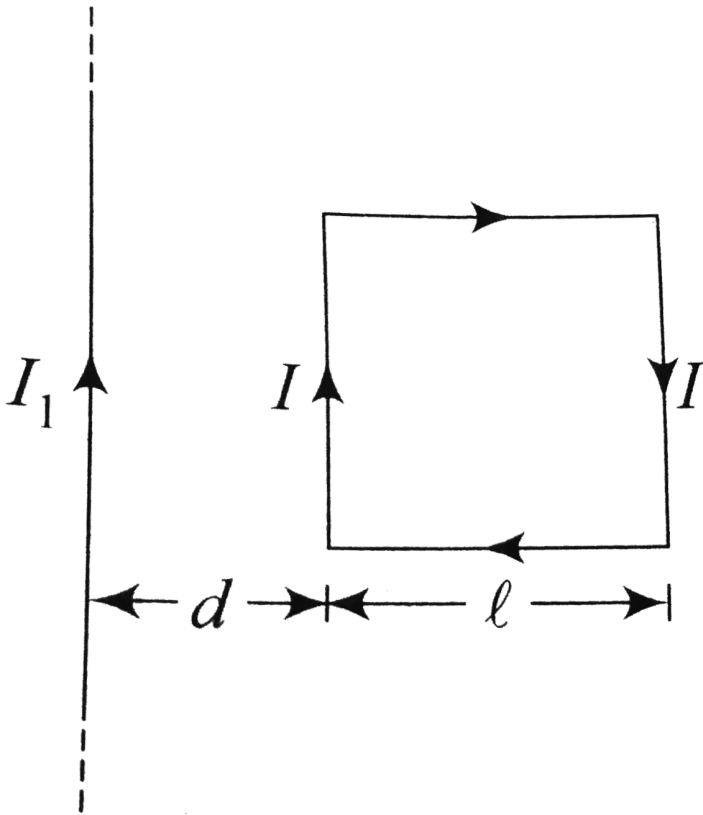
Answer: B



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10. A square loop, carrying a steady current I , is placed in a horizontal plane near a long straight conductor carrying a steady current I , at a distance d from the conductor as shown in

Fig. The loop wil experience



A. A net repulsive force away from the conductor

B. A net torque acting upward

perpendicular to the horizontal plane

C. a net torque acting downward normal to

the horizontal plane

D. a net attractive force toward the

conductor

Answer: D



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11. A conductor with a cavity is charged positively and its surface charge density is σ . If E and V represent the electric field and potential, then inside the cavity

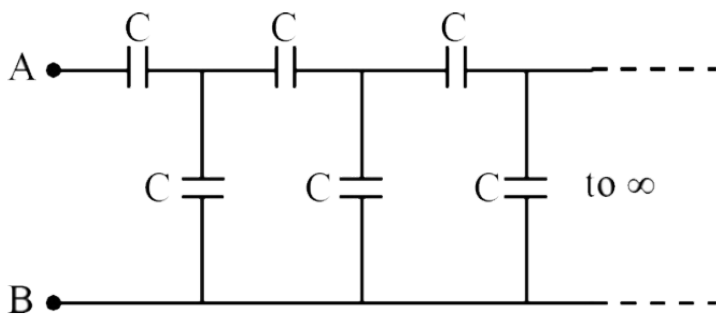
- A. $E = 0$ and $V = 0$
- B. $E = 0$ and σ - constant
- C. $V = 0$ and $\sigma = \text{constant}$
- D. $E = 0$ and $V = \text{constant}$

Answer: D



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12. The effective capacitance between A and B of an infinite chain of capacitors joined as shown in the figure



A. $(\sqrt{3} - 1)\mu F$

B. $\frac{(\sqrt{5} - 1)}{2}\mu F$

C. $(\sqrt{5} - 1)\mu F$

D. $1\mu F$

Answer: B



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13. A man weighs 'W' on the surface of the earth and his weight at a height 'R' from surface of the earth is (R is Radius of the earth)

A. W

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

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

D. $\frac{W}{8}$

Answer: C



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14. 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 hours

B. 20 hours

C. 10 hours

D. 80 hours

Answer: A



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15. Two rods of the same length and diameter, having thermal conductivities K_1 and K_2 , are joined in parallel. The equivalent thermal conductivity to the combination k is

A. $\frac{K_1 K_2}{K_1 + K_2}$

B. $K_1 + K_2$

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

D. $\sqrt{K_1 K_2}$

Answer: C



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16. Among the following the correct statement is

A. Internal energy of a gas depends only on the state of the gas.

B. In an isothermal process change in internal energy is maximum

C. Area under pressure, volume graph equals heat supplied in any process.

D. Work done is state dependent but not path dependent.

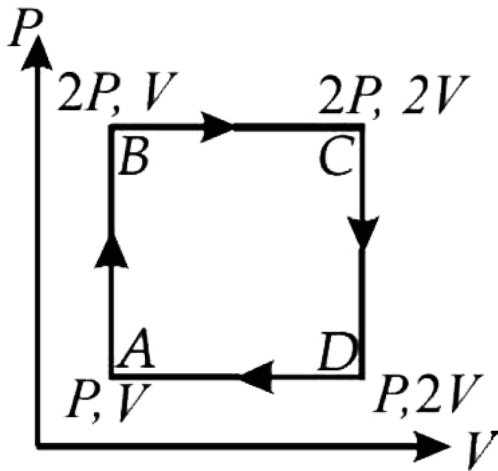
Answer: A



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17. An ideal monoatomic gas is taken round the cycle ABCDA as shown in the P-V diagram.

The work done during the cycle is



A. $\frac{1}{2}PV$

B. PV

C. $2PV$

D. $4PV$

Answer: B



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18. Which of the following particles will describe the smallest circle when projected with the same velocity perpendicular to a magnetic field?

A. Proton

B. He^+

C. Li^+

D. Electron

Answer: D



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19. The length of a magnet is large compared to its width and breadth. The time period of its oscillation in a vibration magnetometer is $2s$. The magnet is cut along its length into three equal parts and these parts are then placed on each other with their like poles together . The time period of this combination will be

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

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

C. $2\sqrt{3}S$

D. $2S$

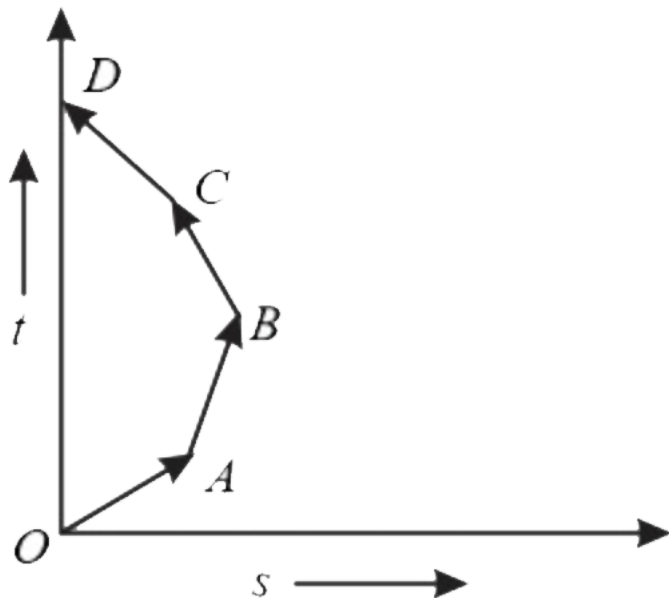
Answer: B



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20. Which of the following options is correct for the object having a straight line motion

represented by the following graph ?



A. The object moves with constantly increasing velocity from O to A and then its moves with constant velocity

B. Velocity of the object increases uniformly

C. Average velocity is zero

D. The graph shown is impossible

Answer: C



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21. The equation of motion of a projectile is

$y = 12x - \frac{3}{4}x^2$. The horizontal component of

velocity is 3ms^{-1} . What is the range of the projectile ?

A. 18m

B. 16m

C. 12m

D. 21.6m

Answer: B



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22. A block of mass 2 kg rests on an inclined plane which makes an angle of 30° with the horizontal. The coefficient of friction between the block and the surface is $\sqrt{3/2}$. (i) What force should be applied on the block so that it moves down without any acceleration ? (ii) What force should be applied on the block so that it moves up without any acceleration ? (iii) Calculate the ratio of the powers in the above two cases if the block moves with uniform speed in both the cases.

A. 11.21

B. 4.5

C. 6.7

D. 30.14

Answer: A



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23. A bullet of mass 0.1 kg is fired with a speed of 100 m/sec , the mass of gun is 50 kg . The velocity of recoil is

A. $0.2ms^{-1}$

B. $0.1ms^{-1}$

C. $0.5ms^{-1}$

D. $0.05ms^{-1}$

Answer: A



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24. A sample of radioactive element has a mass of $10g$ at an instant $t = 0$. The approximate

mass of this element in the sample after two mean lives is

A. $1.35g$

B. $2.50g$

C. $3.70g$

D. $6.30g$

Answer: A



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25. What is the probability of a radioactive nucleus to survive one mean life?

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

B. $\frac{1}{e + 1}$

C. $1 - \frac{1}{e}$

D. $1 + \frac{1}{e}$

Answer: A



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26. A spring of force constant k is cut into two pieces such that one piece is double the length of the other. Then the long piece will have a force constant of :

A. $2k/3$

B. $3k/2$

C. $3k$

D. $6k$

Answer: B



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27. The average acceleration of a particle performing SHM over one complete oscillation is

A. $\frac{\omega^2 A}{2}$

B. $\frac{\omega^2 t}{\sqrt{2}}$

C. zero

D. $A\omega^2$

Answer: C



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28. Light of wavelength 500nm is incident on a metal with work function 2.28eV . The de Broglie wavelength of the emitted electron is

A. $< 2.8 \times 10^{-9}\text{m}$

B. $\geq 2.8 \times 10^{-9}\text{m}$

C. $\leq 2.8 \times 10^{-12}\text{m}$

D. $< 2.8 \times 10^{-10}\text{m}$

Answer: B



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29. When a piece of metal is illuminated by a monochromatic light of wavelength λ , then stopping potential is $3V_s$. When the same surface is illuminated by the light of wavelength 2λ , then stopping potential becomes V_s . The value of threshold wavelength for photoelectric emission will be

A. 4λ

B. 8λ

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

D. 6λ

Answer: A



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30. Two wires having same length and material are stretched by same force. Their diameters are in the ratio 1:3. The ratio of strain energy per unit volume for these two wires (smaller to larger diameter) when stretched is

A. 3: 1

B. 9: 1

C. 27: 1

D. 81: 1

Answer: D



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31. Two water pipes of diameters 2 cm and 4 cm are connected with the main supply line.

The velocity of flow of water in the pipe of 2
cm

- A. 4 times that in the other pipe
- B. $\frac{1}{4}$ times that in the other pipe
- C. 2 times that in the other pipe
- D. $\frac{1}{2}$ times that in the other pipe

Answer: A



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32. A plane mirror of circular shape with radius $r = 20\text{cm}$ is fixed to the ceiling. A bulb is to be placed on the axis of the mirror. A circular area of radius $R = 1\text{m}$ on the floor is to be illuminated after reflection of light from the mirror. The height of the room is 3m . What is maximum distance from the center of the mirror and the bulb so that the required area is illuminated?

A. 75 cm

B. 70 cm

C. 80 cm

D. 100 cm

Answer: A



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33. A double convex thin lens made of the refractive index 1.6 has radii of curvature 15 cm each. The focal length of this lens when immersed in a fluid of refractive index 1.63, is

A. 25 cm

B. 125 cm

C. 250 cm

D. -407.5cm

Answer: D



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34. A thin circular ring of mass M and radius r is rotating about its axis with a constant angular velocity ω . Two objects, each of mass

m, are attached gently to the opposite ends of a diameter of the ring. The wheel now rotates with an angular velocity $\omega =$

- A. $\frac{\omega M}{(M + m)}$
- B. $\frac{\omega(M - 2m)}{(M + 2m)}$
- C. $\frac{\omega M}{(M + 2m)}$
- D. $\frac{\omega(M + 2m)}{m}$

Answer: C



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35. A solid cylinder of mass M and radius R rolls from rest down a plane inclined at an angle θ to the horizontal. The velocity of the centre of mass of the cylinder after it has rolled down a distance d is :

A. $\sqrt{\frac{2}{3}gd \tan \theta}$

B. $\sqrt{gd \tan \theta}$

C. $\sqrt{\frac{3}{4}gd \sin \theta}$

D. $\sqrt{\frac{4}{3}gd \sin \theta}$

Answer: D



36. When a p-n junction diode is reverse biased

- A. Flow of a minority charge carrier from p - side of n - side
- B. Flow of a majority charge carrier from n - side to p - side
- C. Flow of a majority charge carrier from p - side to n - side

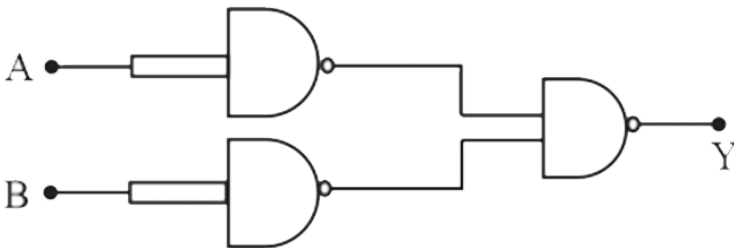
D. Flow to electrons from n - side to p - side

Answer: A



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37. The combination of gates shown in the figure below produces



A. NOR gate

B. OR gate

C. AND gate

D. XOR gate

Answer: B



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38. By what percentage should the pressure of a given mass of a gas be increased so as to decrease its volume by 10% at a constant temperature?

A. 8.1 %

B. 9.1 %

C. 10.1 %

D. 11.1 %

Answer: D



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39. The percentage errors in quantities P, Q, R and S are 0.5%, 1%, 3% and 1.5% respectively in the measurement of a physical quantity

$$A = \frac{P^3 Q^2}{\sqrt{RS}}$$

The maximum percentage error in the value of A will be :

A. 6.5 %

B. 7.5 %

C. 6.0 %

D. 8.5 %

Answer: A



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40. During scattering of light, the amount of scattering is inversely proportional to of wavelength of light

A. Square

B. Fourth power

C. Half

D. Cube

Answer: B



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41. Yong's double-slit experiment is carried out by using green, red and blue light, one color at a time. The fringe widths recorded are β_G , β_R and β_B , respectively. Then

A. $\beta_G > \beta_B > \beta_R$

B. $\beta_B > \beta_G > \beta_R$

C. $\beta_R > \beta_B > \beta_G$

D. $\beta_R > \beta_G > \beta_B$

Answer: D



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42. A source emits a sound of frequency of 400 Hz , but the listener hears it to be 390 Hz .

Then

A. The listener is moving towards the source

B. The source is moving towards the listener

C. The listener is moving away from the source

D. The listener has a defective ear

Answer: C



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43. The fundamental frequency of an air column in a pipe closed at one end is 100 Hz. If the same pipe is open at both the ends, the frequencies produced in Hz are

A. 100, 200, 300, 400,

B. 100, 300, 500, 700, . . .

C. 200, 300, 400, 500, . . .

D. 200, 400, 600, 800, . . .

Answer: D



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44. A particle moves along the X-axis from $x=0$ to $x=5$ m under the influence of a force given by $F = 7 - 2x + 3x^2$. Find the work done in the process.

A. $70J$

B. $270J$

C. $35J$

D. $135J$

Answer: D



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45. A spring of force constant $800N/m$ has an extension of $5cm$. The work done in extending it from $5cm$ to $15cm$ is

A. 16 J

B. 8 J

C. 32 J

D. 24 J

Answer: B



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