

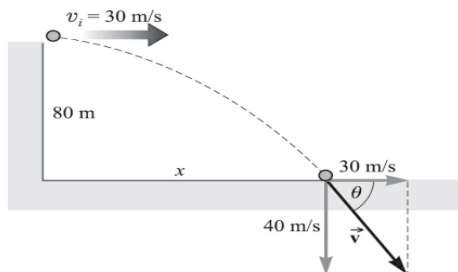
KUSH ACADEMY**PRACTICE MODEL QUESTIONS FOR GRADE 12TH 2017/2025****FROM THE GIVE ALTERNATIVES CHOOSE THE BEST ANSWER**

You may refer to the information given below when you need to work on some of the question

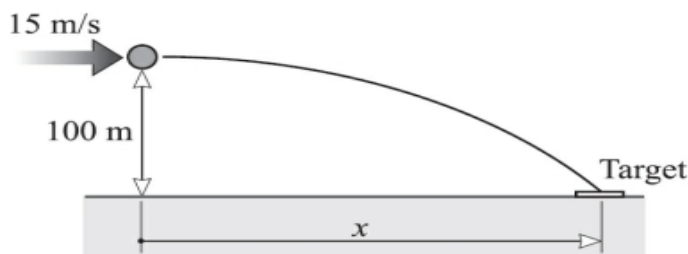
Number of constants	symbol	value	
Acceleration due to gravity	g	10m/s^2	
Mass of proton	m_p	$1.67 \times 10^{-27}\text{kg}$	
Mass of electron	M_e	$9.11 \times 10^{-31}\text{kg}$	
The charge of electron	e^-	$1.67 \times 10^{-19}\text{C}$	
Universal gravitation constant	G	$6.67 \times 10^{-11}\text{Nm}^2/\text{kg}$	
Density of water	ρ	1000 kg/m^3	
Molar gas constant	R	8.31J/mol K	
Permittivity of vacuum	ϵ_0	$8.85 \times 10^{-12}\text{F/m}$	
Magnetic permeability of free space	μ_0	$4\pi \times 10^{-7}\text{ TM/A}$	
Coulomb constant	K	$9 \times 10^9\text{ Nm}^2/\text{C}^2$	
$\sin 30 = 0.5 = \cos 60$			
$\sin 60 = 0.87 = \cos 30$			
$\sin 37 = 0.6 = \cos 53$			

- A boat can travel at a speed of 8 km/h in still water on a lake. In the flowing water of a stream, it can move at 8 km/h relative to the water in the stream. If the stream speed is 3 km/h, how fast can the boat move past a tree on the shore when it is traveling upstream?
A. 5km/hr B. 16km/hr C. 11km/hr D. 3km/hr
- A plane is traveling eastward at an airspeed of 6 km/h. But a 8 km/h wind is blowing southward. What are the speed of the plane relative to the ground?
A. 14km/hr south of east. B. 8km/hr east of south
C. 7km/hr south of east D. 10kmsouth of east.
- A ball is dropped from rest at a height of 5m above the ground. How long does it take to reach the ground? A. 5s B. 1s C. 20s D. 0.5s
- direction of heat flow is from:
A. high pressure to low pressure B. a point of higher emissivity to lower one
C. high density to low density D. high temperature to low temperature
- A bus moving in a straight line at a speed of 20 m/s begins to slow at a constant rate of 3 m/s² each second. How far it goes before stopping. A. 67m B. 60m C. 20m D. 30m

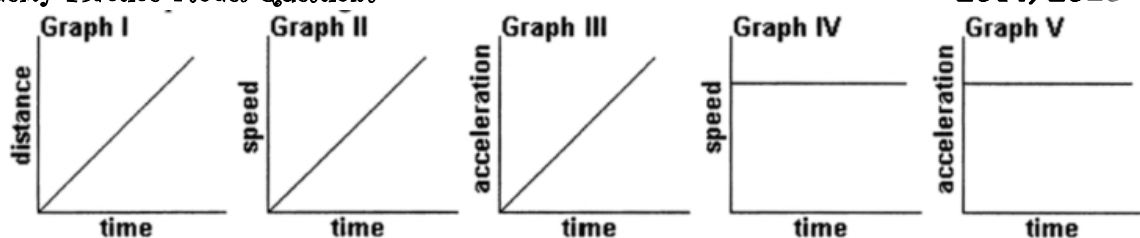
6. A stone is thrown straight upward and it rises to a maximum height of 20 m. With what speed was it thrown? A. 10m B. 5m C. 20m D. 15m
7. As shown in figure below, a projectile is fired horizontally with a speed of 30 m/s from the top of a cliff 80 m high. With what velocity will it strike?



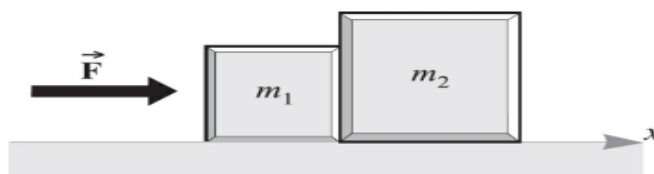
- A. 50m/s B. 40m/s C. 30m/s D. 121m/s
8. A stunt flier is moving at 15 m/s parallel to the flat ground 100 m below, as illustrated in Fig. below. How large must the distance x from plane to target be if a sack of flour released from the plane is to strike the target?



- A. 150m B. 67m. C. 50m D. 75m
9. A whiffle ball is tossed straight up, reaches a highest point, and falls back down. Air resistance is not negligible. Which of the following statements are true?
- I. The ball's speed is zero at the highest point.
 - II. The ball's acceleration is zero at the highest point.
 - III. The ball takes a longer time to travel up to the highest point than to fall back down.
- (A) I only (B) II only (C) I & II only (D) I & III only
10. Which of the following graphs could correctly represent the motion of an object moving with a constant speed in a straight line?

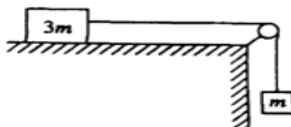


- (A) Graph I only (B) Graphs II and V only (C) Graph II only (D) Graphs I and IV only
11. Is it possible for an object's velocity to increase while its acceleration decreases?
- (A) No, because if acceleration is decreasing the object will be slowing down
 (B) No, because velocity and acceleration must always be in the same direction
 (C) Yes, an example would be a falling object near the surface of the moon
 (D) Yes, an example would be a falling object in the presence of air resistance
12. A 5.0-kg object is to be given an upward acceleration of 0.3m/s^2 by a rope pulling straight upward on it. What must be the tension in the rope?
- A. 1.5N B. 50N C. 52N D. 15N
13. A 70-kg box is slid along the floor by a 400-N force horizontally along +ve x-axis . The coefficient of friction between the box and the floor is 0.50. What is the acceleration of the box. A. 0.7m/s^2 B. 3.5m/s^2 C. 0.5m/s^2 D. 1m/s^2
14. Two blocks, of masses m_1 and m_2 , moving in the x-direction are pushed by a force $\vec{F}$ as shown in Fig. below. The coefficient of friction between each block and the table is 0.4, What must be the value of F if the blocks are to have an acceleration of 2m/s^2 ? (Use $m_1 = 300\text{g}$ and $m_2 = 500\text{g}$) A. 3.2N B. 1.6N C. 4.8N D. 4N

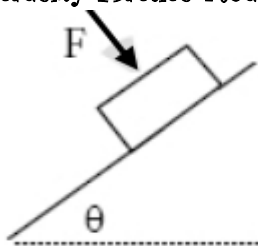


15. Mars has a mass $1/10$ that of Earth and a diameter $1/2$ that of Earth. The acceleration of a falling body near the surface of Mars is most nearly
- (A) 0.25 m/s^2 (B) 0.5 m/s^2 (C) 2 m/s^2 (D) 4 m/s^2
16. A new planet is discovered that has twice the Earth's mass and twice the Earth's radius. On the surface of this new planet, a person who weighs 500 N on Earth would experience a gravitational force of
- (A) 125 N (B) 250 N (C) 500 N (D) 1000 N

17. A satellite moves in a stable circular orbit with speed v_o at a distance R from the center of a planet. For this Satellite to move in a stable circular orbit a distance $2R$ from the center of the planet, the speed of the satellite must be
- A. $\frac{V_o}{2}$ B. $\frac{V_o}{\sqrt{2}}$ C. $\sqrt{2}V_o$ D. $2V_o$
18. If F_1 is the magnitude of the force exerted by the Earth on a satellite in orbit about the Earth and F_2 is the magnitude of the force exerted by the satellite on the Earth, then which of the following is true? **Hint:-** Newton's third law
- (A) F_1 is much greater than F_2 . (B) F_1 is slightly greater than F_2 .
(C) F_1 is equal to F_2 . (D) F_2 is slightly greater than F_1
19. The coefficient of static friction between a box and the flat bed of a truck is 0.60. What is the maximum acceleration the truck can have along level ground if the box is not to slide? A. 10m/s^2 B. 6m/s^2 C. 5m/s^2 D. 3m/s^2
20. A block of mass $3m$ can move without friction on a horizontal table. This block is attached to another block of mass m by a cord that passes over a frictionless pulley, as shown below. If the masses of the cord and the pulley are negligible, what is the magnitude of the acceleration of the descending block?



- (A) $g/4$ (B) $g/3$ (C) $2g/3$ (D) g
21. For which of the following motions of an object must the acceleration always be zero?
- (A) Any motion in a straight line
(B) Simple harmonic motion
(C) Any motion at constant speed
(D) Any single object in motion with constant momentum
22. A force F is used to hold a block of mass m on an incline as shown in the diagram below. The plane makes an angle of θ with the horizontal and F is perpendicular to the plane. The coefficient of friction between the plane and the block is μ . What is the minimum force, F , necessary to keep the block at rest?



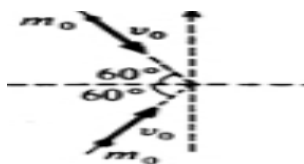
- (A) $mg\cos\theta$ (B) $mg\sin\theta$ (C) $mg\sin\theta/\mu$ (D) $mg(\sin\theta - \mu\cos\theta)/\mu$
23. A ball attached to a string is whirled around in a horizontal circle having a radius R . If the radius of the circle is changed to $4R$ and the same centripetal force is applied by the string, the new speed of the ball is which of the following?
 (A) One-quarter the original speed (B) One-half the original speed
 (C) The same as the original speed (D) Twice the original speed
24. A car travels forward with constant velocity. It goes over a small stone, which gets stuck in the groove of a tire. The initial acceleration of the stone, as it leaves the surface of the road, is
 (A) vertically upward (B) horizontally forward
 (C) horizontally backward (D) zero
25. A moving 5kg object slides unpushed 80 cm in a straight line along a horizontal table top. How much work is done in overcoming friction between the object and the table if the coefficient of kinetic friction is 0.2? A. -8J B.10J C.8J D.-10J
26. A football is kicked off the ground a distance of 50 yards downfield. Neglecting air resistance, which of the following statements would be INCORRECT when the football reaches the highest point? (A) all of the balls original kinetic energy has been changed into potential energy (B) the ball's horizontal velocity is the same as when it left the kickers foot (C) the ball will have been in the air one-half of its total flight time
 (D) The vertical component of the velocity is equal to zero
27. A person pushes a block of mass $M = 6.0$ kg with a constant speed of 5.0 m/s straight up a flat surface inclined 30.0° above the horizontal. The coefficient of kinetic friction between the block and the surface is $\mu = 0.40$ What is the net force acting on the block?
 0 N (B) 21 N (C) 30 N (D) 51 N

Explanation:- Based on network version of work energy theorem. $W_{\text{net}} = \Delta K$, we see that since there is a constant speed, the ΔK would be zero, so the network would be zero requiring the net force to also be zero.

28. A force of 1.50 N acts on a 6kg cart so as to uniformly accelerate it along a straight air track. The track and force are horizontal and in line. How fast is the cart going after acceleration from rest through 8m, if friction is negligible?
A. 4m/s B. 12m/s C. 8m/s D. 2m/s
29. In unloading grain from the hold of a ship, an elevator lifts the grain through a distance of 12 m. Grain is discharged at the top of the elevator at a rate of 2kg each second, and the discharge speed of each grain particle is 3m/s. Find the minimum power rating for a motor that can elevate grain in this way. A. 4.5kw B. 0.12kw C. 0.24kw D. 9kw
30. The wheel and axle of 400-N load can be raised by a force of 50 N applied to the rim of the wheel. The radii of the wheel and axle are 85 cm and 6 cm, respectively. What is the efficiency of the machine? A. 14% B. 8% C. 56% D. 28%
31. A 16kg mass is moving in the +x-direction at 3 m/s, while a 4kg mass is moving in the -x-direction at 5m/s. They collide head on and stick together. Find their velocity after the collision. A. 3.5m/s B. 14m/s C. 8m/s D. 6m/s
32. A ball with a mass of 0.50 kg and a speed of 6 m/s collides perpendicularly with a wall and bounces off with a speed of 4 m/s in the opposite direction. What is the magnitude of the impulse acting on the ball? (A) 1 Ns (B) 5 Ns (C) 2 m/s (D) 10 m/s
33. Two objects, A and B, initially at rest, are "exploded" apart by the release of a coiled spring that was compressed between them. As they move apart, the velocity of object A is 5 m/s and the velocity of object B is - 2 m/s. The ratio of the mass of object A to the mass object B is (A) 4/25 (B) 2/5 (C) 5/2 (D) 25/4

Explanation :- Explosion. $p_{\text{before}} = 0 = p_{\text{after}}$

34. Two particles of equal mass m_0 , moving with equal speeds v_0 along paths inclined at 60° to the x-axis as shown, collide and stick together. Their velocity after the collision is



- A. $V_0/4$ B. $V_0/2$ C. $\sqrt{3}/2 V_0$ D. V_0
35. A bowling ball of mass M and radius R , whose moment of inertia about its center is $(2/5)MR^2$, rolls without slipping along a level surface at speed v . The maximum vertical height to which it can roll if it ascends an incline is hint:- $K_{\text{tot}} = K_{\text{rot}} + K_{\text{trans}}$

A. $\frac{V^2}{5g}$ B. $\frac{2V^2}{5g}$ C. $\frac{V^2}{g}$ D. $\frac{7V^2}{10g}$

36. An ice skater is spinning about a vertical axis with arms fully extended. If the arms are pulled in closer to the body, in which of the following ways are the angular momentum and kinetic energy of the skater affected?

Angular Momentum**Kinetic Energy**

- | | |
|----------------------|------------------|
| (A) Increases | Increases |
| (B) Increases | Remains Constant |
| (C) Remains Constant | Increases |
| (D) Remains Constant | Remains Constant |

37. The number of joules of heat energy required to raise the temperature of a body by 1 K is:

A. Heat capacity C. expansion coefficient B. Specific heat capacity D. calorific value

38. If the frequency of sound wave is doubled, the wavelength:

- A. halves and the speed remains unchanged. B) doubles and the speed remains unchanged.
C) halves and the speed halves. D) doubles and the speed doubles.

39. A solid conducting sphere is given a positive charge Q. How is the charge Q distributed in or on the sphere? **Hint:-** charge is free to move around on/in a conductor

- (A) It is concentrated at the center of the sphere.
(B) It is uniformly distributed throughout the sphere.
(C) Its density increases radially outward from the center.
(D) It is uniformly distributed on the surface of the sphere only.

40. A point charge +q is placed midway between two point charges +3q and -q separated by a distance 2d. If Coulomb's constant is k, the magnitude of the force on the charge +q is:

A. $\frac{2Kq^2}{d^2}$ B. $\frac{4Kq^2}{d^2}$ C. $\frac{6Kq^2}{d^2}$ D. $\frac{9Kq^2}{d^2}$

41. An electroscope is given a positive charge, causing its foil leaves to separate. When an object is brought near the top plate of the electroscope, the foils separate even further. We could conclude

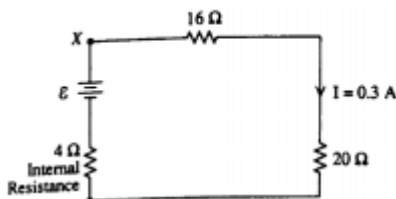
- (A) That the object is positively charged. (B) That the object is electrically neutral.
(C) That the object is negatively charged (D) Only that the object is charged

42. Kirchhoff's loop rule for circuit analysis is an expression of which of the following?

- (A) Conservation of charge (B) Conservation of energy

(C) Ampere's law (D) Ohm's law

43. From the below circuit diagram, What is the emf of the battery?



(A) 1.2 V (B) 6.0 V (C) 10.8 V (D) 12.0 V

44. What power is dissipated by the 4-ohm internal resistance of the battery?

(A) 0.36 W (B) 1.2 W (C) 3.2 W (D) 3.6 W

45. Three resistors R_1 , R_2 , and R_3 are connected in series to a battery. Suppose R_1 carries a current of 2A, R_2 has a resistance of $3\ \Omega$, and R_3 dissipates 6W of power. What is the voltage across R_3 ? (A) 1.0 V (B) 3.0 V (C) 6.0 V (D) 12 V

46. A capacitor of $12\ \mu\text{F}$ capacitance can be charged after it is connected between potential differences 9V. How much electrical energy is used in charging the capacitor?

A. $1 \times 10^{-3}\text{J}$ B. $54 \times 10^{-4}\text{J}$ C. $4.86 \times 10^{-4}\text{J}$ D. $9.72 \times 10^{-4}\text{J}$

47. The capacitance of a parallel plate capacitor is $10\ \mu\text{F}$. If the distance b/n the plates is halved, keeping all other quantities constant, then what is the new capacitance of the capacitor? A. $0.2\ \mu\text{F}$ B. $5\ \mu\text{F}$ C. $10\ \mu\text{F}$ D. $20\ \mu\text{F}$

48. A parallel-plate capacitor has a capacitance C_0 . A second parallel-plate capacitor has plates with twice the area and twice the separation. The capacitance of the second capacitor is most nearly (A) $\frac{1}{4}C_0$ (B) C_0 (C) $2C_0$ (D) $4C_0$.

49. The capacitance of a parallel-plate capacitor can be increased by increasing which of the following? (A) The distance between the plates (B) The charge on each plate (C) The area of the plates (D) The potential difference across the plates

50. Two parallel conducting plates are connected to a constant voltage source. The magnitude of the electric field between the plates is 2,000 N/C. If the voltage is doubled and the distance between the plates is reduced to $\frac{1}{5}$ the original distance, the magnitude of the new electric field is (A) 800 N/C (B) 1,600 N/C (C) 2,400 N/C (D) 20,000 N/C

51. A charged particle traveling with a velocity $\mathbf{v}$ in an electric field $\mathbf{E}$ experiences a force $\mathbf{F}$ that must be (A) parallel to $\mathbf{v}$ (B) perpendicular to $\mathbf{v}$ (C) parallel to $\mathbf{E}$ (D) perpendicular to $\mathbf{E}$

Hint :- Regardless of velocity, the force on a charge in an electric field is parallel to the field ($F = qE$)

52. A positive charge of 3.0×10^{-8} coulomb is placed in an upward directed uniform electric field of $4.0 \times 10^4 \text{ N/C}$. When the charge is moved 0.5 meter upward, the work done by the electric force on the charge is hint:- $W = Fd = qEd$

A. $6 \times 10^{-4} \text{ J}$ (B) $12 \times 10^{-4} \text{ J}$ (C) $2 \times 10^4 \text{ J}$ (D) $8 \times 10^4 \text{ J}$

53. If the only force acting on an electron is due to a uniform electric field, the electron moves with constant

(A) Acceleration in a direction opposite to that of the field
(B) Acceleration in the direction of the field
(C) Speed in a direction opposite to that of the field
(D) Speed in the direction of the field

Explanation:- If F is constant and $F = ma$, the acceleration is also constant. Negative charges experience forces opposite in direction to electric field lines.

54. A physics problem starts: "A solid sphere has charge distributed uniformly throughout. . ."
It may be correctly concluded that the

(A) Electric field is zero everywhere inside the sphere
(B) Electric potential on the surface of the sphere is not constant
(C) Electric potential in the center of the sphere is zero
(D) Sphere is not made of metal

Explanations:- For charge to be distributed throughout a material, it must be non-conducting

55. 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 2cm. How much electrostatic potential is produced by the two charges at midway b/n them? A. 0.36KV B. 0.72KV C. 2.1 6KV D. 1.44KV

56. A student wants to make a brighter light bulb. He decides to modify the filament. How should the filament of a light bulb be modified in order to make the light bulb produce more light at a given voltage?

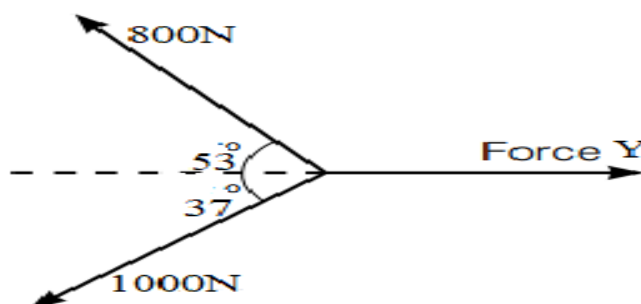
(A) Increase the resistivity only.
(B) Increase the diameter only.
(C) Decrease the diameter only.
(D) Decrease the diameter and increase the resistivity.

Explanation:- For more light at a given voltage, more current is required, which requires less resistance. $R = \rho L/A$

57. A person rubs a neutral comb through their hair and the comb becomes negatively charged. Which of the Following is the best explanation for this phenomenon?
- (A) The hair gains protons from the comb.
 - (B) The hair gains protons from the comb while giving electrons to the comb.
 - (C) The hair loses electrons to the comb.
 - (D) The comb loses protons to the person's hand holding the comb.
58. Three capacitors of capacitance $8\mu\text{F}$, $12\mu\text{F}$, and $24\mu\text{F}$ are connected (a) in series and then (b) in parallel. What is the ratio of the equivalent capacitance in case (a) to that in case (b)? A. 1 : 1 B. 1 : 1 C. 1 : 1 D. 1 : 3
59. Coulomb's law for the force between electric charges most closely resembles
- A. The law of conservation of energy C. Newton's law of gravitation
 - B. Newton's second law of motion D. The law of conservation of mass
60. A charged particle can move with constant velocity through a region containing both an electric field and a magnetic field only if the
- (A) Electric field is parallel to the magnetic field
 - (B) Electric field is perpendicular to the magnetic field
 - (C) Electric field is parallel to the velocity vector
 - (D) Magnetic field is perpendicular to the velocity vector
- Explanation:-** To create forces in the same place, the fields have to be perpendicular to each other.
61. Lenz's law concerning the direction of an induced current in a conductor by a magnetic field could be considered a result of
- A. Ampere's law B) Ohm's Law C) Tesla's Law D) The Law of Conservation of Energy
62. Salt water is more dense than fresh water. A ship floats in both fresh water and salt water. Compared to the fresh water, the amount of water displaced by the ship when it is in the salt water is
- A) more. B) Less. C) The same. D) Cannot be determined from the information given.
63. Liquid flows through a 4cm diameter pipe at 1m/s. There is a 2cm diameter constriction in the line. What is the velocity in this constriction?
- A) 0.25 m/s B) 0.50 m/s C) 2 m/s D) 4 m/s
64. An object is located 0.20 meters from a converging lens which has a focal length of 0.15 meters. Relative to the object, the image formed by the lens will be:
- (A) virtual, inverted, smaller (B) real, inverted, smaller.

- (C) real, inverted, larger (D) virtual, upright, larger
65. A converging lens forms a virtual image of a real object that is two times the objects size. The converging lens is replaced with a diverging lens having the same size focal length. What is the magnification of the image formed by the diverging lens?
(A) -1 (B) $-2/5$ (C) $2/3$ (D) $3/2$
66. An object is in front of a convex lens, at a distance less than the focal length from the lens. Its image is
(A) virtual and larger than the object. (B) real and smaller than the object.
(C) virtual and smaller than the object. (D) real and larger than the object.
67. A diverging lens produces an image of a real object. This image is
(A) Virtual, larger than the object, and upright.
(B) Virtual, smaller than the object, and upright.
(C) Virtual, smaller than the object, and inverted.
(D) Real, smaller than the object, and inverted.
68. A Carnot engine working between 27°C and 327°C has a work output of 800J per cycle. The amount of heat energy supplied to the engine from the source in each cycle is
A. 800J B. 1600J C. 3200J D. 6400J
69. A diode is an electronic component that
A. Allows current to pass through it either from cathode to anode or from anode to cathode. B. Allows the flow of current when its p-type region is connected to the negative terminal of a cell. C. Allows electric current to pass through it in one direction.
D. Is useful to convert a DC voltage to AC voltage.
70. Which one of the following is not the use of electromagnetic radiations?
A. X-rays are used to take pictures of the inside a body
B. Infrared radiation is used in infrared cameras.
C. Microwaves are used for cooking food.
D. Radio waves are used for radiation therapy.
71. Suppose there are four vectors A, B, C and D, if the tail of vector B is placed at the tip of A, the tail of C is placed at the tip of B and the tail of D is placed at the tip of C, the resultant of four vectors is drawn from
A. Tail of A to tip of C B. Tip of D to tail of A
C. Tail of A to tip of D D. Tail of C to tip of D

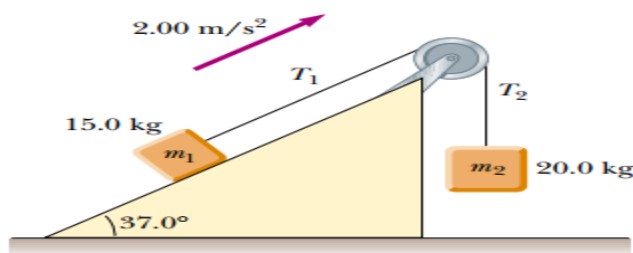
72. Which of the following all are vectors? **A.** Force, speed, Distance and momentum **B.** Work, , Impulse, Velocity and Electric current **C.** Energy, pressure, Volume and acceleration **D.** Momentum, force, acceleration and Impulse.
73. If vector V is 3 m in the x- direction and vector U is 4 m in the y-direction. Then what is the value of vector $V+U$? **A.** 5m at 53° from x-direction **B.** 7m at 37° from x-direction **C.** A. 5m at 37° from x-direction **D.** 12m at A. 5m at 53° from x-direction
74. Three forces are acting on an object as shown in figure below, which is in equilibrium. What is the force Y



- A.** 480N **B.** 1280N **C.** 800N **D.** 320N
75. An example of a body moving with constant speed but still accelerating is
A. A body moving on a straight road **C.** A body moving on a straight railway track
B. A body moving in a circular path **D.** A body Falling in a viscous fluid
76. Consider when you go to school, you travel 8km, East and then 6 km, north in 2 hrs. The magnitude of student's average velocity and average speed are respectively.
A. 5km/hr and 14km/hr **B.** 7km/hr. and 5km/hr.
C. 14km/hr. and 5km/hr. **D.** 5km/hr. and 7km/hr.
77. An aircraft decelerates at 0.5 m/s^2 . After 8 minutes its velocity has dropped to 160 m/s. what its initial velocity of aircraft? **A.** 400m/s **B.** 240m/s **C.** 80m/s **D.** 164m/s
78. A stone is dropped from the top of a 45m high building. How long will it be when it reaches the ground? **A.** 3s **B.** 450s **C.** 90s **D.** 45s
79. A block having a mass of 80 kg is move with an initial velocity of 2 m/s to the right and collides with a spring of negligible mass and force constant $k = 5\text{N/m}$. Assuming the surface to be frictionless, what is the maximum compression of the spring after the collision? **A.** 16m **B.** 4m **C.** 5m **D.** 8m
80. An object experiences a net force and exhibits acceleration in response. Which of the following statements is always true?

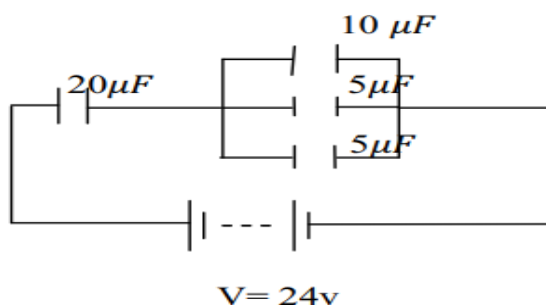
- A. The object moves in the direction of the force.
B. The acceleration is in the same direction as the velocity.
C. The acceleration is in the same direction as the force.
D. The velocity of the object increases
81. In an isolated system, which of the following is a correct statement of the quantity that is conserved? A. kinetic energy B. potential energy C. kinetic energy plus potential energy D. both kinetic energy and potential energy.
82. A force $F = \begin{bmatrix} 2 \\ -4 \\ 5 \end{bmatrix}$ N acts on a particle as it moves a distance of $r = \begin{bmatrix} 2 \\ -4 \\ 3 \end{bmatrix}$ m. What is the work done by a force on the particle? A. 3J B. $4i+16j+15k$ C. 35J D. $-32i+4j$
83. In a hydraulic press a force of 100N is applied to a smaller piston of cross-sectional area 5cm^2 . What magnitude of force will the hydraulic press exert onto a load through a piston of cross-sectional area 500cm^2 ? A. 10,000N B. 500,000N C. 50,000N D. 100,000N
84. Imagine you are sitting in a room. The door is open, and you can hear music coming from the radio in the next room. This phenomenon is
A. Refraction B. Diffraction C. Interference D. Reflection
85. The amount of heat energy required wouldn't depend on
A. Density B. Mass C. Temperatures D. Substance
86. Which of the following cannot possibly be accelerating?
A. An object moving with a constant speed B. An object moving with change velocity
C. An object moving along a curve D. An object moving with a constant velocity
87. Which of the following correctly describes the centripetal acceleration vector for a particle moving in a circular path?
A. Constant and always perpendicular to the velocity vector for the particle
B. Constant magnitude and always perpendicular to the velocity vector for the particle
C. Constant and always parallel to the velocity vector for the particle
D. Constant magnitude and always parallel to the velocity vector for the particle.
88. A particle moves in a circular path of radius r with speed v . It then increases its speed to $2v$ while traveling along the same circular path. The centripetal acceleration of the particle has changed by a factor of A. 0.25 B. 0.5 C. 2 D. 4

89. An automobile whose speed is increasing at a rate of 6m/s^2 travels along a circular road of radius 2m. When the instantaneous speed of the automobile is 4m/s , what is the magnitude of the total acceleration? **A.** 8m/s^2 **B.** 10m/s^2 **C.** 5m/s^2 **D.** 14m/s^2
90. A rigid object is rotating with an angular speed $\omega < 0$. The angular velocity vector ω and the angular acceleration vector α are antiparallel. The angular speed of the rigid object is
A. clockwise and increasing **B.** clockwise and decreasing
C. counterclockwise and increasing **D.** counterclockwise and decreasing.
91. A point on a flywheel of radius 0.5 m has a uniform linear acceleration of 2 m/s^2 . Its angular acceleration is: **A.** 2.5 rad/s^2 **B.** 0.25 rad/s^2 **C.** 1 rad/s^2 **D.** 4 rad/s^2
92. Two blocks as shown in Figure below are connected by a string of negligible mass passing over a pulley of radius 1m and moment of inertia I. The block on the frictionless incline is moving up with a constant acceleration of 2 m/s^2 . What is the T_1 , T_2 and the moment of inertia I of the pulley respectively?



- A.** 118N, 156N, 19kgm^2 **B.** 150N, 40N, 38kgm^2
C. 156N, 118N, 38kgm^2 **D.** 40N, 150N, 19kgm^2
93. A force of $F = (2\hat{i} + 3\hat{j})\text{ N}$ is applied to an object that is pivoted about a fixed axis. If the force is applied at a point located at $r = (4\hat{i} + 5\hat{j})\text{ m}$. What is torque
A. $2\hat{k}\text{ N}\cdot\text{m}$ **B.** $-12\hat{j}\text{ N}\cdot\text{m}$ **C.** $-2\hat{k}\text{ N}\cdot\text{m}$ **D.** $12\hat{j}\text{ N}\cdot\text{m}$
94. A ball with a mass of 0.5kg and a speed of 6 m/s collides perpendicularly with a wall and bounces off with a speed of 4 m/s in the opposite direction. What is the magnitude of the impulse acting on the ball? **A.** 1 Ns **B.** 5 Ns **C.** 2 Ns **D.** 10 Ns
95. A particles of mass 0.2kg whirls in a horizontal circle of radius 4m with a frequency of 5Hz . What is the angular momentum of the particles?
A. $10\pi\text{kgm}^2/\text{s}$ **B.** $3.2\pi\text{kgm}^2/\text{s}$ **C.** $5\pi\text{kgm}^2/\text{s}$ **D.** $16\pi\text{kgm}^2/\text{s}$
96. Which one of the following are not uses of electrostatics?
A. pints sprays **B.** Photocopiers **C.** Lightning **D.** Chimney filters

97. A person rubs a neutral comb through their hair and the comb becomes negatively charged. Which of the Following is the best explanation for this phenomenon?
- The hair gains protons from the comb.
 - The hair gains protons from the comb while giving electrons to the comb.
 - The hair loses electrons to the comb.
 - The comb loses protons to the person's hand holding the comb.
98. Which of the following statements about electric field lines associated with electric charges is **false**? **A.** Electric field lines can be either straight or curved. **B.** Electric field lines can form closed loops. **C.** Electric field lines begin on positive charges and end on negative charges. **D.** Electric field lines can never intersect with one another.
99. For a capacitor given in the figure below, what amount of energy does the $20\mu F$ capacitor store



- $1240\mu J$
- $1440\mu J$
- $1150\mu J$
- $1340\mu J$

100. An inductor has a self-inductance of 1 mH . The current in the circuit decreases at a rate of 2 A/s . What is the magnitude of the induced electromotive force?
- $2.4 \times 10^{-2}\text{ V}$
 - $1.2\pi\text{ V}$
 - $2.4\pi\text{ V}$
 - $1.2 \times 10^{-2}\text{ V}$
101. A 6 V battery is connected across the primary coil of a transformer having 50 turns. If the secondary coil of the transformer has 100 turns, what voltage appears across the secondary?
- 24 V
 - 12 V
 - 6 V
 - 3 V
102. A battery has an *emf* of 15 V . The terminal voltage of the battery is 10 V when it is delivering 20 W of power to an external load resistor R . What is the value of R ?
- 5Ω
 - 10Ω
 - 15Ω
 - 0.5Ω
103. Suppose if you use a boiler to make foods which run 10 kilowatt(KW) for 30 hour. If the consume energy in $0.5\text{ birr per kilowatt hour (kwhr)}$. How much cost you use the boiler?
- 150 birr
 - 200 birr
 - 100 birr
 - 300 birr

104. A length of wire is cut into five equal pieces. The five pieces are then connected in parallel, with the resulting resistance being 2Ω . What was the resistance of the original length of wire before it was cut up? **A.** 10Ω **B.** 50Ω **C.** 5Ω **D.** 20Ω
105. A converging lens forms a virtual image of a real object that is two times the objects size. The converging lens is replaced with a diverging lens having the same size focal length. What is the magnification of the image formed by the diverging lens?
A. -1 **B.** $-2/5$ **C.** $2/3$ **D.** $3/2$
106. A student wants to make a brighter light bulb. He decides to modify the filament. How should the filament of a light bulb be modified in order to make the light bulb produce more light at a given voltage?
A. Increase the resistivity only. **B.** Increase the diameter only.
C. Decrease the diameter only. **D.** Decrease the diameter and increase the resistivity.
107. Liquid flows through a 4cm diameter pipe at 1m/s. There is a 2cm diameter constriction in the line. What is the velocity in this constriction?
A. 0.25 m/s **B.** 0.50 m/s **C.** 2 m/s **D.** 4 m/s
108. Planet X has a mass twice that of Earth. The acceleration due to gravity on the surface of this planet is half that on the surface of Earth. If Earth has a radius of 1, what is the radius of Planet X? **A.** 1 **B.** 2 **C.** 4 **D.** 8
109. What is the force on a ball bearing of radius 5×10^{-3} m falling through a liquid of viscosity 0.25 at a velocity of 10m/s **A.** $7.5\pi \times 10^{-2}$ N **B.** $15\pi \times 10^{-3}$ N **C.** $625\pi \times 10^{-2}$ N
D. $37\pi \times 10^{-2}$ N
110. Which one of the following pair is incorrect the important technologies and the principles of physics **A.** Newton's law of motion ↔ Rocket **B.** Faraday's law of induction ↔ Particles accelerates **C.** Fluid Dynamics ↔ Airplanes **D.** Transmission and reception of electromagnetic waves ↔ Radio and TV
111. Which one is incorrect about physics and chemistry?
A. Both are overlap under the study of matter **B.** Physics is life science but chemistry is physical science **C.** Both are concern with matter and its interaction with energy
D. Both are physical sciences
112. Why the reason sharp edge material easily cut the objects?

- A. They have Low pressure at sharp edge B. They have increase Area when force applied increases C. They have high pressure at sharp edge D. They have Decrease Area when force applied decreases.
113. Hydraulic brakes and hydraulic jacks work on:
A. Bernoulli's principle B. Archimedes' principle
C. Pascal's principle D. Equation of continuity
114. "The speed of water spraying from the end of a garden hose increases as the size of the opening is decreased with the thumb." This statement best describes:
A. Archimedes' principle B. Pascal's principle
C. Equation of continuity D. Bernoulli's equation
115. Which one of the following is wrong about X-Rays A. Creates 2D images B. It use primarily to see bones and to detect cancer and pneumonia C. It use radiation to produce image D. It use primarily to diagnose condition in organs and soft tissues
116. A sleep person is more stable than the standing persons. What is the reason according to physics concepts? A sleeping person has less base area than standing person
B. The center of mass of the sleeping persons is far to the base area.
C. The standing person has more area than sleeping person
D. The center of mass of the sleeping persons is closer to the base area.
117. An egg is placed at the bottom of a vessel filled with water. Common salt is slowly added and dissolved in the water until the egg rises and floats at the surface. From this information what you could conclude?
A. The density of the salt exceeds the density of the egg.
B. There is a tendency for Calcium in the egg shell to be repelled by sodium chloride.
C. Salt sinks to the bottom. D. There is no physical explanation.
118. A step-up transformer operates on a 200 V line and supplies a load of 5 ampere. The ratio of the primary and secondary windings is 1:20. The current in the primary is
A. 100 A B. 50 A C. 25 A D. 12.5 A
119. Which one of the following is wrong about Transistor Configuration?
A. Common-Collector → Current gain but no voltage gain
B. Common-base → Voltage gain but no current gain
C. Common-Emitter → gain both Current and voltage
D. Common-Collector → Voltage gain but no current gain

120. When a diode is forward biased it will:

- A. Exhibit a very low resistance B. Depletion layer increase.
- C. Exhibit a very high resistance D. Junction allow low current

KEY ANSWERS

<u>No</u>	<u>Answer</u>	<u>No</u>	<u>Answer</u>	<u>No</u>	<u>Answer</u>	<u>No</u>	<u>Answer</u>	<u>No</u>	<u>Answer</u>	<u>No</u>	<u>Answer</u>	<u>No</u>	<u>Answer</u>
1	A	11	D	21	D	31	A	41	A	51	C	61	D
2	D	12	C	22	D	32	B	42	B	52	A	62	B
3	B	13	A	23	D	33	B	43	D	53	A	63	D
4	D	14	C	24	A	34	C	44	A	54	D	64	C
5	A	15	D	25	A	35	D	45	B	55	A	65	C
6	C	16	B	26	A	36	C	46	C	56	B	66	A
7	A	17	B	27	A	37	B	47	B	57	C	67	B
8	B	18	C	28	D	38	A	48	B	58	A	68	B
9	C	19	B	29	C	39	D	49	C	59	C	69	C
10	D	20	A	30	C	40	B	50	D	60	B	70	D
71.	C	81.	C	91.	D	101.	B	111.	B				
72.	D	82.	C	92.	A	102.	A	112.	C				
73.	A	83.	A	93.	A	103.	A	113.	C				
74.	B	84.	B	94.	B	104.	B	114.	C				
75.	B	85.	A	95.	B	105.	C	115.	D				
76.	D	86.	D	96.	C	106.	B	116.	D				
77.	A	87.	B	97.	C	107.	D	117.	A				
78.	A	88.	D	98.	B	108.	B	118.	A				
79.	D	89.	B	99.	B	109.	A	119.	D				
80.	C	90.	B	100.	A	110.	B	120.	A				