doubtnut
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PHYSICS

BOOKS - MODERN PUBLICATION PHYSICS (KANNADA ENGLISH)

MOCK TEST-1

Mcqs

1. Two capacitors of 4pF and 6pF are connected in series and a potential difference

of 5 kV is applied across the combination. They are then disconnected and reconnected in paralle. The potential difference across combination is :

A. 1100 V

B. 2250 V

C. 2400 V

D. 1200 V

Answer: C

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2. Two objects are initially at rest on a frictionless surface. Object 1 has a greater mass than object 2. The same constant force starts to act on each object. The force is removed from each object after it accelerates over a distance d. After force is removed from both objects, which statement is correct?

A. $\Delta p_1 < \Delta p_2$

B. $\Delta p_1 > \Delta p_2$

C. $\Delta K_1 > \Delta K_2$

D. $\Delta K_1 < \Delta K_2$.

Answer: B::D

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3. A dart is loaded into spring loaded toy dart gun by pushing the spring in by a distance d. For next loading, the spring is compressed a distance 2d. How much faster does the second dart leave the gun compared to first.

A. four times as first

B. two times as first

C. the same

D. half as first.

Answer: B

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4. One of two parallel metallic plates is uniformly charged with charge +q, and the other one is charged with charge -q. In this case, the electric field between them is E.

When the negatively charged plate is discharged and the recharged with a +ve charge 4q, electrical field between the plates becomes:

A. 0

B. 1.5 E

C. 2.5 E

D. 3 E.

Answer: B

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5. A linear conductor with current I_1 is placed along the axis of a circular conductor, which caries current I_2. The magnetic force acting on each of the conductor is :

A. Zero

B. directly proportional to product of current I_1 and I_2 and inversely proportional to radius of circular conductor.

C. directly proportional to product of current I_1 and I_2, inversely proportional to square of radius of circular conductor.

D. directly proportional to product of current I_1, and area of a circular conductor.

Answer: A

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6. An aquarium is filled with water. The lateral wall of the aquarium is 40 cm long and 30 cm high. Given $g = 10ms^{-2}$ and $\rho_{H_2O} = 1g/cm^3$, the force on lateral wall of aquarium is :

A. 36 N

B. 90 N

C. 180 N

D. 1500 N.

Answer: C

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7. A point particle carries a +ve charge +q and is maintained at a distance h above a large conductive uncharged plate with earth connected. The electric force of interaction between the charge and the plate is best described as:

A. zero force

B. an attractive force proportional to $\frac{q}{h^2}$

C. an attractive force proportional to $\frac{q^2}{h^2}$

D. an attractive force proportional to $\frac{q^2}{4h^2}$.

Answer: D

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8. The thin metallic strip of vernier calliper moves downward from top to bottom in such a way that it just touches surface of breaker. Main scale reading of calliper is 8.6 cm, whereas its vernier constant is 0.1 mm. The 4th of V.S.D. is coinciding with any main scale

division. The actual depth of breaker in cm is (when zero of vernier coincides with zero of main scale).

A. 8.64 cm

B. 8.67 cm

C. 8.63 cm

D. 8.13 cm

Answer: A

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9. A radioactive sample S_1 having an activity of 5 μCi has twice the number of nuclei as another sample S_2 which has an activity of 10 μCi. The half lives of S_1 and S_2 can be

A. 20 years and 5 years, respectively

B. 20 years and 10 years, respectively

C. 10 years each

D. 5 years each.

Answer: A

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10. Two carts A and B, are placed on an air track. They are made of same material and look identical. B is given a constant speed and collides elastically with A at rest. After the collision, both carts move in same direction. One concludes that:

A. A is hollow

B. B is hollow

C. A and B are identical

D. any of first three answers is possible.

Answer: A

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11. Two capillaries of length L and 2L and of radii R and 2R are connected in series. The net rate of flow of fluid through them will be (given rate of flow through single capillary $x = \frac{\pi P R^4}{8\eta^2}$).

A. $\frac{8}{9}x$

B. $\frac{9}{8}x$

C. $\frac{5}{7}x$

D. $\frac{7}{5}x$.

Answer: A

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12. Three identical balls are thrown from top of a cliff and some time later land at the base of the cliff. Ball A is thrown upwards with speed V_A, ball B is thrown downwards with speed V_B, and ball C is thrown at speed V_C and at an

angle of 45° above horizontal. Comparing the speeds V_A, V_B and V_C with which balls hit the ground at the base of the cliff (and ignoring air resistance), you find,

A. $V_A = V_B > V_C$

B. $V_A > V_C > V_B$

C. $V_A = V_B = V_C$

D. $V_B > V_C > V_A$.

Answer: A

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13. A hiker stands on the edge of cliff 490 m above the ground and throws a stone horizontally with an initial speed of $15 \ \mathrm{m\,s}^{-1}$ Neglecting air resistance , find the time taken by the stone to reach the ground , and the speed with which it hits the ground . (Take $g = 9.8 \ \mathrm{m\,s}^{2}$).

A. (0, 490)

B. (150, 490)

C. (150, -490)

D. (490, 150)

Answer: C

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14. A hiker stands on the edge of cliff 490 m above the ground and throws a stone horizontally with an initial speed of $15 \ \mathrm{m\,s}^{-1}$ Neglecting air resistance , find the time taken by the stone to reach the

ground , and the speed with which it hits the ground . (Take $g = 9.8 \ \mathrm{m\,s^2}$).

A. $15ms^{-1}$

B. $98ms^{-1}$

C. $99ms^{-1}$

D. $90ms^{-1}$

Answer: C

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15. Paragraph

A hiker stands on edge of a cliff 490 m above the ground and throws a stone horizontally with an initial speed of $15ms^{-1}$. Take $g = 9.8ms^{-2}$. Neglect air resistance. Take the point of projection as the origin of coordinate system, x-axis is horizontal direction, y-axis vertically upwards.

What is the equation of trajectory?

A. $y = -\frac{4.9}{225}x^2$

B. $y = \frac{4.9}{225}x^2$

C. $y^2 = \frac{4.9}{225}x$

D. $y^2 = \frac{225}{4.9}x.$

Answer: A

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16. A Body of mass (m) is suspended from two light springs of spring constants k_1 and $k_2 (< k_1)$ separately.The periods of vertical oscillations are T_1 and T_2 respectively. Now the same body is suspended

from same two springs which are first connected in series and then in parallel. The period of vertical oscillations are T_S and T_P respectively.

A. $T_P < T_1 < T_2$ for $k_1 > k_2$

B. $\frac{1}{T_P^2} = \frac{1}{T_1^2} + \frac{1}{T_2^2}$

C. $T_S^2 = T_1^2 + T_2^2$

D. $\sqrt{T_S} = \sqrt{T_1} + \sqrt{T_2}$.

Answer: B::C

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17. Two different isolated coils have self inductances, $L_1 = 8mH$ and $L_2 = 2mH$. The current in one coil is increased at a constant rate. The current in second coil is increased at same constant rate. At a certain instant, the power given to two coils is the same. At that time the current, induced voltage and the energy stored in first coil are $i_1 V_1$ and U_1 respectively, Corresponding values for second coil at same instant are i_2, V_2 and U_2 respectively. Then,

A. $\frac{i_1}{i_2} = \frac{1}{4}$

B. $\frac{i_1}{i_2} = 4$

C. $\frac{U_2}{U_1} = \frac{4}{1}$

D. $\frac{V_2}{V_1} = \frac{1}{2}$.

Answer: A::C

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18. An air champer of volume 'V' has a neck area of cross - section A into which a ball of mass m just fits and can move up and down

without any friction. Show that when the ball is pressed down a little and released, it executes SHM. Obtain an expression for the time period of oscillation assuming pressure volume variations of air to to be isothermal.

A. $T = 2\pi\sqrt{\frac{Ba^3}{mV}}$

B. $T = 2\pi\sqrt{\frac{BV}{ma^2}}$

C. $T = 2\pi\sqrt{\frac{mB}{Va^2}}$

D. $T = 2\pi\sqrt{\frac{mV}{Ba^2}}$.

Answer: D

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19. Statement - I : Water kept in an open vessel will evaporate quickly on the surface of moon.

Statement - II : The temperature at the surface of moon is much higher than boiling point of water.

A. Statement-1 is true, Statement-2 is false.

B. Statement-1 is false, Statement-2 is true.

C. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for

Statement-1.

D. Statement-1 is true, Statement-2 is true, Statement-2 is not correct explanation for statement-1.

Answer: C

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20. Statement-1 : Communication is UHF/VHF regions can be established by space wave of tropospheric wave.

Statement -2 : Communication is UHF/VHF regions is limited to line of sight distance.

A. Statement-1 is true, Statement-2 is false.

B. Statement-1 is false, Statement-2 is true.

C. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

D. Statement-1 is true, Statement-2 is true, Statement-2 is not correct explanation for statement-1.

Answer: D

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21. One enetimetre on the main scale of Vernier callipers is divided into ten equal parts. If 10 divisions of Vernier scale coincide with 8 small divisions of the main scale, the least count of the callipers is :

A. 0.01 cm

B. 0.02 cm

C. 0.05 cm

D. 0.005 cm.

Answer: B

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22. The acceleration of a particle increasing linearly with timer is be. The particle starts from the origin with an initial velocity, The distance travelled by the particle in time will be

A. $ut + \frac{bt^3}{3}$

B. $ut + \frac{bt^3}{3}$

C. $ut + \frac{bt^3}{6}$

D. None of these.

Answer: C

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23. The torque of a force $\vec{F} = -3\hat{i} + \hat{j} + 5\hat{k}$ acting at a point is $\vec{\tau}$. If the position vector of

the point vector of the point is $7\hat{i}+3\hat{j}+\hat{k}$, then $\overrightarrow{\tau}$ is :

A. $14\hat{i}-\hat{j}+3\hat{k}$

B. $7\hat{i}-8\hat{j}+9\hat{k}$

C. $2\hat{i}-3\hat{j}+8\hat{k}$

D. $14\hat{i}-38\hat{j}+16\hat{k}$.

Answer: B

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24. The position vectors of the head and tail of radius vector are $2\hat{i} + \hat{j} + \hat{k}$ and $2\hat{i} - 3\hat{j} + \hat{k}$. The linear mementium is $2\hat{i} + 3\hat{j} + \hat{k}$. The angular momentum is :

A. $4\hat{i} - 8\hat{k}$

B. $2\hat{i} - 3\hat{j} + \hat{k}$

C. $2\hat{i} + 3\hat{j} + \hat{k}$

D. $2\hat{i} - \hat{j} + \hat{k}$.

Answer: B

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25. When a carpet is beaten with a stick, dust comes out of it. Explain.

A. Newton's 1st 1aw of motion

B. Newton's 1st 2aw of motion

C. Newton's 1st 2aw of motion

D. None of these.

Answer: A

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26. A sphere of mass m is tied to end of a string of length l and rotated through the other and along a horizontal circular path with speed v. The work done in full horizontal circle is :

A. zero

B. $\left(\frac{mv^2}{l}\right)2\pi l$

C. $mg \times 2\pi l$

D. $\left(\frac{mv^2}{l}\right)l$

Answer: A

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27. A cubical block rests on a plane rough surface with coefficient of static friction $\frac{1}{\sqrt{3}}$. AT what angle the plane be inclined so that the block just slides?

A. 60°

B. 20°

C. 30°

D. 15°

Answer: C

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28. In order that a body of 15 kg weighs zero at the equator, then the angular speed of earth is :

$\left(g = 10ms^{-1}\right)$

A. $\frac{1}{80}\ \text{rad s}^{-1}$

B. $\frac{1}{400}\ \text{rad s}^{-1}$

C. $\frac{1}{100}\ \text{rad s}^{-1}$

D. $\frac{1}{1600}\ \text{rad s}^{-1}$

Answer: C

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29. The binding energy of a hydrogen molecule is 4.75 eV. Energy required to dissociate 0.05% of hydrogen gas at NTP occupying volume 5.6 litres is:

A. 20 J nearly

B. 30 J nearly

C. 40 J nearly

D. 60 J nearly.

Answer: D

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30. A spherical ball contracts in volume by 0.01% when subjected to a uniform pressure of 100 atmospheres. The bulk modulus of

material is:

(one atmosphere $= 10^5 Nm^{-2}$)

A. $10^{10} Nm^{-2}$

B. $10^{13} Nm^{-2}$

C. $10^{11} Nm^{-2}$

D. $2 \times 10^{11} Nm^{-2}$

Answer: C

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31. A particle is executing S.H.M., with the length of its path as as 8 cm. At what displacement from the mean position half the energy is kinetic and half is potential ?

A. $\sqrt{2}cm$

B. $1cm$

C. $2\sqrt{2}cm$

D. $3cm.$

Answer: C

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32. A stone is dropped into a well and sound of impact of stone with water is heard after 2.056 second of the release of stone from top If g 980 cm/s^2 and velocity of sound is 350 m/s. Then depth of well is :

A. 19.6 m

B. 9.8 m

C. 30 m

D. 7 m

Answer: A

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33. The P-V diagram for a cyclic process is a triangle ABC drawn in order. The co-ordinates of A, B, C are (4, 1), (2, 4) & (2, 1). The co-ordinates are in order of P - V in which P is in N/m^2 & volume in litres. The work done during the process from A to B is :

A. $3 \times 10^{-3} J$

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

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

D. $9 \times 10^{-3} J$.

Answer: D

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34. Two vessels of different materials are similar in size and other respects. The same quantity of ice filled in them gets melted in 40 and 70 minutes respectively. The ration of

thermal conductivities for the materials of boxes is :

A. $4:7$

B. $7:4$

C. $4:11$

D. none of these.

Answer: B

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35. A charge +Q is uniformly distributed over a thin ring of the radius R. The velocity of an electron at the moment when it passes through the centre O of the ring, if an electron was initially at rest at a point A which is very far always from the centre and on the axis of the ring is:

A. $\sqrt{\left(\frac{2KQe}{mR}\right)}$

B. $\sqrt{\left(\frac{KQe}{m}\right)}$

C. $\sqrt{\left(\frac{Kme}{QR}\right)}$

D. $\sqrt{\left(\frac{KQe}{mR}\right)}$

Answer: A

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36. Two very long straight parallel wires carry steady currents I and -I. The distance between the wires is 'd'. At a certain instant of time, a point charge 'q' is at a point equidistant from the two wires, in the plane of wires. Its instanteous velocity 'v' is $\perp$ to plane. The

magnitude of force due to magnetic field acting on charge at this instant is:

A. $\frac{\mu_0 Iqv}{2\pi d}$

B. $\frac{\mu_0 Iqv}{\pi d}$

C. $\frac{2\mu_0 Iqv}{\pi d}$

D. $zero$

Answer: D

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37. A short bar magnet of amgnetic moment 25 JT^{-1} is placed with its axis perpendicular to earth the resultant field is inclined at 45° with earth field if $H = 0.4 \times 10^{-4}$T

A. 5 m

B. 0.5 m

C. 2.5 m

D. 0.25 m

Answer: B

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38. A copper rod of length l is rotated about the end perpendicular to a uniform magnetic field B with constant angular velocity. the induced emf between two ends of the rod is:

A. $B\omega l^2$

B. $\frac{1}{2}B\omega l^2$

C. $\frac{1}{2}\frac{B\omega}{l}$

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

Answer: B

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39. A small square loop of wire of side l is placed inside a large square loop of side L. $(L > > l)$. The loops are coplanar and their centres coincide. The mutual induction of the system is :

A. $\frac{l}{L}$

B. $\frac{l^2}{L}$

C. $\frac{L}{l}$

D. $\frac{L^2}{l}$

Answer: B

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40. A convex and a concave mirror of radius 10 cm each are placed 15 cm apart, facing each other. An object is placed mid-way between them. Find the position of final image if the

reflection first takes place in the concave and then in the convex mirror:

A. Final image is formed on the pole of concave mirror.

B. Final image is formed on the pole of convex mirror

C. Final image is formed at ∞:

D. None of above.

Answer: B

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41. Unpolarised light of intensity I_0 falls on a Nicol prism. The light emerging from this Nicol Prism falls on another Nicol whose polarising axis is inclined to that of first by an angle 30°. The light emerging from the second Nicol has the intensity :

A. $\frac{I_0}{\sqrt{2}}$

B. $\frac{I_0}{2}$

C. $\frac{\sqrt{3}}{2} I_0$

D. $\frac{3}{8}I_0$

Answer: D

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42. A plane electromagnetic wave is incident on a material surface. The wave delivers momentum p and energy E, then :

A. $p \neq 0, E \neq 0$

B. $p = 0, E = 0$

C. $p = 0, E \neq 0$

D. $p \neq 0, E = 0$

Answer: A

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43. Maximum frequency of the photon produced by the union of a proton and a antiproton is (given : $m_p = 1.67 \times 10^{-27} kg$):

A. $4.56 \times 10^{21} Hz$

B. $4.56 \times 10^{23} Hz$

C. $5.46 \times 10^{25} Hz$

D. $6.45 \times 10^{25} Hz$

Answer: B

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44. The ionisation potential of mercury is 10.39 volt. To gain energy sufficient enough to ionise mercury, an electron must travel in an electric field of $1.5 \times 10^{6} Vm^{-1}$ at distance of :

A. $\frac{10.39}{1.5 \times 10^6} m$

B. $10.39 \times 1.5 \times x10^6 m$

C. $10.39 \times 1.6 \times 10^{-19} m$

D. $\frac{10.39 \times 1.6 \times 10^{-19}}{1.5 \times 10^6} m.$

Answer: A

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45. The ratio of longest wavelength and the shortest wavelength as observed in the five

spectral series of emission spectrum of hydrogen is :

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

B. $\frac{525}{376}$

C. 25

D. $\frac{900}{11}$

Answer: B

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46. If A is the atomic mass number of an element , N is the Avogardro number and a is the lattice parameter, then the density of the element , if it has crystal structure , is :

A. $\frac{A}{Na^3}$

B. $\frac{2A}{Na^3}$

C. $\frac{\sqrt{3}A}{Na^3}$

D. $\frac{2\sqrt{2}A}{Na^3}$

Answer: B

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47. Power deliverd to a load of impedance Z_L is optimum when the impedance of transmission line Z is :

A. greater than Z_L

B. less than Z_L

C. equal to Z_L

D. not related to Z_L.

Answer: C

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