

MILLENNIUM SECONDARY AND PREPARATORY SCHOOL 2012 E.C GRADE 12
PHYSICS OPEN BOOK MODEL EXAM -ONE

_____ 1. A rectangular stripe measures 32.30m by 21m, find the area taking in to account significant figures:

- A. 6.783×10^2 B. 6.78×10^2 C. 6.7×10^2 D. 6.8×10^2

_____ 2. Use the rules for significant figures to find the answer to addition problem:

$21.4 + 15 + 17.17 + 4.003 =$ _____

- A. 57.573 B. 57.57 C. 57.6 D. 58

_____ 3. The precision of a measurement is 56.47 ± 0.02 mm. the percentage uncertainty equals:

- A. 0.035417% B. 0.0354% C. 0.035% D. all of the above

_____ 4. Which Of the following statement is not true about accuracy and precision in a measurement?

- A. Accuracy refers to how close a reading is to the true value
- B. precision refers to the closeness or exactness of measured value to each other
- C. The more precise a reading is the smaller the uncertainty
- D. If the measurement is precise then it is necessarily accurate

_____ 5. Systemic error occurred due to poor calibration of instrument that can be corrected by

- A. taking several reading B. replacing instrument
- C. taking mean of values D. taking median of values

_____ 6. Given that $\vec{A} \cdot \vec{B} = 0$ and $\vec{A} \times \vec{C} = 0$ What is angle between $\vec{B}$ and $\vec{C}$?

- A. 45° B. 90° C. 0° D. 180°

_____ 7. If $\vec{A} = (i + 3k) \text{ m/s}$ and $\vec{A} = (2j + 3k) \text{ m/s}$, then what is the value of $|\vec{A} \times \vec{B}|$?

- A. $\sqrt{10} \text{ m/s}$ B. $\sqrt{13} \text{ m/s}$ C. 7 m/s D. $\sqrt{130} \text{ m/s}$

_____ 8. If vector $\vec{P}$ is 6m in the X direction and vector $\vec{q}$ is 8m in y direction then what is the value of $\vec{P} + \vec{q}$?

- A. 10m at 53° from x axis B. $\sqrt{136} \text{ m}$ at 45° from x direction
- C. 10m at 37° from x axis D. $\sqrt{136} \text{ m}$ at 30° from x direction

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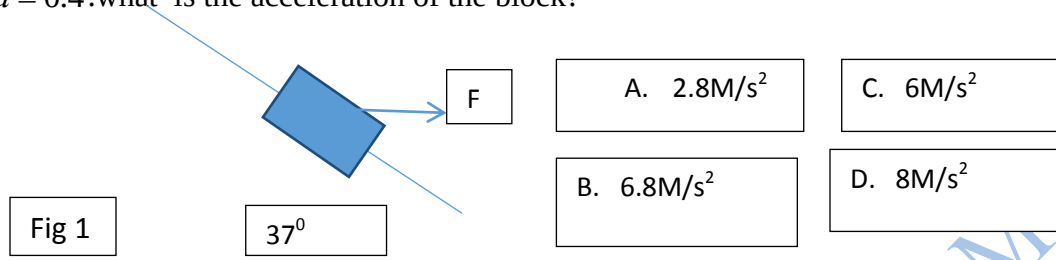
- _____ 9. Suppose $\vec{A} = 3i - 2j$ and $\vec{B} = -i - aj$ are two vectors in XY-plane, What is the value of a such that $\vec{A} + \vec{B} = 2i$
- A. 3 B. 2 C. -2 D. -3
- _____ 10. The resultant and difference of two vectors A and B have equal non zero magnitudes. What can be said about the vectors?
- A. If both A and B makes angle 45° with each other.
B. The two vectors can form a rectangle if appropriately joined
C. The two vectors A and B are less than 90° with each other.
D. When vector A and B parallel and ant parallel.
- _____ 11. A ball rolls off the edge of a horizontal table top 4m high. It strikes the floor at a point 5m horizontally away from the edge of the table. How long was the ball in the air in seconds?
- A. $\frac{3}{\sqrt{5}}$ B. $\frac{1}{\sqrt{5}}$ C. $\frac{2}{\sqrt{3}}$ D. $\frac{2}{\sqrt{5}}$
- _____ 12. Uniform circular motion is a:
- A. Motion with constant velocity. C. motion in one dimension.
B. Motion with acceleration of constant magnitude. D. motion in which net force is constant
- _____ 13. A projectile is fired at 60° with the horizontal. At the highest point of its path, the vertical component of its velocity is momentarily zero. What is the magnitude of its acceleration at this point?
- A. 20m/s^2 B. 10m/s^2 C. 5m/s^2 D. 0m/s^2
- _____ 14. If a long distance jumper athlete leaves the ground at an angle of 37° above the horizontal surface at a speed of 10m/s , how far does he jump in the horizontal direction?
- A. 4.8m B. 6m C. 9.6m D. 12m
- _____ 15. A cricketer throws a ball vertically upwards with initial speed of 20m/s , how long is it in the air before it returns to the cricketer's hand?
- A. 2s B. 10s C. 1.5s D. 4s
- _____ 16. The acceleration of a moving body can be found from
- A. area under velocity-time graph C. slope of the velocity-time graph
B. area under distance-time graph D. slope of the distance-time graph
- _____ 17. A particle at rest starts moving in a horizontal straight line with uniform acceleration. The ratio of the distance covered during the fourth and the third second is
- A. $4/3$ B. $7/5$ C. $26/9$ D. 2

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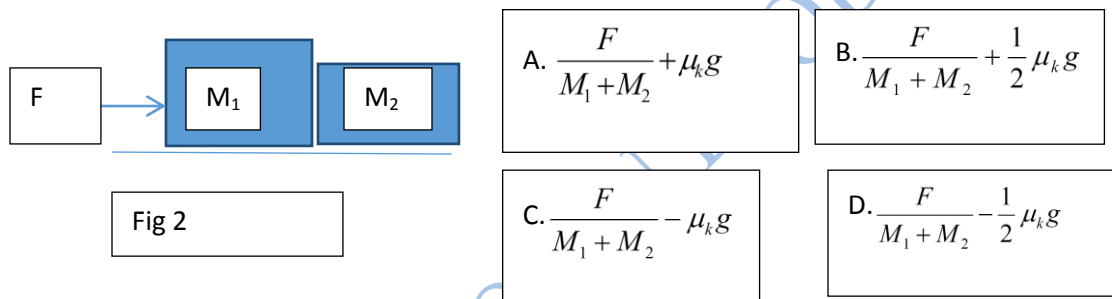
- _____ 18. The distance travelled by a body, falling freely from rest in one, two and three seconds are in the ratio
A. 1: 2: 3 B. 1: 3: 5 C. 1: 4: 9 D. 9: 4: 1
- _____ 19. An object is thrown along a direction inclined at an angle 45° with the horizontal. The horizontal range of the object is equal to
A. vertical height B. twice the vertical height
C. triples the vertical height D. four times the vertical height
- _____ 20. If a particle travels in a circle, covering equal angles in equal times, its velocity vector
A. changes in magnitude only B. Remains constant
C. Changes in direction only D. changes both in magnitude and direction
- _____ 21. The average and instantaneous acceleration are equal when the motion of the body is
A. uniform velocity B. uniform speed C. uniform accelerated D. average acceleration
- _____ 22. When two masses are at a distance of 1m the force between them is F what must be the distance between the masses when the force between them is quadrupled
A. 25cm B. 50cm C. 75cm D. 100cm
- _____ 23. A ball attached to a string is whirled around in a horizontal circle having radius r if the radius of circle is changed to 4r and the same centripetal force is applied by the string. which of the following is true about the new speed?
A. one quarter of original speed B. twice the original speed
C. half of original speed D. four times original speed
- _____ 24. A boy is rotating a bucket of water in a vertical circle of radius 0.9m. The mass of the bucket and water is 5kg. what is bucket's minimum speed at the top of the circle if no water is spill out?
A. 1m/s B. 0m/s C. 9m/s D. 3m/s
- _____ 25. An air – plane flies at a speed of 720km/hr at 37° north of west direction. How far does the plane travel to west in one hour?
 $\sin 37^\circ = \cos 53^\circ = 0.6$ and $\sin 53^\circ = \cos 37^\circ = 0.8$
A. 432km B. 504km C. 576km D. 720km

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- _____ 26. A block of mass 2 kg placed on a rough inclined plane is acted on by a horizontal force of $F=10\text{N}$ as shown in the figure below if the coefficient of friction between block and surface is $\mu = 0.4$. what is the acceleration of the block?



- _____ 27. Two objects of mass M_1 and M_2 are arranged as shown in the figure below. A force F is applied on the system in the direction shown in the figure. Coefficient of friction between the object and table is μ_k . What is the magnitude of acceleration of the system?



- _____ 28. A 4Kg block is given an initial speed of 8m/s at the bottom of 30° inclined planes. The frictional force that retards its motion is 15N . If the block is directed up the inclined plane, how far will it move before it stops?

A. 3.35m B. 3.66m C. 4.40m D. 4.67m

- _____ 29. A block slides on a rough 45° incline. The coefficient of friction between blocks and incline is μ_k . What is the ratio of acceleration when the block accelerates down the incline to the acceleration when the block is projected up the incline?

A. $\frac{\mu_k - 1}{\mu_k + 1}$ B. $\frac{\frac{\mu_k}{\sqrt{2}} - 1}{\mu_k + 1}$ C. $\frac{1 - \mu_k}{1 + \mu_k}$ D. $\frac{1 + \mu_k}{1 - \mu_k}$

- _____ 30. A fun making boy swings a blinking ball tied to the end of the string in a vertical circle. If the radius of the circle is 0.5m , then what should be the minimum speed of the ball at the bottom of the circle to make a complete circular motion at the top?

A. 5m/s B. $\sqrt{5}\text{m/s}$ C. $\sqrt{15}\text{m/s}$ D. $2\sqrt{5}\text{m/s}$

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_____ 31. An object slides down with an inclined plane which makes 37° to the horizontal at constant speed. Calculate the coefficient of friction between the block and the surface?

- A. 0.1 B. 0.25 C. 0.75 D. 0.5

_____ 32. The passenger tends to forward when the bus stops suddenly. This statement is described by

- A. Newton's third law of motion. C. Newton's second law of motion.
B. Newton's first law of motion. D. Coulomb's law

_____ 33. The force between two masses is 486 N. What is the force between these two masses if their separation is tripled?

- A. 1458 N B. 486 N C. 162 N D. 54 N

_____ 34. Among the following statements, one does not describe a property of uniform – rectilinear motion?

- A. Distance is proportional to square of time.
B. Slope of distance – time graph has the same value at any time.
C. The magnitude of Velocity does not vary with time.
D. The average – speed of motion is equal to speed at any time.

_____ 35. An example of a body moving with constant – speed, but still acceleration is _____

- A. A body moving on a straight road.
B. A body moving in a circular – path.
C. A body moving on a straight railway track.
D. A body falling in a viscous – fluid like air, water.

_____ 36. A driver moving at constant – speed of 20 m/s sees an accident up ahead and hits the brakes. If the car decelerates at constant – rate of 5 m/s^2 . How far does the car go before it comes to stop?

- A. 20 m B. 100 m C. 120 m D. 40 m

_____ 37. According to Newton's second law of motion, force is:

- A. Has a dimension of momentum multiplied by time.
B. Is the rate of change of doing work
C. Equals to time rate of change in linear – momentum.
D. Is the ability to do mechanical work.

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____ 38. One of the following is correct about collision?

- A. Momentum is conserved on any kinds of collision.
- B. Kinetic – energy is conserved only an elastic – collision.
- C. Kinetic – energy is not conserved in an explosion.
- D. All of the above are correct.

____ 39. A satellite moves at constant speed in a circular orbit about the center of the earth at an altitude half the radius of the earth above its surface. If g is the gravitational acceleration at the surface of the earth and R its radius, then what is the speed of the satellite?

- A. $\sqrt{2gR}$ B. $\sqrt{\frac{3gR}{2}}$ C. $\sqrt{gR}$ D. $\sqrt{\frac{3gR}{3}}$

____ 40. A body is rotated with a uniform speed in a circle of radius 1m. What is the centripetal acceleration in m/s^2 if it completes 12 rotations in 3sec?

- A. $36\pi^2$ B. $64\pi^2$ C. $72\pi^2$ D. $144\pi^2$

____ 41. The net force acting on a system of particle is zero. Which of the one of the following quantities may vary with time?

- A. The momentum of the system
- B. The kinetic energy of the system
- C. the velocity of the center of mass of the system
- D. The position of the center of mass of the system

____ 42. A ball is thrown downward (not dropped) from the top of a tower. After being released, it's downward:

- A. Velocity will be uniform
- B. Acceleration will be equal to g
- C. acceleration will be greater than g
- D. acceleration will be smaller than g

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_____43. A large – mass (A) and small – mass (B) are pushing one to another a part as shown below figure, the small - mass moves away at a Velocity of 20m/s to right. What is the recoil Velocity of the larger – mass?

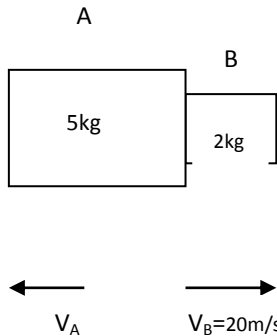


FIG :3

- | | |
|----------|----------|
| -20m/s | C. 20m/s |
| A. -8m/s | D. 8m/s |

_____44. The area under a force versus time graph represents

- A. Impulse B. Acceleration C. Velocity D. Work – done

_____45. Find the distance of center of mass of the system shown below in diagram from point

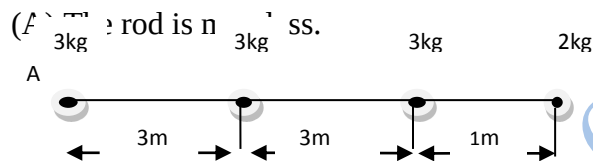


FIG:4

- | | |
|----------|----------|
| A. 3.73m | C. 2.45m |
| B. 2.09m | D. 5.86m |

_____46. Water is flows on section of Niagara Falls at the rate of 1.2×10^6 Kg/s and falls 50m
 What is power wasted by the water fall?

- A. 285W B. 488W C. 600MW D. 560KW

_____47. A particle moves along the x axis from $X=x_1$ to $X=x_2$ under the influence of a force given by $F=2x$ work done on the process is?

- A. $X_2^2 - X_1^2$ B. ZERO C. $2X^2(X_2 - X_1)$ D. $2X_1(X_2 - X_1)$

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_____48. Which has a greater velocity at equilibrium position?

- A. 1Kg mass attached to a spring of $K=100\text{N/m}$ in a horizontal frictionless surface after a completion of 10cm.
- B. A 1Kg mass oscillating on a concave-upward smooth surface with an effective vertical height of 5cm
- C. A pendulum bob of 1 kg displaces through a vertical height of 10cm
- D. All these could not be compared.

_____49. A force $F = \begin{bmatrix} 2 \\ -4 \\ -5 \end{bmatrix}$ N acts on a particle as it moves a distance of $\begin{bmatrix} 2 \\ -4 \\ 3 \end{bmatrix}$ m. What is the work done by a force on the particle?

- A. $4i+16j-15k$ B. 5J C. 35J D. 27J

_____50. If a single constant force F acted on a particle of mass m and the particle starts from rest, what is the instantaneous power delivered by the force at time t ?

- A. $2 \frac{F^2}{m} t$ B. $\frac{F^2}{2m} t$ C. $\frac{F^2}{m} t$ D. $3 \frac{F^2}{m} t$

_____51. A force of 100N is required to stretch a spring that obeys Hooke's law by 50cm. What is the work done in stretching the spring?

- A. 500J B. 50J C. 25J D. 0J

_____52. A 4kg block moving with a speed of 8m/s to the right collides head on with a 2 kg block moving with a speed of 10 m/s to the left. If the collision is completely inelastic, how much kinetic energy is lost in the collision?

- A. 216J B. 128J C. 100J D. 12J

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_____53.A simple pendulum of length 1m shown in the figure is released from point A. What is the speed at point B if $m=0.5 \text{ kg}$ ($\sin 53=0.8$, $\cos 53=0.6$)

- A. $2\sqrt{2} \text{ m/s}$ B. 20 m/s C. $\sqrt{5} \text{ m/s}$ D. 2 m/s

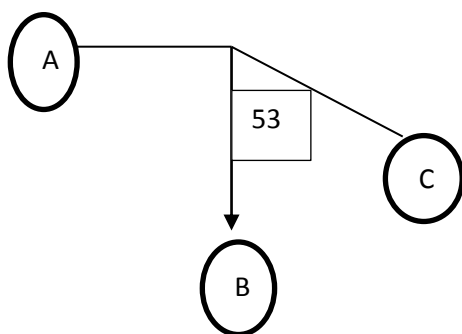


FIG:5

_____54.What is the kinetic energy at point C in the above figure

- A.2J B.3J C.5J D.7J

_____55.What is the potential energy at point C in the above figure

- A.2J B.3J C.5J D.7J

_____56.The angular velocity of a body is $\omega = (2i + 3j + 4k) \text{ rad/s}$ and a torque of $\tau = (-i + 2j + 3k) \text{ Nm}$ acts on it what is the rotational power?

- A. 20W B. 14W C. 16W D. 12W

_____57.A particle is displaced from a position $(2i - j + k) \text{ m}$ to another particles $(i + 2j - k) \text{ m}$ under the action of a force $(3i + 2j - k) \text{ N}$ what is the work done?

- A. 6J B. 5J C. 11J D. 8J

_____58.A fly wheel rotating about fixed axis has a rotational kinetic energy at 360J when its angular speed is 30 rad/s . the moment of inertia of the wheel about the axis of rotation is?

- A. 0.8 kgm^2 B. 0.6 kgm^2 C. 0.15 kgm^2 D. 0.75 kgm^2

_____59.A spring has a spring constant of 75 N/m it stretched by 20 cm .How much energy is stored in the spring? A. 15J B. 750J C. 1.5J D. 150J

_____60.The angular position of rotating fly wheel is given by $\theta(t) = (10 + 15t + 8t^2) \text{ rad}$ where t in sec find angular velocity and acceleration at 3 sec respectively?

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A. 16, 63

B. 63, 16

C. 73, 48

D. 48,73

_____61. In a playing room a turbine table of radius 2m has moment of inertia 250Kg m^2 and is rotating about a frictionless vertical axel. When a body of mass 50kg stands near the rim, the system rotates with angular speed 3rad/s. the boy walks towards the center and stands at 1m from the axel. what is the final angular speed of the system

A. 4.5rad/s

B. 2.5rad/s

C. 5.4rad/s

D. 3rad/s

_____62. A particle of mass 5kg has a position vector equals to $(3\mathbf{i}-2\mathbf{j}+2\mathbf{k})\text{m}$ and velocity vector $(4\mathbf{i}-4\mathbf{j}+2\mathbf{k})\text{ m/s}$ calculate the angular momentum of the particle?

A. $4\mathbf{i}+2\mathbf{j}-4\mathbf{k}$

B. $-4\mathbf{i}-2\mathbf{j}-4\mathbf{k}$

C. $20\mathbf{i}+10\mathbf{j}-20\mathbf{k}$

D. $-20\mathbf{i}-10\mathbf{j}+20\mathbf{k}$

_____63. A force of $(2\mathbf{i}-5\mathbf{j})\text{N}$ acts at a displacement of $(3\mathbf{i}+\mathbf{j})\text{m}$ from a point what torque exerted by the force?

A. $-8\mathbf{k}\text{ Nm}$

B. $8\mathbf{i}\text{ Nm}$

C. $8\mathbf{k}\text{ Nm}$

D. $8\mathbf{j}\text{ Nm}$

_____64. A wheel starts from rest and rotate with constant angular acceleration to reach an angular speed of 12rad/s in 3s. What is the magnitude of angular acceleration of the wheel in rad/s^2 and the angle in radians through which it rotates in this time interval respectively?

A. 4, 18

B. 3,18

C. 18,5

D. 18,4

_____65. Which one of the following is the principle of work energy theorem?

A. Action and reaction force are equal in magnitude.

B. it is the principle which tells about inertia.

C. The work done on an object is equal to the change of kinetic energy.

D. energy can be created or destroyed.

_____66. A point on a wheel rotates at 5rev/s what is tangential velocity if it is located at 0.2m from the axis of rotation?

A. 3.8m/s

B. 1.2m/s

C. 6.3m/s

D. 0.104m/s

_____67. if a force of $8\mathbf{i}+4\mathbf{j}\text{ N}$ moves a body with a constant velocity of $4\mathbf{i}+6\mathbf{j}\text{ m/s}$ find the rate of work done?

A. 56J

B. 56W

C. 24W

D. 24J

_____68. The point in a body from which the force of gravity on that body appears to be acting is known as

A. center of mass

B. turning effect

C. momentum

D. impulse

_____69. If we represent the dimension of mass length and time by M, L and T, then the dimension of power is?

A. $[\text{ML}^2\text{T}^3]$

B. $[\text{ML}^2\text{T}^{-3}]$

C. $[\text{ML}^{-2}\text{T}^{-2}]$

D. $[\text{MLT}^2]$

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- _____70. A pump lifts water from a lake a large tank 30m above the lake. how much work against gravity does the pump transfer 8m^3 of water to the tank?
- A. 42MJ B. 24MJ C. 42KJ D. 24KJ
- _____71. The moment of a 10kg ball is equal to the moment of a 20kg block travelling at a speed of 5m/s. what is the kinetic energy of the ball?
- A. 200 J B. 500J C. 300J D. 400J
- _____72. A particle turns through 3000 rev in 2 min. What must be the magnitude of its average angular velocity in rad/s?
- A. 20 B. 50π C. 30π D. 60
- _____73. A body tied to a string of length 1.5m completes 3 revolutions in one second in a horizontal circle. What is the tangential displacement of the body in 5 sec?
- A. $60\pi\text{m}$ B. $30\pi\text{m}$ C. $12\pi\text{m}$ D. $45\pi\text{m}$
- _____74. Moment of inertia of object doesn't depend on
- A. Axis of rotation B. Center of mass
C. mass of rotating body D. distance of body from the axis of rotation
- _____75. A fly wheel is rotating with an angular velocity of 2 rad/s and acted by an acceleration of $\frac{1}{\pi}\text{rad/s}^2$. How long will it take to complete three revolution?
- A. $0.5\pi\text{ sec}$ B. $\pi\text{ sec}$ C. $2\pi\text{ sec}$ D. $4\pi\text{ sec}$
- _____76. The moment of inertia of a uniform ring about its center of mass is MR^2 . Find the moment of inertia about any point on its surface?
- A. $\frac{3}{2}MR^2$ B. $\frac{6}{5}MR^2$ C. $\frac{7}{5}MR^2$ D. $2MR^2$ _____77. The
- turntable of record player has an angular velocity of 8rad/s when it is turned off. The turbine comes to rest 2.5sec after being turned off. What is the angular displacement of the turntable rotate after being turned off?
- A. 12rad B. 10rad C. 8rad D. 6.8rad
- _____78. A torque of 10NM is applied to turn the wheel through one complete revolution. What is the work done by the torque?
- A. 31.4J B. 10J C. 62.8J D. 36J

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_____79.A thin circular ring of mass M and radius r and moment of inertia Mr^2 is rotating about its axis with constant angular velocity ω . two objects each of mass m , are attached gently to the opposite ends of a diameter of the ring. What would be the angular velocity of the wheel?

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

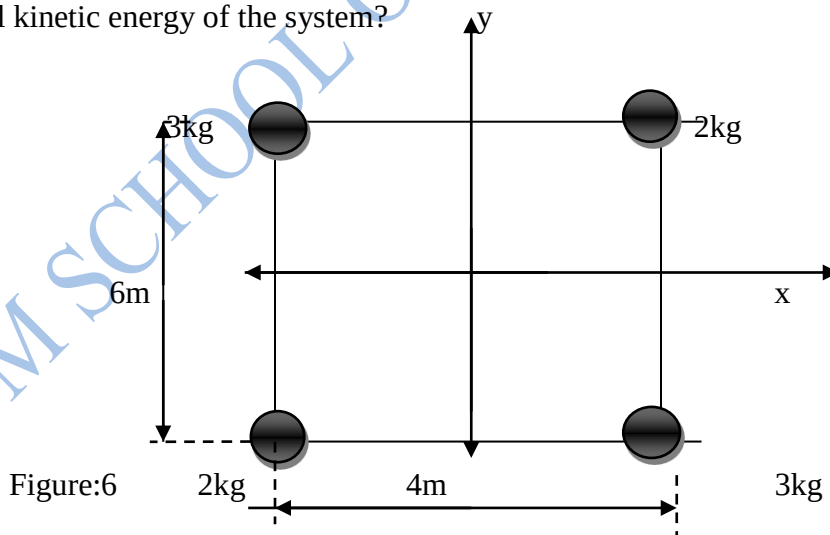
_____80.A wheel of radius 20cm is accelerating at $5\pi \text{ rad/s}^2$. What is the tangential acceleration of the rim of the wheel?

- A. $\frac{\pi m}{s^2}$ B. $\frac{1.5\pi m}{s^2}$ C. $\frac{2\pi m}{s^2}$ D. $\frac{0.5\pi m}{s^2}$

_____81.The particulars shown in figure are connected by rectangular rigid rod of negligible mass. The origin of the xy plane, it is at the center of the rectangle the system rotates in the xy plane about Z axis with an angular speed of 6.00 rad/s .

What is the rotational kinetic energy of the system?

- A. 2574 J
 B. 2340 J
 C. 1287 J
 D. 1170 J



_____82.Which one of the following statements is **NOT** correct about a particle that is in equilibrium?

- A. It can have velocity different from zero
 B. Its velocity can be equal to zero
 C. It can be under the action of more than one force

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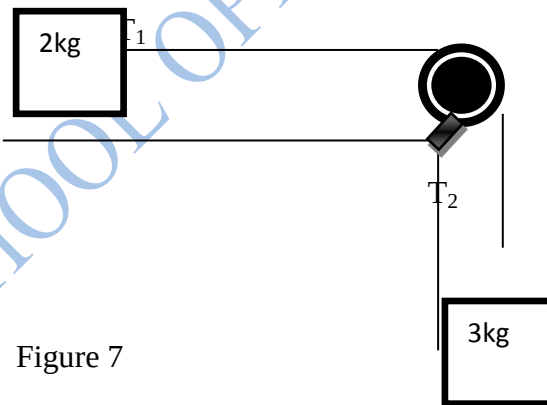
D. It can have acceleration different from zero

_____ 83. A ladder stands on the ground leaning against a wall it is safer climbing up the ladder if

- A. The ground is frictionless and the wall is rough
- B. The ground is rough and the wall is frictionless
- C. Both the ground and the wall is frictionless
- D. The ladder leans at 45° and the ground is frictionless

_____ 84. Two blocks are connected by a string of negligible mass passing over a pulley of radius $r = 0.2\text{m}$ and moment of inertia I as shown in figure 4. The block on the horizontal frictionless surface is moving with constant acceleration $a = 2.0\text{m/s}^2$. If the pulley axis is frictionless, the string is inextensible and does not slip on the pulley, what should be the moment of inertia of the pulley?

- A. 0.40 kgm^2
- B. 0.80 kgm^2
- C. 4.00 kgm^2
- D. 8.00 kgm^2



_____ 85. A ladder of length 3m and mass 20kg leans against a smooth vertical wall so that the angle between the wall and the ladder is 30° . What are the magnitudes of the normal force at the contact point on the wall (N_w) and the contact on the ground (N_g)?

- A. $N_w = 57.7\text{N}$, $N_g = 200\text{N}$
- B. $N_w = 200\text{N}$, $N_g = 57.7\text{N}$
- C. $N_w = 0\text{N}$, $N_g = 200\text{N}$
- D. $N_w = 200\text{N}$, $N_g = 0\text{N}$

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_____86. Traffic light weight 250N are suspended from the cable as shown figure 5 what is the tension T in the string if $\theta_1 = \theta_2 = 30^\circ$ ($\sin 30 = 0.5$, $\cos 30 = 0.866$), $g = 10\text{m/s}^2$

- A. 120N
- B. 1650 N
- C. 196 N
- D. 250 N

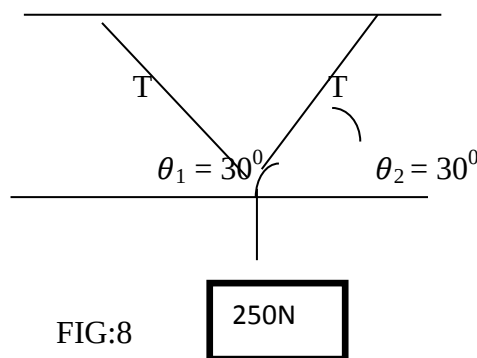


FIG:8

_____87. The amount of heat required to raise the temperature of an object of mass $m = 1\text{kg}$ by 1 Kelvin is known as _____

- | | |
|---------------------------|---|
| A. Specific latent heat | C. Specific latent heat of fusion |
| B. Specific heat capacity | D. Specific latent heat of vaporization |

_____88. The cross sectional areas of small and large piston of hydraulic lift shown figure 6 are 4.0cm^2 and 0.02m^2 respectively. What is the magnitude of the force F_1 that must be applied to the small position to lift a weight $w = 15000\text{N}$ placed on the larger position?

- A. $3.0 \times 10^2 \text{ N}$
- B. $1.5 \times 10^4 \text{ N}$
- C. $7.5 \times 10^5 \text{ N}$
- D. $3 \times 10^6 \text{ N}$

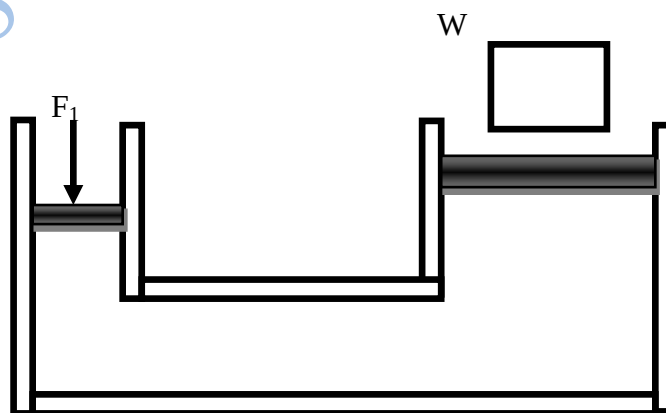


Figure 9

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_____89. An incompressible fluid flows through a horizontal pipe whose diameter varies along its length, the sum of the kinetic energy per unit volume and the pressure of the fluid at different section of the pipe would _____

- A. depend on the length of the pipe
- B. increases as the pipe diameter increases
- C. increases as the pipe diameter decreases
- D. remain the same as the pipe diameter changes

_____90. In which of the following does the internal energy increase with constant temperature?

- A. Ice at -10°C B. water at 60°C C. water at 0°C D. water at 100°C

_____91. A streamline flow is more likely for a liquid with

- A. Low density and low viscosity
- B. High viscosity and high density
- C. high viscosity and low density
- D. low viscosity and high density

_____92. Bernoulli's equation for steady, Non viscous, incompressible flow expresses the

- A. Conservation of angular momentum
- B. Conservation of momentum
- C. conservation of density
- D. conservation of energy

_____93. The mass flow rate of a fluid flowing in to a system is equal to the mass flow rate of fluid leaving the system. This statement is

- A. Equation of continuity
- B. Archimedes principle
- C. Pascal's law
- D. Bernoulli's principle

_____94. Which of the following refers to the definition of strain as ratio?

- A. extension to the original length
- B. Force to area of the object normal to the force
- C. Stress to young modulus
- D. Tensile to applied force

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_____95.Which one of the following mathematical expression is true about stock's law?

- A. $F = \frac{P}{r} + gh + \frac{v^2}{2}$ B. $F = h A \frac{\Delta V}{\Delta y}$ C. $F = 6\pi\eta r v$ D. $F = KA \frac{\Delta\theta}{X}$

_____96.What does the value of Reynolds number signify?

- A. it describes whether the flow is vertical or horizontal
B. it describes whether the flow is laminar or turbulent
C. it describes the magnitude of the viscous of liquid
D. it describes the magnitude of the surface tension of the liquid

_____97.A cohesive effects at the force b/n the liquid due to the forces b/n the liquids atoms or molecules is:

- A. Capillary action B. Pressure difference C. Meniscus D. Surface tension

_____98.A cubical block of wood (density= 0.75g/cm^3) floats in water (density= 1g/cm^3) .What fraction of the block is above the surface of the water?

- A. $1/8$ B. $1/4$ C. $1/2$ D. $3/4$

_____99.A 100g metal at 100°C is added to a 150g water (specific heat = $1\text{cal/g}^\circ\text{C}$) at 4°C . After thermal equilibrium is reached, the temperature of the water and metal is 20°C . Assuming no heat loss to the environment, the specific heat of the metal in $\text{cal/g}^\circ\text{C}$?

- A. 0.3 B. 0.2 C. 0.15 D. 0.2

_____100.Water is flowing through a horizontal pipe with a speed of 15m/s where the pressure is $1.5 \times 10^5\text{Pa}$ and crosssectional area is 4cm^2 . What is the pressure at a point where the crosssectional area of the pipe is 12cm^2 ?

- A. $2.25 \times 10^5\text{Pa}$ B. $1.5 \times 10^5\text{Pa}$ C. $2.5 \times 10^5\text{Pa}$ D. $0.5 \times 10^5\text{Pa}$

_____101.Which of the following statement is NOT true?

- A. if a heat Q is transferred from a hot reservoir at temperature T_h to a cold reservoir at temperature T_c , the entropy of the cold reservoir increase.

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B. the increase in entropy of the cold reservoir is greater than the decrease in entropy of the hot reservoir.

C. the change in entropy of the system between any two equilibrium states does not depend only on the initial and final state.

D. metals are good heat conductors because of their large number of electrons.

_____102.The volume of gas goes from 0.4m^3 to 0.6m^3 while the pressure remains constant at $2 \times 10^5 \text{Pa}$ what is the work done by the gas

- A. $-2 \times 10^4 \text{J}$ B. $-4 \times 10^4 \text{J}$ C. $2 \times 10^4 \text{J}$ D. $4 \times 10^4 \text{J}$

_____103.a block of mass 20Kg is placed on the pan of vertical spring and let to oscillate. if the spring performs a simple harmonic of period π sec. What is the fore constant of the spring ($g=10\text{m/s}^2$)

- A. 4.7N/m B. 50n/m C. 80N/m D. 200N/m

_____104..If the amplitude of sine wave is doubled, the intensity

- A. remain the same B. increase by a factor of 2
C. increase by a factor of 4 D. increase by a factor of 16

_____105.The refractive index of glass is 1.5 for light waves of $\lambda = 6000\text{\AA}$ in vacuum its wave length in glass is

- A. $2000\text{\AA}$ B. $4000\text{\AA}$ C. $1000\text{\AA}$ D. $3000\text{\AA}$

_____106.What is the path difference for destructive interference?

- A. $n\lambda$ B. $n(\lambda + 1)$ C. $(2n + 1)\frac{\lambda}{2}$ D. $(n + 1)\frac{\lambda}{2}$

_____107.A string 30cm long vibrates in its fundamental mode with a frequency of 256Hz . 80cm of the string has a mass of 0.75gm . The tension in the string is

- A. 12.3N B. 22.3N C. 30N D. 154N

_____108.A body is undergoing a simple harmonic motion of amplitude 3 cm . At what distance from the equilibrium is the speed of the body four-fifth of its maximum speed?

- A. 1.8cm B. 2.4cm C. 1.2cm D. 0.9cm

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- _____109.The force between two charges is 120 N. If the distance between the charges is doubled, the force will be
A.60N B.30N C.40N D.15N
- _____110.The electric field intensity at a point situated 4meters from a point charge is 200N/C. If the distance is reduced to 2 meters, the field intensity will be?
A.400N/C B.600N/C C.800N/C D.1200N/C
- _____111.A field line and equipotential surface are
A. Always parallel B.always perpendicular C . inclined at an angle D.none of the above
- _____112.The total electric flux through any closed surface surrounding charge is equal to the amount of charge enclosed "the above statement is associated with
A.Coulombs law B. Gauss's law C.youngs law D. Faraday law
- _____113.A potential of 400V is applied to a capacitor, the plate of which is 4 mm apart. The strength of the electric field is
A. 2KV/m B.5KV/m C. 100KV/m D.10KV/m
- _____114.In young's double slit experiment, if instead of monochromatic light white light is used, what would be the observation?
A. The pattern will not be visible
B. The shape of the pattern will change from hyperbolic to circular.
C. Colored fringes will be observed with a white bright fringe at the center
D. The bright and dark fringe will change position.
- _____115.The acceleration of a simple harmonic oscillator:
A. remains constant during its motion B. remains non zero
C. attains its maximum value when its amplitude is zero.
D. attains minimum value when its velocity is maximum.
- _____116.A wave has a speed of 50m/s and a wave length of 25000m, what is the frequency of the wave?
A. 2.0×10^{-3} Hz B. 6.0×10^1 Hz C. 5.0×10^2 Hz D. 1.8×10^6 Hz

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_____117. Two separate coherent sources produce waves whose wavelengths are 0.10m. Which statement is correct about points that are 3.2m away from one source?

- A. constructive interference occurs if the points are 3.0m from the other source.
 - B. constructive interference occurs if the points are 3.05m from the other source.
 - C. constructive interference occurs if the points are 2.95m from the other source.
 - D. Destructive interference occurs if the points are 3.2m from the other source.
- A. 25m B. 15m c. 0.25m D. 0.15m

_____118. Light with frequency of 6×10^{14} Hz passes through two narrow slits of width 0.2 mm apart and forms an interference pattern on a screen 2.0m away from the slits. What is the distance between the fringes in the interference pattern? (Speed of light $c = 3 \times 10^8$ m/s)

- A. 3mm B. 5mm C. 4mm D. 3.5mm

_____119. A pipe 68cm long is open at one end and closed at the other. When air is blown across the open end, sound is produced at 110Hz. What is the velocity of sound along the pipe?

- A. 598.4m/s B. 334.6m/s C. 299.2m/s D. 149.6m/s

_____120. The total energy of a particle executing Simple Harmonic motion is

- A. Zero.
- B. Directly proportional to the amplitude.
- C. Directly proportional to the square of the amplitude.
- D. Inversely proportional to the square of the amplitude.

_____121. The loudness of sound changes from $L_1 = 30$ dB to $L_2 = 60$ dB. What is the ratio of intensities I_2/I_1 in the two cases?

- A. 2 B. 4 C. 600 D. 1000

_____122. A point source broadcasts sound into a uniform medium. If the distance from the source is tripled, how does the intensity change?

- A. It remains unchanged C. it becomes one-third as large
- B. It becomes three times larger D. it becomes one-ninth as large

_____123. An electron enters a region of uniform electric field of 5×10^3 N/C. What is the force on the electron? ($Q_e = 1.6 \times 10^{-19}$)

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A. $8 \times 10^{-22} \text{N}$ B. $5.3 \times 10^{-22} \text{N}$ C. $8 \times 10^{-16} \text{N}$ D. $1.88 \times 10^{22} \text{N}$

_____ 124. When the voltage applied to a capacitor increase from 80V to 110V. The charge on the capacitor increases by $9 \times 10^{-5} \text{C}$. What is the capacitance of the capacitor?

A. $4 \mu\text{F}$ B. $3 \mu\text{F}$ C. $2 \mu\text{F}$ D. $5 \mu\text{F}$

_____ 125. When potential difference of 150V is applied to the plates of parallel-plate capacitor, the plates carry a surface charge density of $30 \frac{\text{nC}}{\text{cm}^2}$?

A. $2.24 \mu\text{m}$ B. $5.32 \mu\text{m}$ C. $12.24 \mu\text{m}$ D. $4.42 \mu\text{m}$

_____ 126. Two positive charges of magnitude $2.4 \times 10^{-9} \text{C}$ and $1.6 \times 10^{-9} \text{C}$ are separated in air by a distance of 2.0cm. How much electrostatic potential is produced by the two charges at mid-way between them?

A. 3.6KV B. 0.72KV C. 2.16KV D. 1.44V

_____ 127. Two negative point charges are 2 meter apart and repel each other with a force of 2 Newton. When the distance between the charge is doubled, the force between them is

A. one fourth as great B. one half as great C. twice as great D. four times as great

_____ 128. An air filled parallel plate capacitor has a capacitance of 1PF. The plate separation is doubled and the space between them is completely filled with wax. If the capacitance increased to 2pF. What is the dielectric constant of the wax?

A. 2.0 B. 4.0 C. 6.0 D. 8.0

_____ 129. One of the following statements is NOT characteristics of the electric field?

- A. Electric field is region around a charge where another charge will experience a force.
- B. electric field lines move away from a negative charge and towards a positive charge.
- C. Direction of electric field is in direction of the force acting on small positive charge.
- D. lines of electric flux do not cross over each other.

_____ 130. Which of the following statement is Not true about a conductor in electrostatic equilibrium?

- A. The electric field is zero every where inside a conductor.
- B. Any net charge on the conductor resides entirely on its surface.
- C. On an irregularly shaped conductor, the surface charge density is greatest where the radius of curvature of the surface is the smallest.
- D. The electric field is just outside the conductor is tangent to its surface.

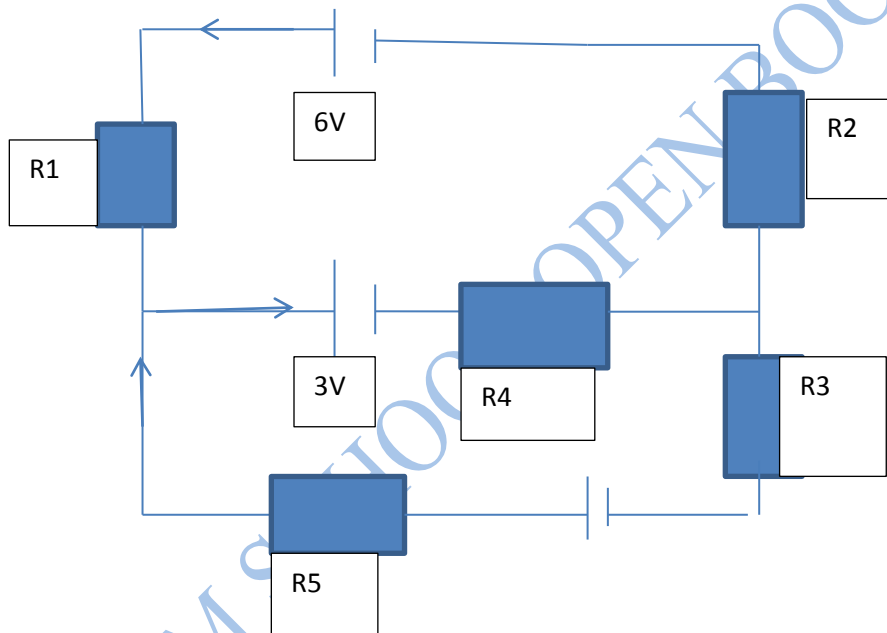
_____ 131. An Object having a net charge of $24 \mu\text{C}$ is placed in a uniform electric field of 610N/C directed vertically. What is the mass of the object if it floats in this electric field ?

A. 14.640kg B. 1.464Kg C. 14.460Kg D. 144.60Kg

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- _____132. Moving 2.5×10^{-6} coulomb of charge from point A to point B in an electric field requires 6.3×10^{-4} J of work. The potential difference between point A and B is?
A. 4×10^{-3} V B. 2.5×10^{-2} V C. 1.6×10^{-19} V D. 1.0×10^{-14} V

- _____133. In the circuit shown, each resistor has a value of 3Ω . What is the value of the current through R4?



- A. 0.125A B. 0.75 C. 0.625 D. 1.0A
- _____134. A galvanometer of full scale deflection 10 m A is to be converted in to a 0-10.0A ammeter. If its coil has a resistance of 100Ω , then what value of shunt resistance must be fitted?
- A. 0.1Ω B. 10Ω C. 9.99Ω D. 0.999Ω

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_____135. If a cell supplies a current of 0.9A when connected to a 2Ω resistor and a current of 0.3A, when it is connected to 7Ω resistor then what will be the internal resistance of the cell?

- A. 2Ω B. 1.2Ω C. 1Ω D. 0.5Ω

_____136. A copper wire of cross-sectional area 2mm^2 carrying a current of 1.5A. If the drift velocity of the electron is 0.00028m/s , what is the number of charge carriers (free electrons) per unit volume in the copper wire?

- A. $1.67 \times 10^{28}/\text{m}^3$ B. $1.5 \times 10^{32}/\text{m}^3$ C. $1.5 \times 10^{25}/\text{m}^3$ D. $1.67 \times 10^{32}/\text{m}^3$

_____137. Which of the following statements is correct?

- A. Galvanometer can be converted to voltmeter of different scale by connecting low value resistance in parallel
- B. Low valued internal resistance increases accuracy of voltmeter.
- C. Galvanometer can be converted to ammeter of different scale by connecting a low valued shunt resistance in parallel.
- D. High valued internal resistance increases the accuracy of ammeter.

_____138. A rod is made of two materials connected to each other. Each conductor has a square cross-section of 3mm on a side. The first material has resistivity of $\rho_1 = 4 \times 10^{-3} \Omega\text{m}$ and is 25cm long while the second material has a resistivity of $\rho_2 = 6 \times 10^{-3} \Omega\text{m}$ and is 40cm long. What is the resistance between the ends of the rod?

- A. 378Ω B. 267Ω C. 436Ω D. 363Ω

_____139. The maximum power delivered to the load resistance R occurs when the load resistance R and internal resistance r have the following relation

- A. $r=2R$ B. $r=R$ C. $r=3R$ D. $r=7R$

_____140. The resistance of an ohmic conductor is independent of :

- A. the size of the material C. the nature of the material
- B. the temperature D. the voltage applied