PHYSICS

BOOKS - MODERN PUBLICATION PHYSICS (KANNADA ENGLISH)

MOCK TEST-2

Mcqs

1. Given that force (F) is given $F = Pt^{-1} + Qt$. Here t is time. The unit of P

is same as that of :

A. Acceleration

B. Momentum

C. Velocity

D. Displacement.

Answer: B

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2. A body dropped from top of a tower falls through 40 m during last two seconds of its motion of its fall. The height of tower in m is :

A. 45 m

B. 50 m

C. 60 m

D. 80 m.

Answer: A

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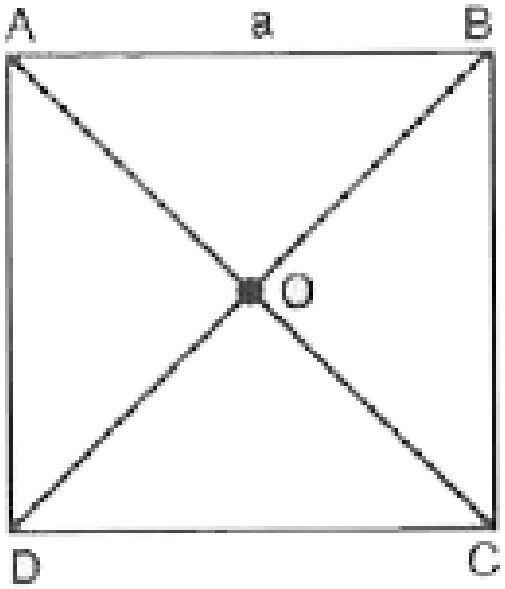
3. Four boys are standing at the four comers of a square ABCD of length of sideal. They simultaneously start running such that runs towards B, B runs towards C, C runs towards D and D runs towards A each with velocity . They will meet at after time given by :



A. $\frac{a}{V}$

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

C. $\frac{a}{V\sqrt{2}}$

D. None of these.

Answer: A

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4. A 600 kg rocket is set for a vertical firing. If the exhaust speed is 1000 m/s, the gas ejected

per second to supply the thrust needed to overcome the wight of rocket is :

A. $6kg/s$

B. $58kg/s$

C. $75kg/s$

D. None of these.

Answer: A

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5. 230 J work is done in lifting a block of 10 kg to a height of 2 m above the ground. The acceleration of the block (given $g = 10m/s^2$) is :

A. $23m/s^2$

B. $11.5m/s^2$

C. $1.5m/s^2$

D. zero.

Answer: C

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6. Four spheres of radius r each of mass m placed with their centres on the four corners of the square of side 'a'. The M.I. of the system about an axis along one of the sides of square is :

A. $\frac{4}{5}mr^2 + 2ma^2$

B. $\frac{8}{5}mr^2 + 2ma^2$

C. $\frac{8}{5}mr^2$

D. $\frac{4}{5}mr^2 + 4ma^2$

Answer: B

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7. A body weighs 90 kg on the surface of earth. How much will it weigh on the surface of Mars, whose mass is $\frac{1}{9}$th and radius $\frac{1}{2}$ that of earth ?

A. 40 kg

B. 60 kg

C. 90 kg

D. 180 kg.

Answer: A

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8. A packet is released from a satellite by simply detaching it from the outer wall of the satellite. What will happen to the packet:

A. It will fall on the earth

B. The packet goes to the space and is lost

C. It continues moving along the satellite with double the velocity

D. It will continue moving along with the satellite in same orbit with same velocity.

Answer: D

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9. If the work done in blowing a bubble of radius R is W, then the work done in blowing a bubble of radius 2R from that solution is :

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

B. 2W

C. 4W

D. $2^{2/3}W$.

Answer: C

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10. A body executes S.H.M. with an amplitude A.

At what displacement from the mean position

is the potential energy of the body is one-fourth of its total energy ?

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

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

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

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

Answer: C

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11. Stationary waves of frequency 200 are formed in air. If velovity of the wave is 360 m/s the shortest distance between antinodes will be :

A. 1.8 m

B. 3.6 m

C. 7.2 m

D. 0.9 m.

Answer: D

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12. Radius of curvature of a plano-convex lens of focal length 0.2 m made up of glass of refractive index 1.5 is :

A. 0.2 m

B. 0.1 m

C. 2.5 m

D. 0.4 m.

Answer: B

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13. 1000 small spherical drops each of radius r and carrying charge q coalesce to form one spherical drop. The potential of big drop is large than that of the smaller one by a factor of:

A. 1000

B. 100

C. 10

D. 1

Answer: B

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14. A parallel plate condenser of area A has charge Q. Then the force on each plate is

A. $\frac{q^2}{\in_0 A}$

B. $\frac{2q^2}{\in_0 A}$

C. $\frac{q^2}{2 \in_0 A}$

D. Zero.

Answer: C

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15. A electric motor working on a 100V d.c. supply draws a current of 15A. If efficiency of motor is 40%, then resistance of the windings of motor is :

A. 4Ω

B. 8Ω

C. 16Ω

D. 32Ω

Answer: A

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16. A dip needle free to move in a vertical plane perpendicular to the magnetic will remain:

A. horizontal

B. vertical

C. at an angle of 30° with horizontal

D. at an angle of 45° with horizontal.

Answer: B

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17. An aeroplane is moving north horizontally with speed of 200 m/s at a plane where the vertical component of the earth's magnetic field is 0.5×10^{-4}T. What is the induced e.m.f. set up between the tips of the wings if they are 10 m apart?

A. 0.01 V

B. 0.1 V

C. 1 V

D. 0 V.

Answer: B

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18. The distance between the object and real image formed by a lens is D. If the

magnification is m, then the focal length of the lens is given by :

A. $\frac{md}{(m+1)^2}$

B. $\frac{md}{(m+1)}$

C. $\frac{md}{(m-1)^2}$

D. $\frac{md}{(m-1)}$.

Answer: A

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19. A full wave rectifier is fed with a.c. mains frequency 50 Hz. What is fundamental frequency of the ripple in the output current ?

A. 25 Hz

B. 50 Hz

C. 100 Hz

D. None of these.

Answer: C

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20. A slab consists of two parallel layers of two different materials of same thickness having thermal conductivities K_1 and K_2, the equivalent conductivity of the combination is :

A. $k_1 + k_2$

B. $\frac{2k_1k_2}{k_1 + k_2}$

C. $\frac{k_1 + k_2}{2}$

D. $\frac{k_1 + k_2}{2k_1k_2}$

Answer: B

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21. Two discs A and B are mounted coaxially on a vertical axle. The discs have moments of inertia I and 2I respectively about the common axis. Disc A is imparted an initial angular velocity 2ω using the entire potential energy of a spring compressed by a distance x_1. Disc B is imparted an angular velocity ω by a spring having the same spring constant and compressed by a distance x_2. Both teh discs rotate in the clockwise direction. The ratio $\frac{x_1}{x_2}$ is :

A. 2

B. $1/2$

C. $\sqrt{2}$

D. $1/\sqrt{2}$

Answer: C

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22. Paragraph-1 : Two discs A and B are mounted coaxially on a vertical axle. The discs have moments of inertia I and 2I respectively

about the common axis. Disc A is imparted an initial angular velocity 2ω using the entire potential energy of a spring compressed by a distance x_1. Disc B is imparted an angular velocity ω by a spring having the same spring constant and compressed by a distance x_2. Both the discs rotate in the clockwise direction.

When disc B is brought in contact with disc A, they acquire a common angular velocity in time t. The average frictional torque on one disc by the other during this period is :

A. $\frac{2I\omega}{3t}$

B. $\frac{9I\omega}{3t}$

C. $\frac{2I\omega}{4t}$

D. $\frac{3I\omega}{2t}$.

Answer: A

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23. Paragraph-1 : Two discs A and B are mounted coaxially on a vertical axle. The discs have moments of inertia I and 2I respectively

about the common axis. Disc A is imparted an initial angular velocity 2ω using the entire potential energy of a spring compressed by a distance x_1. Disc B is imparted an angular velocity ω by a spring having the same spring constant and compressed by a distance x_2. Both the discs rotate in the clockwise direction.

The loss of kinetic energy during the above process is :

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

B. $\frac{I\omega^2}{3}$

C. $\frac{I\omega^2}{4}$

D. $\frac{I\omega^2}{6}$.

Answer: B

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24. Which of the graphs shown below correctly represents the variation of magnetic field with distance r from a long current carrying conductor.

A. 

B. 

C. 

D. 

Answer: C

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25. A point source of light is placed 4m below the surface of a transparent liquid of refractive index $\frac{5}{3}$. The minimum diameter of

a disc which should be placed over the source on the surface of liquid to cut off all light coming out of liquid is :

A. 1 m

B. 3 m

C. 4 m

D. None of these.

Answer: D

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26. Statement-1 : A block of mass m starts moving on a rough horizontal surface with a velocity V. It stops due to friction between the block and the surface after moving through a certain distance. The surface is now tilted to angle of 30° with the horizontal and the same block is made to go up on the surface with the same initial velocity V. The decrease in the mechanical energy in the second situation is smaller than that in the first situation.

Statement-2 : The coefficient of friction

between the block and the surface decreases with the increase in the angle of inclination.

A. statement-1 and 2 are true and statement-2 is a correct explanation for statement-1

B. statement-1 and 2 are true and statement-2 is not a correct explanation for statement-1

C. statement-1 is true, statement-2 is false

D. statement-1 is false, statement-2 is true.

Answer: C

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27. Statement I: If the accelerating potential in an X-ray tube is increased, the wavelengths of the characteristic X-rays do not change.

Statement II: When an electron beam strikes the target in an X-ray tube part of the kinetic energy is converted into X-ray energy.

A. statement-1 and 2 are true and statement-2 is a correct explanation for statement-2

B. statement-1 and 2 are true and statement-2 is not a correct explanation for statement-2

C. statement-1 is true, statement-2 is false

D. statement-1 is false, statement-2 is true.

Answer: B

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28. Statement-1 : The formula connecting u, v and f for a spherical mirror is valid only for mirrors whose sizes are very small compared to their radii of curvature.

Statement-2 : Laws of reflection are strictly valid for plane surfaces, but not for large spherical surfaces.

A. statement-1 and 2 are true and statement-2 is a correct explanation for statement-3

B. statement-1 and 2 are true and statement-2 is not a correct explanation for statement-3

C. statement-1 is true, statement-2 is false

D. statement-1 is false, statement-2 is true.

Answer: C

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29. If a body of mass m moving with velocity v collides with another body of mass m at rest. If e is the coefficient of restitution then find the ratio of final velocities of two bodies :

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

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

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

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

Answer: A

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30. If units of length, mass and force are chosen as fundamental units, the dimensions of time would be :

A. $M^{1/2}L^{-1/2}F^{1/2}$

B. $M^{1/2}L^{1/2}F^{1/2}$

C. $M^{1/2}L^{1/2}F^{-1/2}$

D. $M^{1}L^{-1/2}F^{-1/2}$.

Answer: C

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31. The relation between time t and distance x is given by $t = ax^2 + bx$. Where a, b are constants. Then retardation is :

A. $2av^3$

B. $2abv^3$

C. $2bv^3$

D. $2ab.$

Answer: A

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32. Given $\vec{r} = 2\hat{i} + \hat{j} + \hat{k}$ and $\vec{p} = 2\hat{i} - 3\hat{j} + \hat{k}$. Then angular momentum $\vec{L}$ is :

A. $8\hat{k}$

B. $4\hat{i}$

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

D. $4\hat{i} + 8\hat{k}$

Answer: C

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33. The angle between two vectors $\vec{A} = \vec{B}$ is θ. The resultant of $\vec{A}$ and $\vec{B}$ making an angle $\frac{\theta}{2}$ with $\vec{A}$. Then:

A. $A = B$

B. $AB = 1$

C. $A = 2B$

D. $A = \frac{B}{2}$.

Answer: A

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34. A Frame of reference attached to a satellite orbiting around earth can be regarded as:

A. An inertial frame of reference

B. Non-inertial frame of reference

C. both inertial as well as non-inertial

D. None of these.

Answer: B

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35. A ball is dropped from height of Im. If coefficient of restituion between surface and ball is 0.6. The ball rebounds to a height of:

A. 0.4 m

B. 1 m

C. 0.6 m

D. 0.36 m.

Answer: D

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36. A weight lies on a rough horizontal surface. It is found that a force F gives it an acceleration of $4ms^{-2}$ and when force is doubled the acceleration becomes 4 times, if $g = 10ms^{-2}$. What is coefficient of kinetic friction?

A. 0.2

B. 0.4

C. 0.6

D. 0.8.

Answer: D

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37. Minimum work done to shift a body of mass m from a circular orbit of 2R to a higher orbit of radius 3R around the earth (R = Radius of earth):

A. $\frac{GMm}{12R}$

B. $\frac{GMm}{6R}$

C. $\frac{GMm}{4R}$

D. $\frac{GMm}{8R}$

Answer: B

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38. A thick rope of rubber of density $1.5kg/m^3$ and $Y = 5 \times 10^6 Nm^{-2}$ 8 metres in length when hung vertically will increase in length by : $(g = 10ms^{-2})$

A. $9.6 \times 10^{-5} m$

B. $9.6m$

C. $19.2 \times 10^{-3} m$

D. $19.2 \times 10^{-5} m.$

Answer: A

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39. A simple harmonic oscillator has an amplitude A and time period T, the time

required by it to travel from x = A to $x = \frac{A}{2}$ is

:

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

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

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

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

Answer: A

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40. A road runs between two parallel rows of buildings. A motorist moving with speed of 36 km/h sounds the horn. He hears the echo one second after he sounds the horn. He hears the echo one second after he sounded the horn. If speed of sound is 330 m/s then distance between two rows of buildings is :

A. 330m

B. $2\sqrt{(165)^2 - (5)^2}m$

C. 165m

D. $\sqrt{(165)^2 - (5)^2 m}$

Answer: B

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41. 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. zero.

Answer: A

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42. Two slabs A and B, each though similar, in all other respects, have different materials. They are placed one above the other in perfect

contact and a steady difference of temperature of $36^{\circ}C$ is maintained across the combination. If the thermal conductivity of A is twice that of B, what is the temperature of interface ?

A. $16^{\circ}C$

B. $12^{\circ}C$

C. $28^{\circ}C$

D. $24^{\circ}C$

Answer: D

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43. A point particle of mass m is attached to one end of massless rigid non-conducting rod of length l. Another point particle of same is attached to the other end of the rod. The two particles carry equal charges +q and -q respectively. This arrangement is held in a region with the field E such that the rod makes an angle with the field direction :

A. The tension in rod remains constant

B. If q is very small, the rod exectutes simple harmonic motion of period $2\pi\sqrt{\frac{ml}{2qE}}$

C. At every instant, net force on the system is zero

D. Both (b) and (c) are correct

Answer: D

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44. A magnetic dipole is under the effect of two magnetic field inclined at 75° to each other one of the fields has a magnitude of 1.5×10^{-2} t the magnets come to stable at an angle of 30 degrees with the direction of the field. the magnitude of othe field is

A. $\frac{15}{2\sqrt{2}} \times 10^{-2}T$

B. $\frac{1.5}{\sqrt{2}} \times 10^{-2}T$

C. $1.5 \times \sqrt{2} \times 10^{-2}T$

D. $1.5 \times 10^{-2}T.$

Answer: B

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45. A convex mirror gives the image of an object 30 cm from it at the same point as plane mirror at a distance of 5.0 cm from the convex mirror and 25.0 cm from the object. Find the radius of curvature of convex mirror.

A. 30 cm

B. 60 cm

C. 90 cm

D. 120 cm

Answer: D

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46. A Fresnel's biprism is used to form the interference fringes. The distance between the source and the biprism is 20 cms and that between the biprism and the screen is 80 cm. If $\lambda = 6563$ Å and the separation between the

virtual sources is 3.6 mm, then the fringe width is :

A. 1.82 cm

B. 0.182 cm

C. 0.0182 cm

D. 0.00182 cm

Answer: C

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47. An electromagnetic wave going through vacuum is described by $E = E_0 \sin(kx - \omega t)$ which of the following is/are independent of the wavelength?

A. k

B. k / ω

C. $k\omega$

D. ω.

Answer: B

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48. If the frequency of incident light on a certain metal is $8.2 \times 10^{14} Hz$, having threshold frequency $3.3 \times 10^{14} Hz$, then cut off potential is :

A. 3.0 V

B. 4.0 V

C. 5.1 V

D. None of these.

Answer: D

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49. The Rydberg constant for hydrogen is $1.097X10^{7}ms^{-1}$. Calculate the short and long wavelength limits of Lyman series.

Data: $R = 1.097 \times 10^{7}ms^{-1}$

For short wavelength limit of Lyman Series,

$n_f = 1, n_i = \infty, \lambda_s = ?$

For long wavelength limit of Lyman series,

$n_f = 1, n_i = 2, \lambda_i = ?$

A. 602 Å, 906 Å

B. 204 Å, 306 Å

C. 911 Å, 1212 Å

D. none of these.

Answer: C

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50. Find the recoil speed of a hydrogen atom after it emits a photon in going from n = 5 state to n = 1 state $\left(R = 1.097 \times 10^7 m^{-1}\right)$:

A. $2.4ms^{-1}$

B. $4.18ms^{-1}$

C. $3.2ms^{-1}$

D. $6.4ms^{-1}$.

Answer: B

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51. An n - type semiconductor has resistivity $0.1\Omega m$. The number of donor atoms which

must be added to achieve this is ($\mu = 0.05 m^2 V^{-1} s^{-1}$) :

A. 1.25×10^{17}

B. 1.25×10^{23}

C. 1.25×10^{21}

D. 1.25×10^{22}.

Answer: C

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52. If V_r is the reflected voltage and V_i the incident voltage of a transmission line, then reflection coefficient K_r of the line is given by :

A. $K_r = \frac{V_r}{V_i}$

B. $K_r = \frac{V_i}{V_r}$

C. $K_r = \sqrt{V_r \times V_i}$

D. $K_r = \frac{V_r \times V_i}{2}$

Answer: A

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