Physics

Physics EUEE 2007 E.C

Grade 11

Unit One

1. Which one of the following experimental errors can be reduced by taking repeated measurements?
   A. Parallax errors
   B. Systematic errors
   C. Random errors
   D. Zeros errors
2. A teacher gave a student a book whose thickness is 4.30 cm, and instructed him to measure the thickness of the book with vernier calipers. The student took four measurements. The average and standard deviation of the measurements where 4.33 cm and 0.04cm, respectively. Which one of the following is the uncertainty in the accuracy the student's measurement?
   A. 0.03cm B. 0.04cm C. 0.035cm D. 0.30cm

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Grade 11

Unit One

1. Which statement is WRONG about units and dimensions?
   A. Two quantities can have the same units but different dimensions.
   B. Two quantities can have the same dimensions but different units.
   C. It is always possible to add two numbers that have the same units.
   D. There are quantities that have no unit and dimension.

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Unit Two

1. Suppose $A = 3i - 2j$ and $B = -i -$ aj are two vectors in xy – plane. What is the value of a, such that $A + B =$ 2i?
   A. 3 B. 2 C. -2 D. -3
2. The sum and difference of two non – zero vectors A and B are equal in magnitude. What can you conclude about these two vectors?
   A. A and B have the same direction
   B. A and B have opposite directions
   C. A and B have the same magnitude
   D. A and B are perpendicular to each other

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Unit Two

1. Two non-zero vectors A and B are related by $A = cB$, where c is a scalar. If the two vectors have opposite directions, then one of the following is true about c?
   A. c is a positive number C. c = 1
   B. c is a negative number D. c = 0

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2. A vector that represents the position of an object in relation to another object is called

A. Unit vector C. Coplanar vector

B. Position vector D. Collinear vectors

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Unit Two

1. *Two non zero vectors D and E have precisely equal magnitude for the magnitude of D + E to be 3 times larger than magnitude of D – E, what must be the angle between D and E?*

A. 30° B. 37° C. 53° D. 60°

2. *What does the slope of a velocity – time graph represent?*

A. Distance B. Acceleration C. Displacement

D. Speed

3. *The vector* $2\hat{i}+\hat{j}+\hat{k}$ *is perpendicular to* $\hat{i}-4\hat{j}+\lambda\hat{k}$ *if* λ *is equal to*

A. 0 B. -1 C. 2 D. 3

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Unit Two

1. What is the angle between vectors A = (a **i** + a $\sqrt{3}$ **j**) units and **B** = a $\sqrt{3}$**i** + a **j**) units?

A. 90° B. 60° C. 37° D. 30°

2. The magnitudes of the two vectors **A** and **B** are 12 units and 5 units, respectively. Which one of the following is **NOT** the possible value for the magnitude of the resultant vector **A + B**?

A. 60 units B. 17 units C. 13 units D. 7 units

3. What is the vector product $A\times B$ of two vectors $A=7\hat{i}+4\hat{j}-8\hat{k}$ and $\hat{B}=3\hat{i}-2\hat{j}+5\hat{k}$?

A. $36\hat{i}+11\hat{j}-2\hat{k}$ C. $-4\hat{i}+59\hat{j}+26\hat{k}$

B. $4\hat{i}-59\hat{j}-26\hat{k}$ D. $-36\hat{i}-11\hat{j}+2\hat{k}$

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Unit Two

1. An airplane flies at speed of 720.0 km/hr at 37^0 North of West direction. How far does the plane travel to the west in 1 hour?

A. 432 km. B. 720 km. C. 576 km. D. 504 km.

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Unit Three

1. 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?

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A. $20m/s^2$ B. $10m/s^2$ C. $5m/s^2$ D. $0m/s^2$

2. A car accelerates steadily form 0 m/s to 30m/s in a distance d and a time t. Another car takes a time 3t to accelerates steadily from stationary to the same final velocity. What distance does the second car cover during the new acceleration?
   A. 3d B. d C. d/3 D. d/9
3. An object moving with uniform acceleration has a velocity of 12m/s in the positive x direction when its x coordinate is 3cm. In its x coordinate 2s later is – 4m, what is its acceleration?
   A. $-12m/s^2$ C. $-16m/s^2$
   B. $-13m/s^2$ D. $12m/s^2$

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Grade 11

<u>Unit Three</u>

1. The coordinate of a particle in meters is given by $x(t) = 25t - 3t^2$, where the time t is in seconds. At what value t will the particle become momentarily at rest?
   A. 2.78s B. 1.67s C. 0.6s D. 0.36s
2. A rocket moving in free space has a speed of 3 x 103 $\frac{m}{s}$ relative to the Earth. Its engines are turned on, and fuel is ejected in a direction opposite the rocket's motion at a speed of 5 x 103 $\frac{m}{s}$ relative to the rocket. What is the speed of the rocket relative to the Earth once the rocket's mass is reduced to half its mass before ignition?
   A. 7 x 103 $\frac{m}{s}$ B. 5 x 103 $\frac{m}{s}$ C. 4 x 103 $\frac{m}{s}$ D. 2 x 103 $\frac{m}{s}$

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Grade 11

<u>Unit Three</u>

1. *Two projectiles are fired from ground level at equal speed but different angles. One is fired at an angle of 30 degrees and the other at 60 degrees. The projectile to hit the ground first will be the one fired at (neglect air resistance)*
   A. 60 degrees
   B. 30 degrees
   C.. Both hit at the same time
   D. Cannot be determined from the given information
2. *A body moving with constant acceleration covers the distance between to points 60m a part in 5s. its velocity as it passes the second point is 15m/s. what is the acceleration?*
   A. $3m/s^2$ B. $2.4m/s^2$ C. $1.8m/s^2$ D. $1.2m/s^2$
3. *A placekicker must kick a football from a point which is at a distance of 36.0m from the goal. When kicked, the ball leaves the ground with a speed of 20.0m/s at an angle of 53.0° to the horizontal. If the ball hits the crossbar of the goal at a height h and bounces back what will be the height of the crossbar?*
   A. 2.45m B. 2.85m C. 3.00m D. 3.15

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Unit Three

1. If a long distance jumper athlete leaves the ground at an angle of 37.0° above the horizontal surface at a speed of 10.0m/s, how far does he jump in the horizontal direction?
   A. 4.8m B. 6m C. 9.6m D. 12m
2. A woman is rotating a bucket of water in a vertical circle of radius 0.9m. The mass of bucket and water is 5kg. What is the bucket's minimum speed at the top of the circle if no water is to spill out?
   A. 0 B. 1m/s C. 3m/s D. 9m/s
3. Which one of the following statements is correct?
   A. An object moving toward the east cannot have an acceleration toward the west.
   B. If the average velocity of an object for that time interval is also zero.
   C. The velocity-time graph of an object moving with constant acceleration is parallel to the time axis.
   D. An object having zero velocity can have acceleration different from zero.
4. A car travels along a straight line at a constant speed of 20m/s for a distance d and then another distance d in the same direction at a constant speed of 36km/hr. what is the average speed for the entire trip?
   A. 23km/h B. 48km/h C. 54km/h D. 60km/h
5. A highway curve is banked (inclined) in such a way that a car travelling at a speed of 13.5m/s can round the curve without skidding, in the absence of friction. If the banking angle is 30°, what is the radius of the curve?
   A. 10.5m B. 21.0m C. 31.7m D. 36.7m

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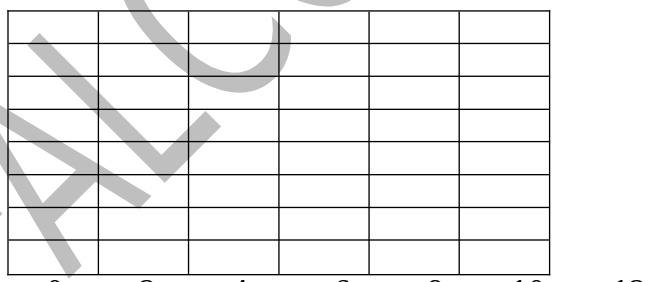
Unit Three

1. The graph below illustrates the position and time for a cat that runs to catch a rat and then returns with it. The cat caught the rat after 2 seconds. What was the cat's average speed as it returned with the rat?



2. An airplane travelled from Addis Ababa to Mekele, 780km, in 45 minutes. What was its average speed?
   A. 0.28 m/sec C. 17.3 m/min
   B. 1040 km/hr D. 585 km/hr
3. 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 in a circular path

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B. A body moving on a straight railway rack
D. A body falling in a viscous fluid

4. A student moves along the boundary of a square field of side 10m in 40sec. If he started from one of the corners of the square what will be the magnitude of displacement of the student at the end of 2 minutes and 20 seconds from his initial position?

A. 10m B. $10\sqrt{2}m$ C. 40m
D. 30m

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Grade 11

Unit Four

1. A car/mass m1/ is driving at velocity v, when it smashes in to an unmoving car/mass m2/. Locking bumpers, both cars move together at the same velocity. The common velocity will be given by:

A. $\frac{M_1V}{M_2}$ B. $\frac{M_2V}{M_1}$ C. $\frac{M_2V}{(m1+m2)}$ D. $\frac{(m1+m2)v}{M1}$

2. A cart on an air track is moving at 0.5m/s when the air is suddenly turned off. The cart comes to rest after traveling 1m. The experiment is repeated, but the cart is moving at 1m/s when the air is turned off. How far does the cart travel before coming to rest?
A. 1m B. 2m C. 3m D. 4m
3. A 4kg block is given an initial speed of 8m/s at the bottom of 30° inclined plane. The frictional force that retards its motions is 15N. If the block is directed up the inclined plane, how far will it move before it stops?
A. 3.66m B. 4.40 C. 3.38m D. 4.67m
4. A stationary mass explodes in to two parts of masses 0.4kg and 4kg. If the larger mass has a kinetic energy of 100J, what is the kinetic energy of the smaller mass?

A. $4\sqrt{50}J$ C. 1000J
B. 100J D. The change in kinetic energy is the same for both particles.

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Unit Four

1. What is the direction to which a fish must push the water with its fins in order to propel eastward?
A. eastward B. upward C. westward D. downward
2. A woman driving a 2000 kg car along a level road at 30m/s takes her foot off the gas to see how far her car will roll before it slows to a stop. She discovers that it takes 150m. what is the average force of friction acting on the car?
A. 9000N B. 6000N C. 3000N D. 400N
3. A 2kg object experiences two concurrent forces of 100N at 30° above the positive x-axis and 80 N at 60° above the negative x-axis. what is the magnitude to acceleration of the object?

A. $68\ m/s^2$ C. $48\ m/s^2$
B. $64\ m/s^2$ D. $46\ m/s^2$

4. A driver moving at a constant speed of 30 m/s sees an accident up ahead and hits the brakes. If the car decelerates at a constant rate of -5 m/s^2, how far does the car go before it comes to a stop?

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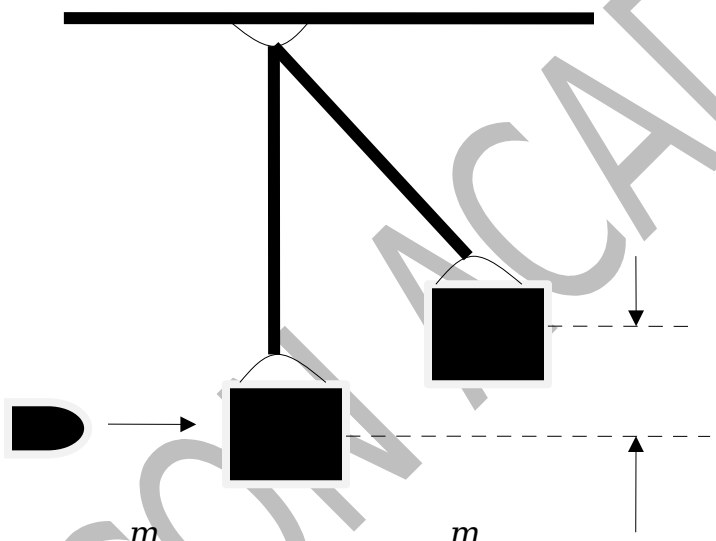
A. 120m
B. 100m
C. 40m
D. 20m

5. The planet Jupiter is about 318 times as massive as Earth, yet on its surface you would weigh only about 2.4 times your weight on earth. Why is this happened?
   A. Your mass is 132.5 times less on Jupiter
   B. You are 132.5 times more weight less there
   C. Jupiter is significantly farther from the sun
   D. Jupiter's radius is about 11.5 times the Earth's radius
6. If two particles have equal; momentum, then which one of the following statements is TRUE about their kinetic energies?
   A. Their kinetic energies are always equal
   B. Their kinetic energies are never equal
   C. Their kinetic energies are equal when their masses are the same
   D. Their kinetic energies are equal when the speed of one of the particle is half the speed of the other particle and their masses are the same
7. A bullet of mass 10gm, moving horizontally, strikes and embeddes itself in a box of mass 1kg suspended from a light string as shown in the figure below. If the composite mass rises to a height, H = 0.45 m, then what is the speed of the bullet before collision?



A. 303 $\frac{m}{s}$ B. 300 $\frac{m}{s}$ C. 90.9 $\frac{m}{s}$ D. 90 $\frac{m}{s}$

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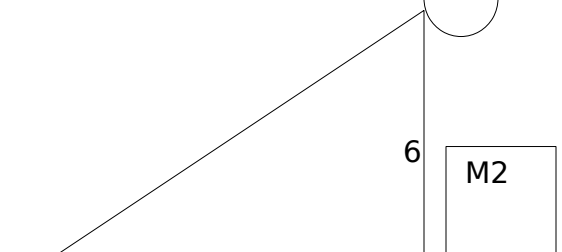
Grade 11

Unit Four

1. *Which one of the following statements is true about the motion of a particle in a circular path?*
   A. The centripetal acceleration is constant if the particle's speed is constant.
   B. The tangential acceleration can be perpendicular to velocity vector of the particle.
   C. The centripetal acceleration is always in the direction perpendicular to the velocity vector of the particle
   D. The acceleration is always perpendicular to the velocity of the particle.
2. *As shown in Figure 5, two blocks are connected by a string of negligible mass passing over a pulley of radius r = 0.2m and moment of inertia I. the block on the*
3. 

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4. *frictionless incline is moving with a constant acceleration a = 2.0m/s2 up along the incline. What is the moment of inertia of the pulley?*
   - *A. 0.8 kg m^2*
   - *B. 1.25 kg m^2*
   - *C. 4 kg m^2*
   - *D. 40 kg m^2*

Fig. 5

5. *An aluminum block of mass m1 = 3kg and a copper block of mass m2 = 5 kg are connected by a light string over a frictionless pulley. They sit on a steel surface as shown in Figure 4, where $\theta = 53°$. The coefficient of kinetic friction between the steel surface and each block is 0.3. if the blocks are released from rest what is the tension T in the string?*
   - *A. 29.40N*
   - *B. 17.25N*
   - *C. 12.25N*
   - *D. 8.60N*

T *Fig.4*

Steel

M2

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Grade 11

Unit Four

1. A force **F** of magnitude 20 N is applied to a block of mass 2 kg that lies on a rough, horizontal surface as shown in Figure 1. The coefficient of kinetic friction between the block and surface is 0.4. What is the magnitude of the acceleration of the block?
   - A. 10m/s^2
   - B. 5.2m/s^2
   - C. 4m/s^2
   - D. 2.8m/s^2

Bloc k **F**

Fig.1

2. A hard ball moving on a horizontal frictionless surface with a speed of 5m/s in the positive x direction strikes a stationary hard ball of the same mass. After the collision, the first ball moves with a speed of 4m/s along a direction that makes an angle of 37.0° with its initial direction of motion. What is the struck ball's speed and the smallest angle between its direction of motion and the positive x axis after the collision?
   A. 3 m/s and 53.0°
   B. 3 m/s and 37.0°
   C. 4 m/s and 53.0°
   D. 4 m/s and 37.0°
3. A man standing on a frictionless surface continuously fired 120 bullets horizontally in 1 minute using a machine gun. If each bullet has a mass of 10g and leaves the muzzle of the gun with a speed of 800m/s, what is the average force what is the average force exerted by the gun on the man?
   A. 8N B. 16N C. 960N D. 16000N
4. Two blocks are connected by a string of negligible mass passing over a pulley of radius r = 0.2 m and moment of inertia I as shown in Figure 3. The block on the horizontal frictionless surface is moving with a constant acceleration a = 2.0 m/s2. 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 kg m^2
   B. 0.80 kg m^2
   C. 4.00 kg m^2
   D. 8.00 kg m^2

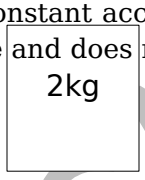

Fig. 3

5. A block of mass 10kg is pulled up a rough inclined plane with a force of 100 N parallel to the inclined plane. The inclined plane makes an angle of 37° with the horizontal. At the instant when the force is applied the block has a speed of 1.5m/s. if the coefficient of kinetic friction if 0.40, and the block is pulled up 5m, what is the change in the kinetic energy of the block?
   A. 20 J B. 30 J C. 40 J D. 45.5 J

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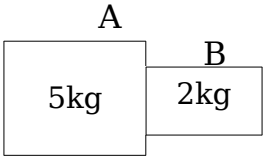
Unit Four

1. A man is standing on a spring scale in an elevator. When the elevator is at rest, the scale reads 560N. When the elevator starts to move, the scale reads 600N. The elevator has:
   A. an upward acceleration. C. a constant upward speed.
   B. a constant downward speed. D. downward acceleration.
2. A large mass (A) and a small mass (B) are pushing one another apart, as shown in the figure below. The small mass moves away at a velocity of 20m/s to the right. What is the recoil velocity of the large mass?



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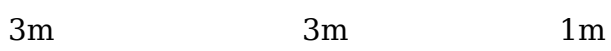
V 20m/s

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

3. Find the distance of the centre of mass of the system shown in the diagram from point A. The rod is mass less.



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

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Grade 11

Unit Five

1. The speed of a mass is increased by two fold. By what factor does the kinetic energy change?

A. 2 B. 4 C. 8 D. 16

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Grade 11

Unit Five

1. One person drops a ball from the top a building while another person at the bottom observes its motion. The two people DISAGREE on which of the following?
   A. the value of total energy of the ball,
   B. the change in potential energy of the ball,
   C. the value of the gravitational potential energy of the ball Earth system
   D. the kinetic energy of the ball at some point in its motion if one of them is walking
2. Suppose that a voltage surge produces 240 V for a moment. By what percentage does the power output of 220-V light bulb increase?

A. 38% B. 36% C. 19%
D. 18%

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Grade 11

Unit Five

1. *Two men, A and B, are loading identical boxes onto a truck. A lifts his box straight up from the ground to the bed of the truck, whereas B slides his box up a rough ramp to the truck. Which statement is correct about the change in the potential energy on the box-Earth system?*
   A. A and B changes the potential energy by the same amount.
   B. A changes more potential energy than B.
   C. B changes more potential energy than A.
   D. None of those statements is necessarily true because the force of friction and the angle of the incline is unknown.

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2. *A planet of mass m is circling a star in an elliptical orbit as shown below*

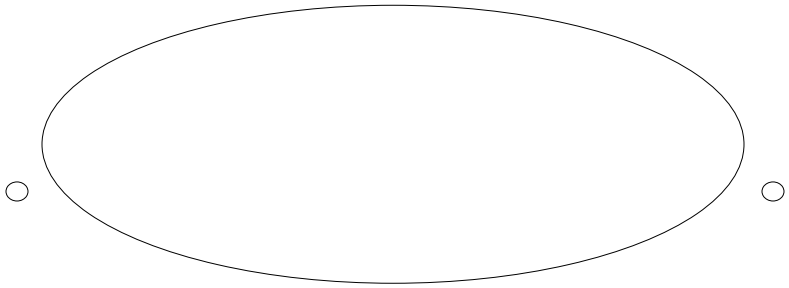

Fig.2

If its velocity at point A is 60,000m/s, and $r_b = 8r_a$ *what is its velocity at point B?*

A. 7,500m/s B. 8,571m/s C. 60,000m/s D/ 488,000m/s

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Grade 11

Unit Five

1. A car of mass 1500 kg is travelling at a uniform velocity of 30 m/s due east. The driver applies the brakes to slow down the car to a velocity of 10m/s due east. What is the work done in slowing down the car?

   A. 15KJ B. 300KJ C. 600KJ D. 750KJ
2. Which one of the following statements is true about a spring-mass system oscillating on horizontal frictionless surface?
   A. The kinetic and potential energies are equal at all times.
   B. The kinetic and potential energies are both constant.
   C. The maximum potential energy is achieved when the mass passes through its equilibrium position.
   D. The maximum kinetic energy and maximum potential energy are equal.

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Grade 11

Unit Five

1. The area under a force versus distance graph represents:
   A. acceleration. C. the change in momentum.
   B. the change in energy. D. work done.
2. A net external non zero force acts on a particle that is moving along a straight line. Which one of the following statements is correct?
   A. The velocity, but not the kinetic energy, of the particle is changing.
   B. Both the velocity and the kinetic energy of the particle are changing.
   C. The kinetic energy, but not the velocity, of the particle is changing.
   D. The momentum is conserved.
3. Which statement is correct about conservation and dissipative forces?
   A. The work done by conservative forces is path dependent.
   B. The work done, along a closed path, by non-conservative forces is nonzero.
   C. Gravitational force is an example of non-conservative force.
   D. Friction is an example of conservative force.

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Grade 11

<u>Unit Six</u>

1. A wheel starts from rest and rotates with constant angular acceleration to reach an angular speed of 12 $\frac{rad}{s}$ in 3s. what is the magnitude of the angular acceleration of the wheel in $\frac{rad}{s2}$ 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

2. Which of the following objects has the largest moment of inertia assuming they all have the same mass and radius?

   A. A solid disk
   B. A solid sphere
   C. A circular loop
   D. A solid cylinder

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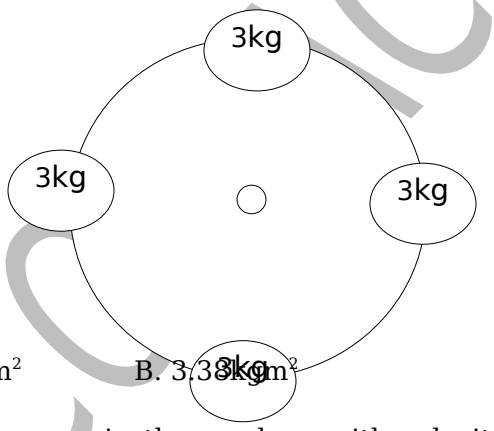
Grade 11
<u>Unit Six</u>

1. The radius of the wheel shown below is 0.75m. What is its moment of inertia?



   A. 2.25kgm^2 B. 3.38kgm^2 C. 6.75kgm^2 D. 9.00kgm^2

2. A 1.5 kg particle moves in the xy-plane with velocity v = (4.2$\hat{i}$ - 3.6$\hat{j}$)m/s. What is its angular momentum when its position vector is r = (1.5$\hat{i}$ + 2.2$\hat{j}$)m?

   A. -22 $\hat{k}$kg m^2/s B. 14.6 $\hat{k}$kg m^2/s C. -14.6 $\hat{k}$kg m^2/s D. 22 $\hat{k}$kg m^2/s

3. A uniform ball of radius r and mass m starts from rest and rolls down a frictionless incline of height h. when the ball reaches the ground, how fat is it going?

   A. $\sqrt{\frac{10}{7}gh}$ B. $\sqrt{\frac{9}{10}gh}$ C. $\sqrt{\frac{10}{9}gh}$ D. $\sqrt{\frac{7}{10}gh}$

4. A particle of mass ma is fired into a magnetic field of strength B at a speed v. The particle travels in a circular path inside the field with a radius r. Which of the following expressions given the magnitude of the charge of the particle?

   A. $\frac{mr}{v^2B}$ B. $\frac{mv^2}{Br}$ C. $\frac{vB}{mr}$ D. $\frac{mv}{Br}$

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Grade 11
Unit Six

1. *A hoop of mass M and radius R is at rest at the top of an incline plane of height h. The hoop rolls down the plane without slipping when the hop reaches bottom, its angular momentum about its center of mass is:*

   A. Mgh *B.* $MR\sqrt{2gh}$ *C.* $MR\sqrt{2gh}/2$ *D.* $MR\sqrt{gh}$

2. *Two particles with masses 2m and 3m are moving toward each other along the x axis with the same initial speeds v. particle 2m is traveling to the left, and particle 3m is traveling to the right. They undergo an elastic glancing collision such that particle 2m is moving in the negative y direction after the collision. What are the x component of the final velocity of particle 3m and the kinetic energy of particle 2m, respectively?*

   A. 0.33 V and 0.7 mv^2
   B. 0.33 v and 1.40 mv^2
   C. 0.67 v and 0.70 mv^2
   D. 0.67 v and 1.4 mv^2

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Grade 11

Unit Six

1. An object with a mass of m = 3.0 kg is attached to the free and of a light string wrapped around a pulley of radius R = 0.50 m and moment of inertia I = 0.75 kg m^2. The pulley is free to rotate in a vertical plane about a fixed frictionless axis passing through its center as shown in Figure 4. The suspended object is released from rest at 3.60 m above the floor. What is the angular momentum of the pulley at the time when the object strikes the floor?

   A. 4.5 kg m^2/s
   B. 9.0 kg m^2/s
   C. 12.3 kg m^2/s
   D. 18 kg m^2/s

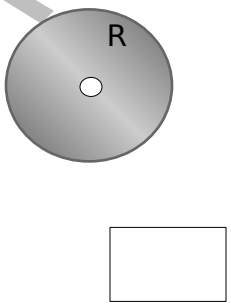

Fig.4

2. The particles shown in Figure 2 are connected by rectangular rigid rods of negligible mass. The origin of the xy plane is at the center of the rectangle. The system rotates in the xy plane about the 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



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Grade 11

Unit Six

1. What is the necessary and sufficient condition for conservation Linear momentum?
   A. The presence of more linear than nonlinear forces in the system.
   B. Net force on the system is zero.
   C. The presence of only non-linear forces.
   D. Internal forces exceed external forces.

2. Determine the torque due to a force $\vec{F} = 2\hat{i} - 3\hat{j} + 4\hat{k} N$ acting at point $\vec{r} = 3\hat{i} - 2\hat{j} + 3\hat{k}$ about the origin?
   A. $6\hat{i} - 6\hat{j} + 12\hat{k}$
   B. $-6\hat{i} - 6\hat{j} + 12\hat{k}$
   C. $17\hat{i} - 6\hat{j} + 13\hat{k}$
   D. $-17\hat{i} - 6\hat{j} + 13\hat{k}$

3. If the impulse of a rotating disc is non-zero, what can you conclude?
   A. The change in linear momentum is zero
   B. The torque acting on object is constant.
   C. Impulse of the disc equals its moment of inertia.
   D. The change in angular momentum is non zero.

4. The rotational analogue of mass is:
   A. moment of inertia.
   B. torque
   C. angular momentum.
   D. angular acceleration.

5. A fly wheel is rotating with an angular velocity of 2.0 rad/s and acted by an acceleration of $1/\pi$ rad/s^2. How long will it take to complete three revolutions?
   A. 0.5π s. B. π s. C. 2π s. D. 4 π s^2.s

Physics EUEE 2004 E.C

Grade 11

Unit Seven

1. A ladder stands on the ground, learning 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. The ground is frictionless and the wall is frictionless
   D. The ladder leans at 45 degree and the ground is frictionless
2. 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°. Determine the magnitude of the normal forces at the contact point on the wall/W_w/ and at the contact point on the ground /N_g/
   A. N_w = 57.7N, N_g = 200N
   B. N_w = 200N, N_g = 57.7N
   C. N_w = 0N, N_g = 200N
   D. N_w = 200N, N_g = 0N

Physics EUEE 2006 E.C

Grade 11

Unit Seven

FALCON ACADAMY

1. *An object of mass 3 kg hangs from three light inextensible wires as shown in Figure 6. Two of the wires make angles* $\theta_1 = 53^\circ$ *with the horizontal. If the system is in equilibrium, what will be the tensions* T_1 *and* T_2 *in the wires?*
   - *A.* $T_1 = 18N$ *and* $T_2 = 24N$
   - *B.* $T_1 = T_2 = 18N$
   - *C.* $T_1 = T_2 = 24N$
   - *D.* $T_1 = 24N$ *and* $T_2 = 18N$

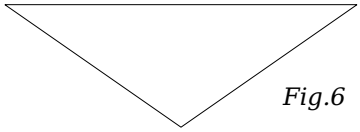

Fig.6



2. *A 10.0 m uniform ladder weighing 200N rests against a frictionless wall. The ladder makes 53° angle with the horizontal. If the ladder is just on the verge of slipping when a 600.0 N firefighter is 6.00 m along the ladder from the bottom, what is the coefficient of static friction between the ladder and ground?*
   - *A. 0.3240* *B. 0.4313* *C. 0.5750* *D. 0.7667*

Physics EUEE 2007 E.C

Grade 11

Unit Seven

1. Which one of the following statements is **NOT** correct about a particle that is in equilibrium?
   - A. It can have a velocity different from zero.
   - B. Its velocity can be equal to zero
   - C. It can be under the action of more than one force
   - D. It can have an acceleration difference from zero
2. A uniform bar of length 2.0 m and mass 30.0 kg is supported by two massless ropes which are attached to a fixed horizontal bar, as shown in Figure 5. What are the tensions in each rope when a 700 N weight is suspended at d = 0.50 m from the left end of the bar?
   - A. T_1 = 675 N and T_2 = 325 N
   - B. T_1 = 325 N and T_2 = 375 N
   - C. T_1 = 500 N and T_2 = 500 N
   - D. T_1 = 525 N and T_2 = 175 N



Fig.5

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Grade 11

Unit Seven

1. Abrehet (A); Bekele(B) and Chaltu (C) are pulling a box horizontally with forces $\vec{F}_A; \vec{F}_B$ and $\vec{F}_C$ respectively as shown below. Which statement is correct if the box is in equilibrium?
   - A. $\vec{F}_A = \vec{F}_B \times \vec{F}_C$
   - B. $-\vec{F}_A = \vec{F}_B + \vec{F}_C$
   - C. $\vec{F}_A = \vec{F}_B . \vec{F}_C$
   - D. $\vec{F}_A = \vec{F}_B \times \vec{F}_C$
2. A uniform, 6m long, and 600-N beam, rests on two supports, as shown. The force exerted on the beam by the right support B is closest to:

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A. 75 N B. 240 N C. 400 N D. 320 N

Physics EUEE 2004 E.C

Grade 11

Unit eight

1. What does the value of Reynolds number signify?
   A. It describes whether the flow is vertical or horizontal
   B. It describes the magnitude of the viscosity of the liquid
   C. It describes whether the flow is stream lined or turbulent.
   D. It describes the magnitude of the surface tension of the liquid.
2. A table – tennis ball has a diameter of 3.80 cm and average density of 0.084g/cm^3. What force F required to hold it completely submerged under water?
   A. 0.521N B. 0.258N C. 0.300N D. 0.510N
3. The pressure at the bottom of a cylindrical tube filled with water was measured to be 5000pa. If the water in the tube were replaced with ethyl alcohol, what would be the new pressure at the bottom of the tube? / The density of ethyl alcohol is 0.8g/cm3/.
   A. 4000pa B. 4800pa C. 500pa D. 6225pa
4. Water flows through a fire hose of diameter 6.35cm at rate of 0.012 $\frac{m3}{see}$. The fire hose ends in a nozzle of inner diameter 2.20cm. What is the speed with which the water exits the nozzle?
   A. 23.4 m/s^2 B. 31.6 $\frac{m}{s}$ C. 63.2 $\frac{m}{s}$ D. 46.8 $\frac{m}{s}$

Physics EUEE 2005 E.C
Grade 11
Unit eight

1. A very large open tank is full of oil whose density is 800 kg/m^3. If the absolute pressure at the bottom of the tank is 1.81 x 10^5 pa, then what is the depth of the oil? (Note that atmospheric pressure is 1.01 x 10^5 pa)
   A. 100.0m B. 75.0m C. 10.0m D. 9.5m
2. The length of an aluminum rod at a temperature of 20°C is 3m. what will be the ratio of change in the length of the rod to its original if its temperature is raised to 120°C? The coefficient of linear expansion of Aluminum is 2.31 x $10^{-5}K^{-1}$.
   A. 23% B. 3.2% C. 3% D. 0.23%
3. A container resting on the floor of an elevator contains an incompressible fluid of density p, when the elevator has an upward acceleration of magnitude a then what will be the pressure difference between two points in the fluid separated by a vertical distance Δh?
   A. $pa\Delta h$ B. $p(g+a)\ \Delta h$ C. $pg\ \Delta h$ D. $pga\ \Delta h$

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4. Water flows through a fire hose of diameter 6.35 cm at a rate of 0.012 $\frac{m^3}{s}$. The fire hose ends in a nozzle of inner diameter 2.20 cm. what is the speed with which the water exits the nozzle?

A. 63.2 $\frac{m}{s}$ B. 46.8 $\frac{m}{s}$ C. 31.6 $\frac{m}{s}$ D. 23.4 $\frac{m}{s}$

Physics EUEE 2006 E.C
Grade 11
Unit eight

1. *Which statement is correct about the pressure under a fluid container?*
   - *A. It depends on the volume of the fluid*
   - *B. It depends on the density of the fluid*
   - *C. It depends on the shape of the container*
   - *D. It is independent of the depth of the fluid*
2. *A garden hose has an inside diameter of 16cm. the hose can fill a 10 liter bucket in 20 seconds. If the diameter of the nozzle is reduced to 8cm,*
   - *A. Water exits with a speed twice the speed inside the hose.*
   - *B. A 10 litter bucked can be filled in 10 seconds.*
   - *C. A 20 litter bucket can be filled in 40 seconds.*
   - *D. Water exits with a speed half the speed inside the hose.*
3. *A table-tennis ball which is spherical in shape has a diameter of 6cm and average density of 0.400 g/cm3. What force is required to hold it completely submerged under water?*
   - *A. 0.68 N downward* *C. 1.13 N downward*
   - *B. 0.68 N upward* *D. 1.13 N upward*
4. *When a load of 500 kg is handing from a steel wire of length 3m and cross sectional area 0.20 cm^2 , the wire stretches beyond no-load length. If the Young's modulus for the sire made of steel is Y = 2 x 10^{11} pa, what is the change in length of the beyond its no-load length?*
   - *A. 3.75mm* *B. 2.75mm* *C. 1.75mm* *D. 0.75mm*
5. *A horizontal pipe of 10cm in diameter has a smooth reduction a pipe of 5cm in diameter. If the pressure of the water in the larger pipe is 80 kpa and the pressure in the smaller pipe is 60 kpa, at what rate does the water flow through he smaller pipe?*
   - *A. 1..63 m/s* *B. 6.53 m/s* *C. 13.6 m/s* *D. 42.67 m/s*
6. *A glass flask whose volume is exactly 1000cm3 at 0°C is totally filled with 1000 cm3 of mercury at this temperature. When flask if the coefficient of volume expansion of mercury is 1.82 X 10-4 per Celsius degree, what should be the coefficient of volume expansion of the glass?*
   - *A. 1.52 x 10^{-4}/C°*
   - *B. 1.82 x 10^{-4}/C°*
   - *C. 3.00 x 10^{-5}/C°*
   - *D. 1.00 x 10^{-5}/C°*

Physics EUEE 2007 E.C

Grade 11
Unit eight

1. Two solid spheres made of gold and silver having equal masses are suspended by strings and fully submerged in a tank of water. Given that the density of gold is greater than that of silver, which one of the following statements is true?
   - A. The buoyant force on each sphere is the same.
   - B. The volume of water displaced by the gold sphere is larger than that of the silver sphere.
   - C. The tension in the string supporting each sphere is the same.
   - D. The buoyant force on the silver sphere is greater than that on the gold sphere.

FALCON ACADAMY

2. The cross-sectional areas of the small and large pistons of a hydraulic lift shown in Figure 6 are 4.0 cm^2 and 0.02 m^2, respectively. What is the magnitude of the force F_1 that must be applied to the small piston to lift a weight w = 15,000 N placed on the large piston?

   A. 3.0×10^2 N
   C. 7.5×10^5 N
   B. 1.5×10^4 N
   D. 3×10^6 N

Fig.6

3. An incompressible fluid flows through a horizontal pipe whose diameter varies along its length. The sum of the kinetic energy per unit volume and pressure of the fluid at different sections of the pipe would _____
   A. depend on the length of the pipe.
   B. increase as the pipe diameter increases.
   C. increases as the pipe diameter decreases.
   D. remain the same as the pipe diameter changes.
4. Which one of the following laws bet describes the behavior of elastic materials?
   A. Gay Lussac's law
   B. Hook's Law
   C. Newton's second law
   D. Newton's law of gravitation

Physics EUEE 2008 E.C

Grade 11

<u>Unit eight</u>

1. 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.
2. Pressure at the bottom of a liquid column is independent of:
   A. shape of the column
   C. the depth of the point.
   B. the density of the fluid.
   D. the acceleration due to gravity.
3. The definition of Young's Modulus is given by:
   A. force per unit area.
   C. ratio of stress to strain.
   B. ratio of strain to stress
   D. force per unit elongation.
4. A water pipe has a diameter of 5.0 cm in the inlet side and 1.5 cm in outlet side. Water flows at 0.50 m3 per minute at the inlet point. What is the speed of the water at the outlet point?
   A. 26.67 m/s B. 13.33 m/s C. 74.1 m/s D. 148.1 m/s
5. A metal ball has a diameter that is slightly greater than the diameter of a hole that has been cut into a metal plate. The coefficient of linear expansion for the metal from which the ball is made is greater than that for the metal of the plate. Which one of the following procedures can be used to make the ball pass through the hole?
   A. Raise the temperatures of the ball and the plate by the same amount.
   B. Heat the ball and cool the plate.
   C. Lower the temperatures of the ball and the plate by the same amount.
   D. There is no way of passing the ball through the hole.
6. A billiard ball of radius 4cm if falling through a liquid of viscosity 0.985 at a velocity of 2.5 m/s. The drag force on the ball is
   A. 0.591π N B. 0.118π N C. 1.182π N D. 0.059π N
7. Which one of the following statements is correct?
   A. Elastic materials retain their shape after deformation.
   B. Plastic materials can recover the original size or shape after being distorted.
   C. Plastic materials change their shape by pressure.

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D. Elastic materials cannot recover the original size or shape after being distorted.

Physics EUEE 2004 E.c

Grade 12

Unit one

1. The temperature of a gas is due to
   A. The kinetic energy of the molecules
   B. The potential energy of the molecules
   C. The attractive force between the molecules
   D. The repulsive forces between the molecules
2. What does a curve drawn between two points on p-v diagram represents?
   A. The state of the system
   B. A thermodynamic process
   C. Work done in a cyclic process
   D. Work done on or by the system
3. Which statement is NOT among the assumptions made in the kinetic theory of gases?
   A. There is no interaction between particles or between particles and the wall except during collision.
   B. Collisions between particles, and between particles and walls are perfectly elastic.
   C. The volume occupied by the particle is negligible compared to the volume of the gas as a whole
   D. The distribution of velocities of particles is uniform

Physics EUEE 2005 E.C

Grade 12

Unit one

1. Suppose two molecules of different mass are kept at the same temperature. Which one of the following statements is NOT true?
   A. Both remain at rest
   B. Both move with the same speed
   C. The lighter molecule moves faster
   D. The heavier molecule moves faster
2. In a reversible thermodynamic process, the system
   A. is always close to equilibrium states
   B. might never be close to any equilibrium state
   C. is close to equilibrium states only at the beginning and end
   D. is close to equilibrium states throughout, except at the beginning and end
3. An ordinary refrigerator is turned on and its door is left open in a thermally insulated kitchen. What is the temperature of the room?
   A. increases according to the first law of thermodynamics
   B. decreases according to the first law of thermodynamics
   C. remains constant according to the first law of thermodynamics
   D. remains constant according to the second law of thermodynamics
4. Gas at a pressure p is contained in a vessel. If the masses of all the molecules are doubled and their speed halved, then what will be the resulting pressure?

   A. 2p B. $\frac{p}{3}$ C. $\frac{p}{2}$ D. 3p

Physics EUEE 2006 E.C

Grade 12

Unit One

1. *A cup of coffee at a temperature of 80°C is placed on a table in a 20°C room. What happens to the thermal energy and molecular motion of the coffee when it is left on the table?*

   A. The thermal energy decreases and the molecules move more slowly.

FALCON ACADAMY

B. The thermal energy increases and the molecules move more slowly.
C. The thermal energy decreases and the molecules move faster.
D. The thermal energy increases and the molecules move faster.

2. *Which of the following combinations of properties would be most desirable for a heat sink in a machine?*
   A. High specific heat and low conductivity.
   B. Low specific heat and high conductivity.
   C. High specific heat and high conductivity.
   D. Low specific heat and low conductivity.
3. *An ideal gas is at a temperature of 300 K. if we wish to double the root mean square (rms) speed of the molecules of the gas, to what value must we raise its temperature?*
   A. 450 B. 600K C. 800K D. 1200 K
4. *A heat engine is being designed to have a carnot efficiency of 65.0% when operating between two energy reservoirs. If the temperature of the cold reservoir is 20.0°C, what must be the temperature of the hot reservoir?*
   A. 57°C B. 310 °C C. 564 °C D. 807°C

Physics EUEE 2007 E.C
Grade 12
Unit One

1. The First Law of Thermodynamics takes the form dU = dW. This equation is valid if the process is _____.
   A. isobaric B. isochoric C. isothermal D. adiabatic
2. An ideal gas undergoes an isothermal process starting with a pressure of 2 x 15pa and a volume of 6cm^2. Which one of the following might be the pressure and volume of the final state?
   A. 4 x 10^5 pa and 4 cm^2
   B. 4 x 10^5 pa and 3 cm^2
   C. 5 x 10^5 pa and 3 cm^2
   D. 105 pa and 10 cm^2
3. Which one of the following statements is **NOT** correct?
   A. The entropy of the Universe increases in all natural processes.
   B. No heat engine operating in a cycle can absorb energy from a reservoir and use it entirely to do work.
   C. When a system undergoes a change in state, the change in its internal energy is the difference between the energy transferred to it by heat and the work done on it.
   D. The entropy of an isolated system reaches its maximum value when the system is in equilibrium state.
4. The amount of heat required to raise the temperature of an object of mass m = 1 kg by 1 Kelvin is known as _____.
   A. Specific heat capacity
   B. Heat capacity
   C. Expansion coefficient
   D. Internal energy
5. A given weight of gas has a temperature of 27°C and volume V. Keeping the pressure constant, the volume is increased to 3V by varying the temperature. What is the final temperature of the gas?
   A. 81°C B. 546 °C C. 627 °C D. 900°C

Physics EUEE 2008 E.C
Grade 12
Unit One

1. A device for transforming heat energy to mechanical energy is referred to as:
   A. transformer B. refrigerant C. generator D. engine
2. Two bodies that are separately in thermal equilibrium with third body must be in thermal equilibrium with each other. This statement is statement of:

FALCON ACADAMY

A. The first law of thermodynamics.
B. The zeroth law of thermodynamics.
C. the second law of thermodynamics.
D. the third law of thermodynamics.

Physics EUEE 2004 E.C
Grade 12
Unit Two

1. If the amplitude of a sine wave is doubled, the intensity
   A. Remains the same
   B. Increase by a factor of 2
   C. Increase by a factor of 4
   D. Increase by a factor of 16
2. A 1kg mass is attached to a spring of stiffness constant 100N/m. what is the maximum displacement of the mass from its equilibrium position if its speed is 3m/s at the equilibrium point.?
   A. 0.1m B. 0.3m C. 3m D. 10m
3. 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
4. The loudness of sound changes from L_1 = 30db to L_2 = 60db. What is the ratio of intensities I_1/I_2 in the two cases?
   A. 2 B. 4 C. 600 D. 1000
5. 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
   B. It becomes three times larger
   C. It becomes one-third as large
   D. It becomes one-ninth as large
6. A block of mass 0.23kg is placed on top of a light vertical spring of force constant 5000 $\frac{N}{M}$ and pushed downward so that the spring is compressed by 0.10m. After the block is release from rest, it travels upward and then leaves the spring. To what maximum height above the point of release does it rise?
   A. 10.2m B. 9.2m C. 8.0m D. 9.0

Physics EUEE 2005 E.C
Grade 12
Unit Two

1. A wave has a speed of 50m/s and a wavelength of 25,000m. 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
2. An oscillating system is used to create a succession of waves on a water surface. The rate of wave generation is one every 0.33 seconds. What is the period of these waves?
   A. 0.3 seconds B. 1.0 seconds C. 2.0 seconds D. 3.0 seconds

Physics EUEE 2006 E.C
Grade 12
Unit Two

1. *A transverse sinusoidal wave is traveling on a string. Which statement is correct about a point on the string?*
   A. The point moves in the same direction as the wave.
   B. The point moves in simple harmonic motion with a different frequency than that of the wave.
   C. The point moves in simple harmonic motion with the same angular frequency as the wave.

FALCON ACADAMY

D. The point moves in uniform circular motion with a different angular speed than the wave.

2. *A mass suspended from the end of a spring vibrates up and down 24 times in 36s. What are the frequency and period of the vibration?*
   A. 1.5Hz, 0.67s *C. 0.0012Hz, 854 s*
   B. 0.67 Hz, 1.5s *D. 864 Hz, 0.0012s*
3. *An object of mass m is hung from a spring and set into oscillation. The frequency of the oscillation is measured and recorded as f. if the object of mass m is replaced with an object of mass 2m and set into oscillation, what will be the frequency of the motion?*
   A. f/√2 *B. f* *C. (√2)f* *D. 2f*
4. *The change in entropy is zero for:*
   A. reversible isobaric processes.
   B. reversible adiabatic processes.
   C. reversible isothermal processes.
   D. reversible processes during which no work is done.

5. *The sound level at a distance of 4.00 m from a source is 120 dB. At what distance is the sound level 100 dB?*
   A. 0.40m *B. 4.80m* *C. 40m* *D. 48m*

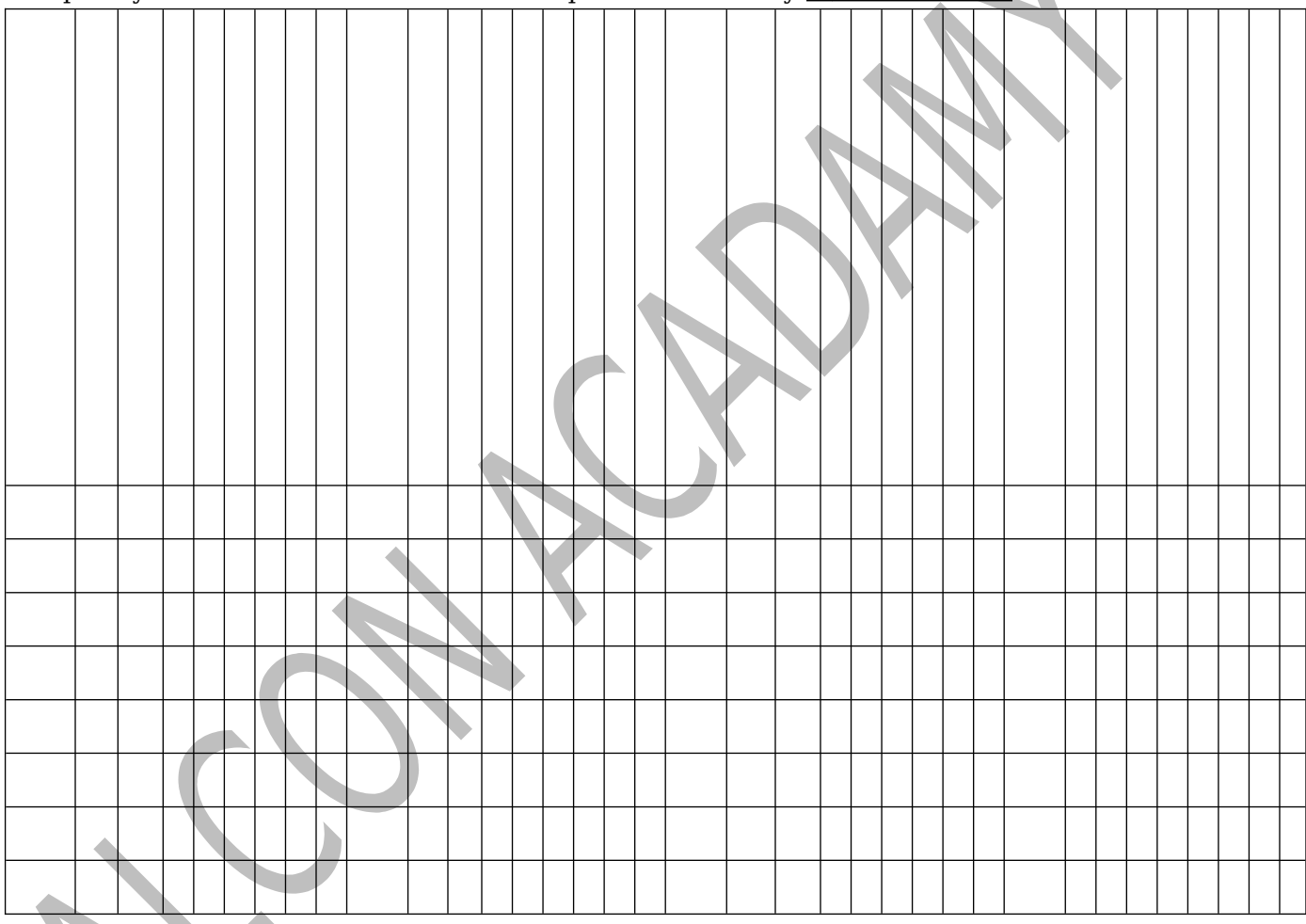
Physics EUEE 2007 E.C
Grade 12
<u>Unit Two</u>

1. A given minimum point (trough) of a sinusoidal wave is traveling 480 cm along a rope in 12s. If the oscillator that generates the wave completes 48 vibrations in 30 s, what is the wave length of the wave?
   A. 25 m B. 15 m C. 0.25 m D. 0.15 m
2. A wave traveling from a medium of index of refraction n_1 toward a medium of index of refraction n_2 undergoes partly transmission and partly reflection. If n_2 is greater than n_1 which one of the following statement sis not correct?
   A. The speed of the wave in the medium with refractive index n1 is smaller than with n_2.
   B. The incident and the reflected waves are in-phase.
   C. The angle of reflection is the same as the angle of incidence.
   D. The refraction angle is less than the incidence angle.
3. The position of a particle moving with simple harmonic motion is given by an expression $x = A\cos(\omega t + \phi)$, where A is the amplitude of the oscillation, t is time, ω is angular frequency, and ϕ is the phase constant. If $\phi = \pi/2$, what will be the sign of the particle's position and velocity at $t = 7T/8$, where T is the period of oscillation?
   A. The position is positive, and the velocity is negative.
   B. The position and velocity are both positive.
   C. The position and velocity are both negative.
   D. The position is negative, and the velocity is positive.
4. If a long rope of uniform linear density is hung from a ceiling and waves are sent up the rope from its lower end, which one of the following is true about the speed of the asending waves?
   A. The speed decreases as the waves ascend.
   B. The speed increases as the waves ascend.
   C. The wave ascend with a uniform speed.
   D. The speed of the waves is larger around the middle of the rope than around the beginning and end.

Physics EUEE 2008 E.C
Grade 12
<u>Unit Two</u>

FALCON ACADAMY

1. A simple pendulum is made using a long, thin metal wire. What happens to the period of the pendulum when the temperature drops?
   A. Increase
   B. Remain the same
   C. Decrease
   D. Period of oscillation has random dependence on temperature
2. What fundamental frequency can a string vibrate at if it is 30 cm long and the velocity of travelling waves along the string is 120 m/s?
   A. 400Hz B. 600 Hz C. 800 Hz D. 200 Hz
3. The hearing curve, shown below, indicates the variation of the threshold of hearing with frequency. The ear is most sensitive at the point indicated by _____.



Frequency (Hz)

   A. A B. C C. B D. D
4. A wave length is:
   A. A line that represents the direction of propagation of light.
   B. The minimum distance between two points that are in phase.
   C. The locus of all points of a travelling wave that are in phase.
   D. The number of waves crossing a given plane in a unit time.

Physics EUEE 2004 E.C

Grade 12

<u>Unit Three</u>

1. Which phenomenon is responsible for the colors seen on a thin oil film on the water surface?

FALCON ACADAMY

A. Diffraction B. interference C. Superposition D. refraction

2. A pipe, 68cm long, is open at one end and closed at the other. When air is blown across the open end sound produces 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

1. When a soap bubble is in air, it exhibits different colores under sunlight. The absence of a particular color in a region is due to
   A. Double refraction.
   B. Straight line propagation of light.
   C. Destructive interference of light of that color in that region.
   D. Constructive interference of light of that color in that region.
   E.
2. What happens if the monochromatic light used in young's double slit experiment is replaced by white light?
   A. No fringes are observed
   B. All bright fringes become white
   C. All bright fringes have colors between violet red.
   D. Only the central fringe is white, all other fringes colored.

Physics EUEE 2005 E.C

Grade 12

Unit Three

1. In young's double slit experiment both the separation between the slits and the distance between the slits and the secreen are halved then what is the fringe width?

A. halved B. unchanged C. zero D. doubled

2. Refraction of a wave does NOT involve change in its

A. Speed B. wavelength C. frequency D. speed and wavelength

3. A thin film of oil (n = 1.25) is located on a smooth wet floor. When viewed perpendicular to the floor, the film reflects most strongly red light at 640 nm and reflects no blue light at 512nm. How thick is the oil film?

A. 640 nm B. 612nm C. 548nm D. 512nm

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Grade 12

Unit Three

4. *Two projectiles are fired from ground level at equal speed but different angles. One is fired at an angle of 30 degrees and the other at 60 degrees. The projectile to hit the ground first will be the one fired at (neglect air resistance)*
   C. 60 degrees.
   D. 30 degrees
   E. Both hit at the same time
   F. Cannot be determined from the given information
5. *A body moving with constant acceleration covers the distance between to points 60m a part in 5s. its velocity as it passes the second point is 15m/s. what is the acceleration?*

B. $3m/s^2$ B. $2.4m/s^2$ C. $1.8m/s^2$ D. $1.2m/s^2$

6. *A placekicker must kick a football from a point which is at a distance of 36.0m from the goal. When kicked, the ball leaves the ground with a speed of 20.0m/s at an angle of 53.0° to the horizontal. If the ball hits the crossbar of the goal at a height h and bounces back what will be the height of the crossbar?*

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B. 2.45m *B. 2.85m* *C. 3.00m* *D. 3.15m*

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Grade 12

Unit Three

6. If a long distance jumper athlete leaves the ground at an angle of 37.0° above the horizontal surface at a speed of 10.0m/s, how far does he jump in the horizontal direction?
   B. 4.8m B. 6m C. 9.6m D. 12m
7. A woman is rotating a bucket of water in a vertical circle of radius 0.9m. The mass of bucket and water is 5kg. What is the bucket's minimum speed at the top of the circle if no water is to spill out?
   B. 0 B. 1m/s C. 3m/s D. 9m/s
8. Which one of the following statements is correct?
   E. An object moving toward the east cannot have an acceleration toward the west.
   F. If the average velocity of an object for that time interval is also zero.
   G. The velocity-time graph of an object moving with constant acceleration is parallel to the time axis.
   H. An object having zero velocity can have acceleration different from zero.
9. A car travels along a straight line at a constant speed of 20m/s for a distance d and then another distance d in the same direction at a constant speed of 36km/hr. what is the average speed for the entire trip?
   B. 23km/h B. 48km/h C. 54km/h D. 60km/h
10. A highway curve is banked (inclined) in such a way that a car travelling at a speed of 13.5m/s can round the curve without skidding, in the absence of friction. If the banking angle is 30°, what is the radius of the curve?
    B. 10.5m B. 21.0m C. 31.7m D. 36.7m

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Grade 12

Unit Three

1. When viewed in white light, soap bubbles show color because of:
   A. Interference B. dispersion C. scattering D. diffraction

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Grade 12

Unit Four

1. An ion accelerates through a potential difference of 115 V and experiences and increase in kinetic energy of 7.37×10^{-17}J. What is the charge on the ion?
   A. 6.41×10^{-19}C C. 4.51×10^{-15}C
   B. 2.32×10^{-12}C D. 2×10^{-21}C
2. What is magnitude of the electric force between two protons separated by 2×10^{-15}m?
   A. 67.5M B. 115.0N C. 57.5N D. 83.4N
3. What is the SI unit of Electric field?
   A. Am^{-1} B. Vm^{-1} C. Cm D. NC^{-1}

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4. When a potential difference of 150V applied to the plates of a parallel = plate capacitor, the plates carry a surface charge density of 30 $\frac{nC}{cm^2}$. What is the spacing between plates?

   A. $2.24\,\mu m$ B. $5.32\,\mu m$ C. $12.24\,\mu m$ D. $4.42\,\mu m$

5. A small object of mass m carries a charge q and is suspended by a thread between the vertical plates of a parallel – plate capacitor. The plate separation is d. If the thread makes an angle Θ with the vertical, what is the potential difference between the plates?

   A. $\frac{mgd\tan\theta}{q}$ B. $\frac{md\tan\theta}{q}$ C. $\frac{mgd\sin\theta}{q}$ D. $\frac{md\sin\theta}{q}$

6. Five capacitors $10\,\mu F$ capacity each is connected to A, D, and C potential of 100 volt as shown in the next figure. What is the equivalent capacitance between A and B?

   A. $10\,\mu F$
   B. $20\,\mu F$
   C. $30\,\mu F$
   D. $60\,\mu F$

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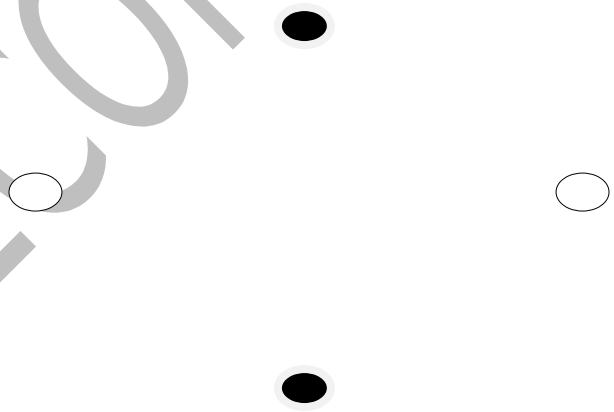
Grade 12

<u>Unit Four</u>

1. An air – filled parallel – plate capacitor has a capacitance of 1pF. The plate separation is then doubled and a wax dielectric is inserted, completely filling the space between the plates. As a result, the capacitance becomes 2 pF. What is the dielectric constant of the wax?

   A. 8.0 B. 4.0 C. 2.0 D. 0.5

2. Points A and B are each a distance d from each of two equal and opposite charges as shown below.



3. What will be the work required to move a negative charge q from A to b?

   A. Zero B. $\frac{qQ}{4\pi\varepsilon_0 d^2}$ C. $\frac{qQ}{4\pi\varepsilon_0 d}$ D. $\frac{qQ}{4\pi\varepsilon_0(4d^2)}$

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4. What is the capacitance of a capacitor that should be connected with 2 other capacitors having capacitance of 4 μF and 8 μF all in series to produce an effective capacitance of $\frac{24}{11}\mu F$?

   A. 12 μF B. 10 μF C. 8 μF D. 4 μF

5. Which one of the following changes to parallel plate capacitor would not increase energy stored in the capacitor at a fixed voltage across the plates?
   A. increasing the area of the plates
   B. increasing the dielectric constant
   C. decreasing the charges on the plates
   D. increasing the distance between the plates

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Grade 12

Unit Four

1. *Moving 2.5 x 10-6 coulomb of charge from point A to point B electric fielf requires 6.3 x 10-4 joule of work. The potential difference between points A and B is approximately*
   A. 4.0 x 10^{-3} V B. 2.5 x 10^{-2} V C. 1.6 x 10^{-19} V D. 1.0 x 10^{-14} V
2. *A capacitor made of parallel plates is charged by connecting it to a battery. The distance between the plates is much less than the surface area of each plate. After fully charged if the plates are disconnected from the battery and then pulled a part a little, what will happen to the total stored energy, the electric field, and the potential difference between the plates?*
   A. The electric field between he plates increases.
   B. The potential difference between the plates decreases.
   C. The total energy stored in the capacitor increases.
   D. The electric field, the potential difference and the stored energy remain the same.
3. *The distance between two point charge is doubled. What will happen to the force of interaction between the charges?*
   A. The force will be doubled.
   B. The force will be reduced by half.
   C. The force will be reduced by a factor of ¼.
   D. The force will not be affected.
4. *Two positive charges of magnitude q are each a distance d from the origin A of a coordinate system as shown below*

   The magnitude of the electric field is minimum at point
   A. A B. B C. C D. D
5. *Two different capacitors of capacitances C_1 = 2 μ F and C_2 = 2 μ F and C_2 = 3 μ F are connected in series across a 120V supply line. The charged capacitors are disconnected from the line and from each other, and reconnected with terminal of like sigh together. What will be the final charges on C_1 and C_2, respectively.*
   A. 57.6 μ C and 86.4 μ C
   B. 115.2 μ C and 127.8 μ C
   C. 144 μ C across each
   D. 288 μ C across each

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Grade 12

Unit Four

1. A force **F** of magnitude 20 N is applied to a block of mass 2 kg that lies on a rough, horizontal surface as shown in Figure 1. The coefficient of kinetic friction between the block and surface is 0.4. What is the magnitude of the acceleration of the block?

   A. $10 m/s^2$
   B. $5.2 m/s^2$
   C. $4 m/s^2$
   D. $2.8 m/s^2$



Fig.1

2. A hard ball moving on a horizontal frictionless surface with a speed of 5m/s in the positive x direction strikes a stationary hard ball of the same mass. After the collision, the first ball moves with a speed of 4m/s along a direction that makes an angle of 37.0° with its initial direction of motion. What is the struck ball's speed and the smallest angle between its direction of motion and the positive x axis after the collision?

   A. 3 m/s and 53.0°
   B. 3 m/s and 37.0°
   C. 4 m/s and 53.0°
   D. 4 m/s and 37.0°

3. A man standing on a frictionless surface continuously fired 120 bullets horizontally in 1 minute using a machine gun. If each bullet has a mass of 10g and leaves the muzzle of the gun with a speed of 800m/s, what is the average force what is the average force exerted by the gun on the man?

   A. 8N B. 16N C. 960N D. 16000N

4. Two blocks are connected by a string of negligible mass passing over a pulley of radius r = 0.2 m and moment of inertia I as shown in Figure 3. The block on the horizontal frictionless surface is moving with a constant acceleration a = 2.0 m/s2. 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 kg m^2
   B. 0.80 kg m^2
   C. 4.00 kg m^2
   D. 8.00 kg m^2

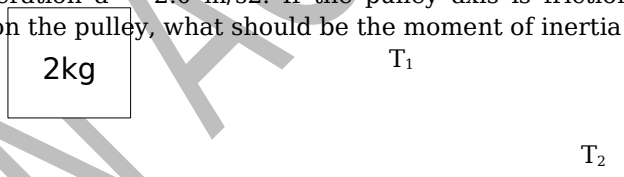

Fig. 3

5. A block of mass 10kg is pulled up a rough inclined plane with a force of 100 N parallel to the inclined plane. The inclined plane makes an angle of 37° with the horizontal. At the instant when the force is applied the block has a speed 11. of 1.5m/s. if the coefficient of kinetic friction if 0.40, and the block is pulled up 5m, what is the change in the kinetic energy of the block?

   A. 20 J B. 30 J C. 40 J D. 45.5 J

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Grade 12

Unit Four

1. In the sketches below, which best describes the location of the negative changes (electrons) when a negatively charged rod is brought near but not touching the conducting sphere?



(A) (B) (C) (D)

A. C B. D C. A D. B

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2. What is the potential (V) at a distance of 10m from a change of +5.0C?
   A. -4.45×10^{9}V
   B. -0.5V
   C. $+4.45 \times 10^{9}$V
   D. +0.5V

3. A positive charge of 1.0×10^{-4}C is on the negatively charged plate of a parallel plate capacitor as shown below.



   A. 2.0J B. 1.0J C. Zero D. 2.0×10^{4}J

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Grade 12

Unit Five

1. Determine the current in the 5 resistor in the figures shown below
   A. 7.85A
   B. 1.09A
   C. 0.48A
   D. 0.18A

2. A cell supplies a current of 0.9A through a 2 resistor and a current of 0.3A through a 7 resistor. The internal resistance of the cell is?
   A. 0.5 B. 1.0 C. 1.2 D. 2. 0

3. 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 $_1=4 \times 10^{-3}$ m and is 25cm long while the second material has resistivity of $p_1 = 6 \times 10^{-3}$ m and is 40cm long. What is the resistance between the ends of the rod?
   A. 378 B. 267 C. 436 D. 363

4. 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

5. There is a current of 2A in the system of conductors shown in the figure below. The potential difference $V_A - V_B$ is
   A. -2V
   B. -1V
   C. +1V
   D. +2V

6. A galvanometer may be used as an ammeter by
   A. Shunting the galvanometer with a high resistance
   B. Connecting a low resistance in parallel with the galvanometer
   C. Connecting a low resistance in series.
   D. Connecting a high resistance in series

Physics EUEE 2005 E.C

Grade 12

Unit Five

1. A 200-V power lines is protected by a 15-A fuse. What is the maximum number of "220V, 500W" light bulbs that can be operated at full brightness from this line?

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A. 0.2 B. 0.4 C. 0.6 D. 0.8

2. In the circuit shown below, what is the potential difference between points B and D?

A. 1V B. 2V C. 3V D. 4V

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Grade 12

Unit Five

1. *What is the resistance of a copper cable if it has a cross-sectional area of 1cm2 and a length of 2km? the resistivity of copper is 2 x 10^{-8}*

   A. 0.0004 B. 0.004 C. 0.04 D. 0.4

2. *A small radio receiver uses a battery that delivers a constant current of 25mA for 3 hours. Calculate the total charge delivered by the battery.*

   A. 1080000C B. 270000C C. 540C
   D. 270C b

3. *If the terminal of a battery with zero internal resistance are connected across two identical resistors in series, the total power delivered by the battery is 8W. if the same battery is connected across the same resistors in parallel, what is the total power delivered by the battery?*

   A. 2W B. 4W C. 16W D. 32W

4. *If Figure 8, the current in the 16 resistor is:*
   A. 0.64A
   B. 0.15A
   C. 0.49A
   D. 1.28A

5. *A block of mass 1.6kg is attached to a horizontal spring that ha s force constant of 2000 N/m. the spring is compressed 2.0 cm and is then released from rest. At speed will the block pass through the*

FALCON ACADAMY

equilibrium position if a constant friction force of 10.0N retards its motion from the moment it is released?

A. 70m/s *B. 50m/s* *C. 70cm/s* *D. 50cm/s*

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Grade 12

Unit Five

3. A car of mass 1500 kg is travelling at a uniform velocity of 30 m/s due east. The driver applies the brakes to slow down the car to a velocity of 10m/s due east. What is the work done in slowing down the car?

   B. 15KJ B. 300KJ C. 600KJ D. 750KJ

4. Which one of the following statements is true about a spring-mass system oscillating on horizontal frictionless surface?
   A. The kinetic and potential energies are equal at all times.
   B. The kinetic and potential energies are both constant.
   C. The maximum potential energy is achieved when the mass passes through its equilibrium position.
   D. The maximum kinetic energy and maximum potential energy are equal.

Physics EUEE 2008 E.C

Grade 12

Unit Five

1. Which one of the following statement is NOT correct about galvanometer?
   A. It is used to measure small amount of current.
   B. It has infinite resistance.
   C. It can be used to measure voltage if shunted with large load in series.
   D. Its working principle is the same as that of the electric motor.

2. Three resistors connected in series have individual voltages labeled ΔV_1, ΔV_2, and ΔV_3 respectively. Which of the following expresses the value of the total voltage taken over the three resistors together?

   A. $\Delta V_T = \Delta V_1 + \Delta V_2 + \Delta V_3$

   B. $\Delta V_T = \Delta V_1 = \Delta V_2 = \Delta V_3$

   C. $\Delta V_T = \left(1/\Delta V_1 + 1/\Delta V_2 + 1/\Delta V_3 \right)$

   D. $\Delta V_T = \left(1/\Delta V_1 + 1/\Delta V_2 + 1/\Delta V_3 \right)^{-1}$

3. Which instrument should, ideally, have zero resistance?
   A. Wheatstone bridge C. Voltmeter
   B. Oscilloscope D. Ammeter

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Grade 12

Unit Six

1. Find the magnitude of the force felt by an electron traveling at an angle of 60° to the earth's magnetic field at 1.4×10^7 m/s. (The charge on an electron is 1.6×10^{-19}C and the magnitude of the earth's magnetic field is 5×10^{-5}T)

   A. 0N B. 9.7×10^{-17}N C. 1.1×10^{-16}N D. 8.6×10^{-17}N

Physics EUEE 2005 E.C

Grade 12

FALCON ACADAMY

Unit Six

1. On which of the following does the induced emf in a coil NOT depend when a magnet is inserted into it?
   A. Resistance of the coil
   B. Number of turns in the coil
   C. Speed of approach of the magnet
   D. Magnetic moment of the magnet
2. An electron enters a region of uniform electric field of 5x103N/C. what is the force on the electron?
   A. $8x10^{-22}N$ B. $5.3 x 10^{-22}N$ C. $8x10^{-16}N$ D. $1.88 x 10^{22}N$
3. A wire carries a steady currant of 2.4A. A straight section of the wire is 0.75 m long and lies along the x axis within a uniform magnetic field, B = 1.6T along + z axis. If the current is in the +x direction, what is the magnetic force on the section of wire?
   A. 2.88 B. 1.62 C. -1.62 D. -2.88

Physics EUEE 2006 E.C

Grade 12

Unit Six

1. *A coil formed by warping 50 turns of wire in the shape of a square is positioned in a magnetic field so that the normal to the plane of the coil makes an angle of 37° with the direction of the field. When the magnetic field is increased uniformly from 200mT to 600mT 4.00s, an emf of magnitude 160.0 mV if induced in the coil. What is the total length of the wire in the coil?*
   A. 100m B. 200m C. 300m D. 400m
2. *Wire B has twice the length and twice the radius of wire A. Both wires are made from the same material. If wire A has a resistance R, What is the resistance of wire B?*
   A. 4R B. 2R C. R/2 C. R/4
3. *A wire carries a steady current of 2.4A.A straight section of the wire is 0.75 m long and lies in xy-plane along the x axis within a uniform magnetic field, B = 1.6K T. If the current is in the positive x direction, what is the magnetic force on the section of wire?*
   A. 2.88 N, in the negative y direction
   B. 2.88 N, in the positive y direction
   C. 3.84 N, in the negative y direction
   D. 3.84 N, in the positive y direction

Physics EUEE 2007 E.C

Grade 12

Unit Six

1. An electron moving at a speed of 1.5 x 10^7m/s enters a region of uniform magnetic field of magnitude 2 x 10^{-3} T, in a direction perpendicular to the field. The path followed by the electron is circular. What is the radius of the circular path?
   A. 0.43 cm B. 4.3 cm C. 43 cm D. 430 cm
2. If a wire carrying current in the plane of this paper toward the top of the page experiences a magnetic force toward the right edge of the page, what will be the direction of the magnetic field causing this force?
   A. In the plane of the page and toward the left edge.
   B. In the plane of the page and toward the bottom edge.
   C. Perpendicular and directed out of the plane of the page.
   D. Perpendicular and directed in to the plane of the page.
3. Which one of the following statements is correct about the effect and formation of a magnetic field?

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A. A magnetic field exerts a non zero force on a stationary charged object.
B. A magnetic field exerts a non zero force a conducting wire placed in the field.
C. A uniform magnetic field can be created at all points around a long current carrying wire
D. A magnetic field can be created in the space surrounding any charged object that is in motion.

4. Which one of the following actions increases the magnetic energy density in the interior of a very long current-carrying solenoid?
   A. Increasing the number of turns per unit length of the solenoid.
   B. Increasing the cross sectional area of the solenoid.
   C. Increasing the length of the solenoid keeping the number of turns per unit length fixed.
   D. Decreasing the cross sectional area of the solenoid.

Physics EUEE 2008 E.C

Grade 12

Unit Six

1. The torque experienced by a current carrying lop, in an external, magnetic field is:
   A. independent of the number of turns of the loop.
   B. independent of the current in the loop.
   C. dependent on the orientation of the loop.
   D. dependent on magnetic field generated according to Lenz's law.
2. Two long wires of the same length and cross-sectional area carry the same amount of current. Which one of the following statements is correct about the magnetic field and the magnetic forces on the wires?
   A. The magnetic field is zero at the midpoint between the wires when the current are in the same direction.
   B. The force between the wires is attractive when they carry current in opposite direction.
   C. The magnetic fields between the wires reinforce each other when the currents are in the same direction.
   D. The magnetic field due to one is proportional to the current through the other wire.

Physics EUEE 2004 E.C

Grade 12

Unit Seven

1. Which statement is correct about a purely inductive circuit?

   A. The current leads the voltage by
   B. The current is in phase with the voltage

   C. The current lags behind the voltage by

   D. The current lags by at low frequencies and leads by a high frequencies
2. Find the impedance of the RLC circuit shown in the figure below.
   A. 1.96
   B. 19.2
   C. 25.5
   D. 648.1
3. What is the main reason why alternating current is used to transmit electricity?

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A. To minimize power gain
B. To minimize energy loss
C. To maximize voltage gain
D. To maximize current gain

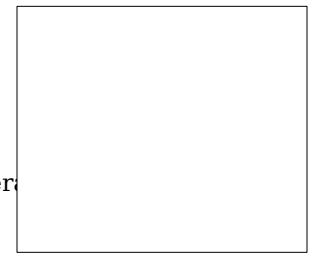
4. In RLC circuit, given R = 7.6 , L = 2.2mH and C = 1.8 F, what is the frequency of the damped oscillation of the circuit?
   A. 2.5 x 10^3Hz B. 15.72 x 10^3Hz C. 12.5 x 10^3Hz D. 25.0 x 10^3Hz
5. Two coils, held in fixed positions, have a mutual inductance of 100 H. What is the peak voltage in on when the sinusoidal current given by I(t) = (10.0A) sin(1000t) flows in the other?
   A. 1.0V B. 100.0V C. 10.0V D. 1.0V
6. A conduction rod g length 1 moves with a constant velocity V perpendicular to along, strait wire carrying current I. What is the magnitude of the emf generated between the ends of the rod?

Physics EUEE 2005 E.C

Grade 12

<u>Unit Seven</u>

1. Consider a series RC circuit for which R = 1.0M , C = 5.0 and = 30.0V. What is the time constant of the circuit and the maximum charge on the capacitor after the switch is closed respectively?
   A. 5 seconds , 150 C. 10 seconds, 160
   B. 7 seconds, 155 D. 9 seconds, 135
2. A step –up transformer is used to
   A. increasing the power C. increasing the voltage
   B. decreasing the power D. decrease the voltage
3. A rectangular loop carrying a current is situated near a long straight wire such that the wire is parallel to one if the sides of the loop and it is in a plane of the loop. If a study current is established in the wire as shown in figure, the loop will
   A. remain stationary
   B. move toward the wire
   C. move away from the wire
   D. rotate about an axis parallel to the wire



4. Which device uses the principle of electromagnetic induction for its oper
   A. Ac generator C. Cathode ray tub
   B. Moving coil meter D. Light emitting diode
5. A series RLC circuit has a resistance of 45.0 and an impedance of 75.0 . What average power is delivered to this circuit when ΔV_{rms} = 210V?
   A. 573W B. 353W C. 255W D. 247W
6. An alternating current is represented by I(t) = (10.0A) sin (100) what are the amplitude and frequency of the alternating current?
   A. 100 A, y5Hz B. 10..0A,100Hz C. 10.0A,50Hz D. 5.0A,25Hz

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7. 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 forces at the contact point on the wall (Nw) and at the contact point on the ground (Ng)

   A. N_w = 0N, N_g = 200N

   B. N_w = 200N, N_g = 0N

   C. N_w = 57.7N, N_g = 200N

   D. N_w = 200N, N_g = 57.7N

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Grade 12

Unit Seven

1. *Two rectangular loops of wire lie in the plane of this paper as shown in Fig.1. if the current I in the outer loop is counterclockwise and increase with time. Which one of the following statements is correct about the current induced in the inner loop?*

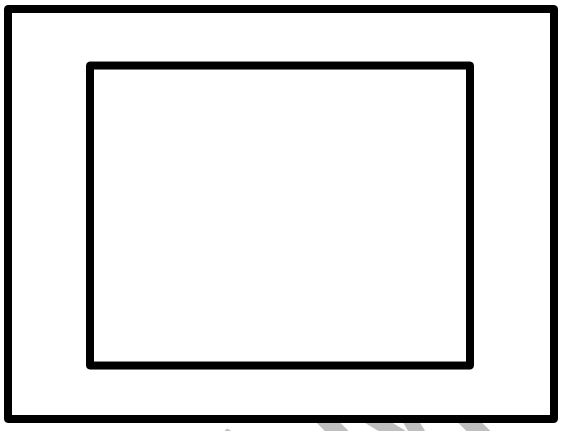

Fig.1

   A. *A current is induced in the inner loop in the clockwise direction.*
   B. *A current is induced in the inner loop in the counter clock wise direction.*
   C. *The induced current in the inner loop creases a magnetic field inside the area bounded by the inner loop in the same direction of the magnetic field. That the outer produced in the same area.*
   D. *It is zero*

2. *Determine the total impedance for the circuit shown below*

A. 0 *B. 4* *C. 27* *D. 31*

3. *A 6.00-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?*

A. 24.0V *B. 12.0V* *C. 6.00V* *D. 3.00V*

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Grade 12

Unit Seven

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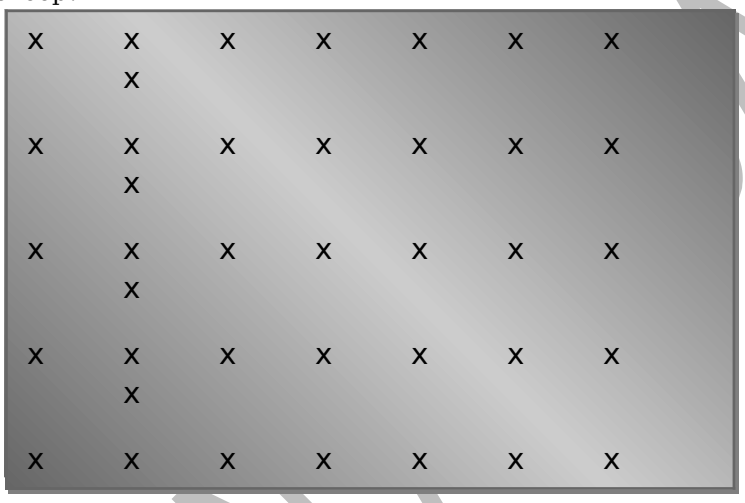
1. A square flat loop of wire is placed in a uniform magnetic field that is in the y direction. The magnetic flux through the loop is a maximum if the plane of the loop is in the
   A. *xy* plane
   B. *xz* plane
   C. *yz* plane
   D. *inclined* 45° *with respect to the xy* plane

2. A series *RLC* circuit has a total impendence of 75.0 . If the resistance is R = 45.0 and the average power delivered to the circuit is P = 352.8W, what is the root-mean square value of the ac voltage source?
   A. 83V B. 116V C. 210V D. 297V

3. Figure 8 (below) shows a rectangular loop of wire of width L and resistance R. one end of the loop is in a uniform magnetic field of strength B directed perpendicular into the plane of the page. The loop is pulled to the right at a constant speed v. what are the magnitude and direction of the induced current in the loop?



   A. I = BL vR and clock wise
   B. I = BL v/R and clock wise
   C. I = BL vR and counter clock wise
   D. I = BL v/R and counter clock wise.

Physics EUEE 20008 E.C

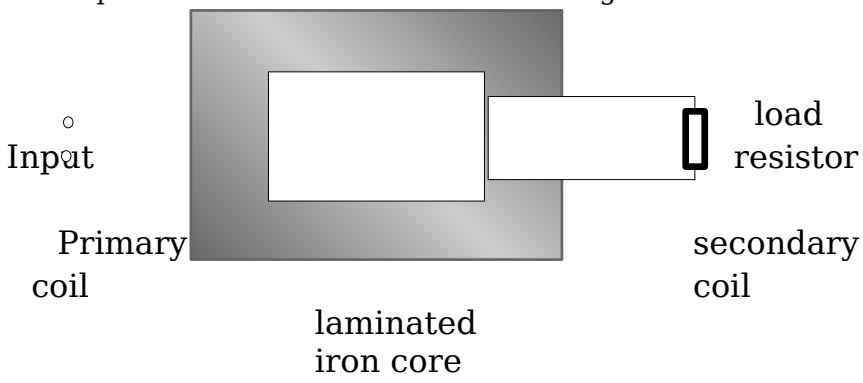
Grade 12

Unit Seven

1. Self inductance is a quantity that describes:
   A. the number of turns in a circuit.
   B. the induction of an electric field by an AC current in a lone coil.
   C. the induction of a magnetic field by an AC current in a lone coil.
   D. the steady stat current in a coil.
2. Which conversion process forms the basis for the function of an electric generator?
   A. alternating current to direct.
   B. mechanical energy to electrical.
   C. electrical energy to mechanical.
   D. low voltage to high or vice versa.
3. What is the change in magnetic flux in a coil of area $5m^2$ as it orientation relative to the perpendicular of a uniform 3.0T magnetic field changes from 45^0 to 90^0?
   A. 0Wb B. -11Wb C. 7.5 Wb D. 11 Wb

FALCON ACADEMY

4. A simple transformer is illustrated in the figure below.



Why is it that the core is laminated?

A. To increase the induced current in the primary coil.
B. To increase the induced current in the secondary coil.
C. To avoid heat exchange between the primary and secondary coils.
D. To reduce the loss in power in the core due to eddy currents.

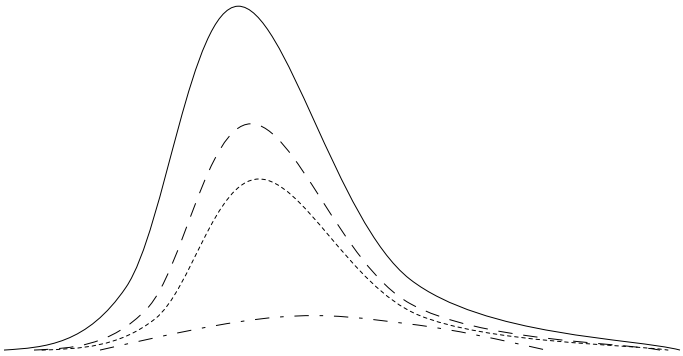
Physics EUEE 2005 E.C

Grade 12

<u>Unit eight</u>

1. Which of the following is correct about the meaning of photon?
   A. quantum of matter
   B. positively charged particle
   C. negatively charged particle
   D. quantum of light

2. The energy spectrum emitted by a black body at different temperature is as shown in the figure below. Which of the following statement is NOT correct about the black body energy spectrum?



   A. T1<T2<T3<T4
   B. 1> 2> 3> 4
   C. Black body radiate energy over the entire electromagnetic spectrum
   D. The wavelength corresponding to the maximum intensity increases with temperature

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Physics EUEE 2006 E.C

Grade 12

<u>Unit eight</u>

1. *The half – life of radium – 244 is 3.5 days, what fraction of the sample remains undecayed after fourteen days?*
   (If needed use ln2=-ln(1-2) 0.693)
   A. 1/2 B. 1/4 C. 1/8 D. 1/16

Physics EUEE 2007 E.C

Grade 12

<u>Unit eight</u>

1. Which of the following phenomena most clearly demonstrates the wave nature of electrons?
   A. The photoelectric effect
   B. Blackbody radiation
   C. The Compton effect
   D. Diffraction of electrons by crystals

2. When the radioactive element decays to , Which one of the following particles is emitted?
   A. A beta particle
   B. an alpha particle
   C. a proton
   D. a gamma ray

Physics EUEE 2008 E.C

Grade 12

<u>Unit eight</u>

1. In photoelectric effect, the energy of photoelectrons is proportional to the:
   A. frequency of light. C. speed of light.
   B. intensity of light D. absorbance of the metal.
2. The activity of a radioactive source falls to one sixteenth of its original value in 32 minutes. What is the half-life, in minutes, of this decay process?
   A. 2 min B. 8 min C. 4 min D. 16 min
3. Which statement is NOT correct about emissions from radioactive isotopes?
   A. Alpha particles are positively charged and less penetrating than beta and gamma.
   B. Beta particles are negatively charged and more penetrating than alpha particles.
   C. Alpha emissions are least influenced by magnetic field.
   D. The most penetrating emissions are gamma particles.
4. A common unit of energy in atomic physics is:
   A. Plank's constant. C. de Broglie wave length
   B. electron volt. D. uncertainty principle.

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