



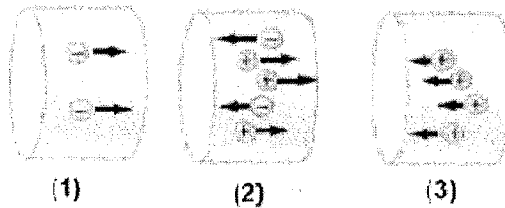
14-A conductor of length 1m has a cross-sectional area of  $2\text{cm}^2$  and its resistance is  $10\ \Omega$ , then its resistivity ( $\rho$ ) equal :

- a-  $2 \times 10^3\ \Omega\cdot\text{m}$       b-  $2 \times 10^{-3}\ \Omega\cdot\text{m}$       c-  $20\ \Omega\cdot\text{m}$       d-  $20 \times 10^{-6}\ \Omega\cdot\text{m}$

15-Three resistances  $R_1 = R_2 = R_3$  are connected in series in circuit , the current  $I_1, I_2, I_3$  pass in these resistances are :

- a-  $I_1 \neq I_2 \neq I_3$       b-  $I_1 \neq I_2 = I_3$       c-  $I_1 = I_2 = I_3$       d-  $I_1 = I_2 \neq I_3$

16-Rank the current in these four regions from highest to lowest



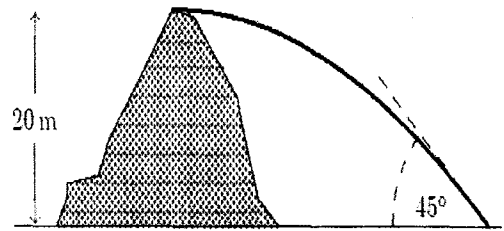
- a- 1, 3, 2      b- 2, 3, 1      c- 3, 1, 2      d- 3, 2, 1

17- A dielectric material is inserted between parallel plates of a capacitor. The potential difference across the capacitor plates ( $\Delta V$ ) and the charge stored ( $Q$ ) will be

- a-  $\Delta V$  increases and  $Q$  remains the same      b-  $\Delta V$  decreases and  $Q$  remains the same  
 c-  $\Delta V$  remains the same and  $Q$  increases      d-  $\Delta V$  remains the same and  $Q$  decreases

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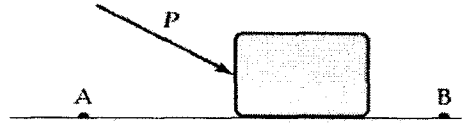
- 2) A ball is thrown horizontally from the top of a 20 m high hill. It strikes the ground at an angle of  $45^\circ$ . With what speed was it thrown?



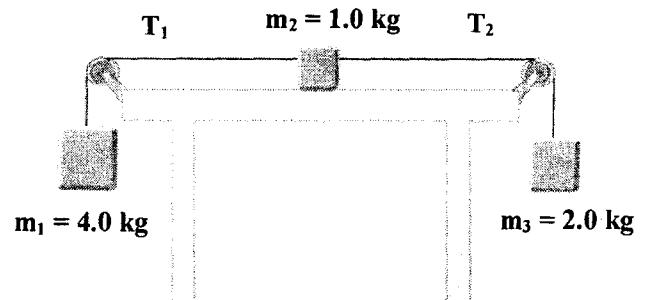
2) Starting from one lake, a camel walks 25 km in a direction  $30^\circ$  south of west and then walks 30 km toward the north to a second lake. What distance separates the two lakes and what is the direction from the first lake to the second lake?

24. When two or more waves are at the same place at the same time, the resulting effect is called
- a standing wave.
  - a Doppler wave.
  - a shock wave.
  - interference.
25. Suppose there is an object for which  $F = +kx$ . What will happen if the object is moved away from equilibrium ( $x = 0$ ) and released?
- It will return to the equilibrium position.
  - It will move further away with constant velocity.
  - It will move further away with constant acceleration.
  - It will move further away with increasing acceleration.
26. A mass  $M$  is suspended from a light spring. If the additional mass  $m$  is added, it displaces the spring by a distance  $x$ . now the combined mass will oscillate on the spring with time period equals to:
- $T = 2\pi \sqrt{\frac{mg}{x(M+m)}}$
  - $T = 2\pi \sqrt{\frac{x(M+m)}{mg}}$
  - $T = \frac{\pi}{2} \sqrt{\frac{mg}{x(M+m)}}$
  - $T = 2\pi \sqrt{\frac{x(M+m)}{mg}}$
27. Oscillations become damped due to
- normal force.
  - friction.
  - tangential force.
  - parallel force.
28. In simple harmonic motion, object's acceleration depends upon
- displacement from equilibrium position.
  - magnitude of restoring force.
  - both A and B.
  - force exerted on it.
29. Velocity at equilibrium position is
- constant.
  - minimum.
  - maximum.
  - zero.
30. Potential energy of mass attached to spring at mean position is
- maximum.
  - moderate.
  - zero.
  - minimum.

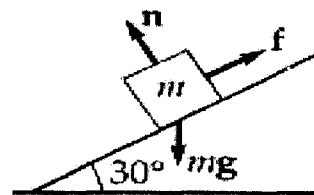
3) A block of 1 Kg is pushed across a rough horizontal surface by a force (magnitude  $P = 5.4$  N). The force of friction is 1.2 N and points A and B are 0.5 m apart. If the kinetic energies of the block at A and B are 4.0 J and 5.6 J, respectively, how much work is done on the block by the force P between A and B and what is the value of the coefficient of kinetic friction?



- 3) Three objects are connected on the table as shown. The table has a coefficient of kinetic friction of 0.35. The objects have masses 4.0 kg, 1.0 kg and 2.0 kg, and the pulleys are frictionless. (a) Determine the acceleration of each object and their directions. (b) Determine the tensions in the two cords.

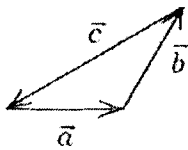


- 5) A 3 kg block starts from rest at the top of a  $30^\circ$  incline and slides a distance of 2 m down the incline in 1.5 s. Find:
- The magnitude of the acceleration of the block,
  - The speed of the block after it has slid 2 m, and
  - The coefficient of the kinetic friction between the block and plane.

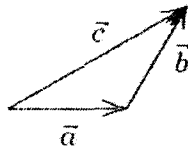




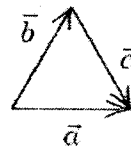
- 5) The vectors  $\vec{a}$ ,  $\vec{b}$ , and  $\vec{c}$  are related by  $-\vec{c} = \vec{b} + \vec{a}$ . Which diagram below illustrates this relationship?



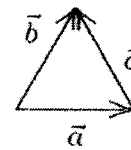
A



B



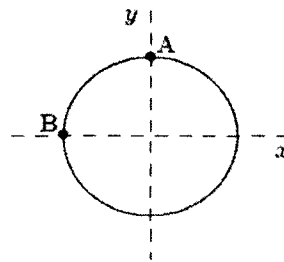
C



D

- 6) A toy racing car moves with constant speed around the circle shown below. When it is at point A its coordinates are  $x = 0$ ,  $y = 3$  m and its velocity is  $(6\text{m/s})\hat{i}$ . When it is at point B its velocity and acceleration are:

- $-(6\text{m/s})\hat{j}$  and  $(12\text{m/s}^2)\hat{i}$ , respectively
- $(6\text{m/s})\hat{i}$  and  $-(12\text{m/s}^2)\hat{i}$ , respectively
- $(6\text{m/s})\hat{j}$  and  $(12\text{m/s}^2)\hat{i}$ , respectively
- $(6\text{m/s})\hat{i}$  and  $(2\text{m/s}^2)\hat{j}$ , respectively



- 7) A person weighing  $0.70$  kN rides in an elevator that has an upward acceleration of  $1.5$   $\text{m/s}^2$ . The force of the elevator on the person is:

- $0.11$  kN
- $0.81$  kN
- $0.70$  kN
- $0.59$  kN

- 8) A constant force of  $12$  N in the positive  $x$  direction acts on a  $4.0$ -kg object as it moves from the origin to a particular point  $(6\hat{i} - 8\hat{j})$  m. The work done by the given force during this displacement is:

- $+60$  J
- $+84$  J
- $+72$  J
- $+48$  J

4. A mass of 0.40 kg, hanging from a spring with a spring constant of 80 N/m, is set into an up-and-down simple harmonic motion. What is the speed of the mass when moving through the equilibrium point? The starting displacement from equilibrium is 0.10 m.
- a. zero  
b. 1.4 m/s  
c. 2.0 m/s  
d. 3.4 m/s
5. A pendulum swings through a total of  $28^\circ$ . If the displacement is equal on each side of the equilibrium position, what is the amplitude of this vibration? (Disregard frictional forces acting on the pendulum.)
- a.  $28^\circ$   
b.  $14^\circ$   
c.  $56^\circ$   
d.  $7.0^\circ$
6. What is the maximum value of the acceleration  $a$  when  $x = A \cos(\omega t + \phi)$ ?
- a.  $\omega$   
b.  $\omega t$   
c.  $\omega^2 A$   
d.  $A \phi$
7. Vibration of an object about an equilibrium point is called simple harmonic motion when the restoring force is proportional to
- a. time.  
b. displacement.  
c. a spring constant.  
d. mass.
8. Tripling the displacement from equilibrium of an object in simple harmonic motion will change the magnitude of the object's maximum acceleration by what factor?
- a. one-third  
b. 1  
c. 3  
d. 9
9. A mass attached to a spring vibrates back and forth. At maximum displacement, the spring force and the
- a. velocity reach a maximum.  
b. velocity reach zero.  
c. acceleration reach a maximum.  
d. acceleration reach zero
10. For a mass hanging from a spring, the maximum displacement the spring is stretched or compressed from its equilibrium position is the system's
- a. amplitude.  
b. period.  
c. frequency.  
d. acceleration.

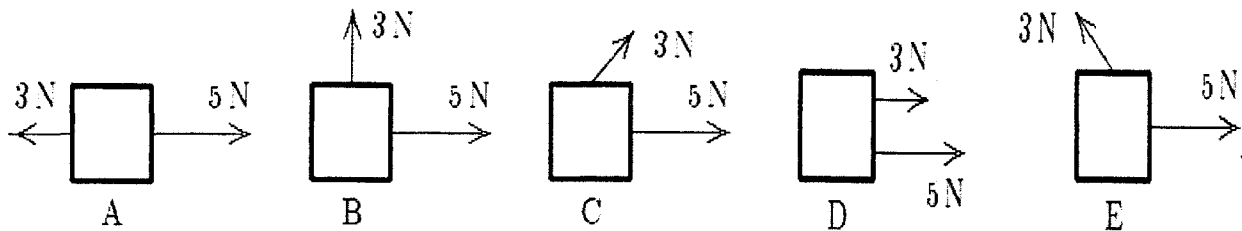
9- A particle moves at a constant speed in a circular path with a radius of 2.06 cm. If the particle makes four revolutions each second, the magnitude of its acceleration is:

- A)  $20 \text{ m/s}^2$
- B)  $18 \text{ m/s}^2$
- C)  $13 \text{ m/s}^2$
- D)  $15 \text{ m/s}^2$

10- When a certain force is applied to one kilogram its acceleration is  $5 \text{ m/s}^2$ . When the same force is applied to another object its acceleration is one-fifth of the acceleration of the first mass. The mass of the second object is:

- A) 0.2kg
- B) 0.5kg
- C) 5.0kg
- D) 1.0kg

11- Two forces, one with a magnitude of 3N and the other with a magnitude of 5N, are applied to an object. For which orientations of the forces shown in the diagrams is the magnitude of the acceleration of the object the least?



Your answer is:

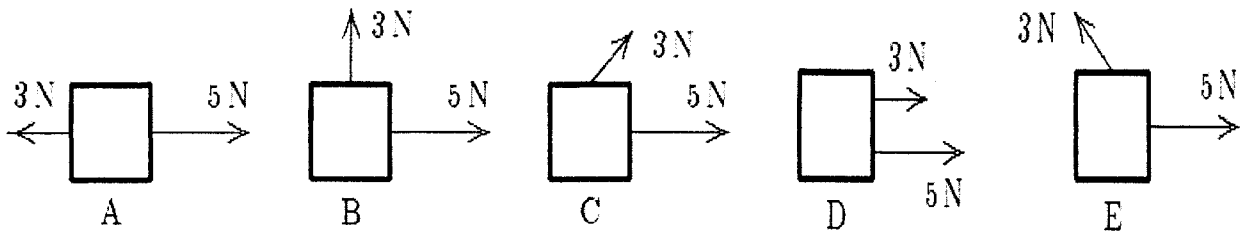
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11- Two forces, one with a magnitude of 3N and the other with a magnitude of 5N, are applied to an object. For which orientations of the forces shown in the diagrams is the magnitude of the acceleration of the object the least?



Your answer is:

5- An object is thrown vertically upward such that it has a speed of 25 m/s when it reaches  $(2/3)$  of its maximum height above the launch point. The maximum height is:

- A) 64.3 m
- B) 95.7 m
- C) 32.0 m
- D) 48.5 m

6- If the rectangular coordinates of a point are given by  $(2, y)$  and its polar coordinates are  $(r, 30^\circ)$ , the value of  $y$  and  $r$ , respectively is:

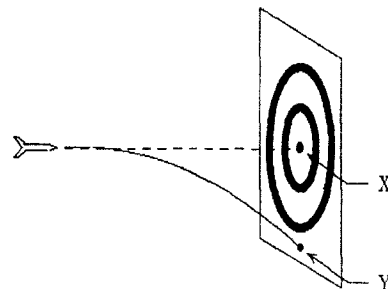
- A) 1.15, 2.31
- B) 3.46, 1.73
- C) 1.31, 2.15
- D) 2.25, 2.51

7- A vector has a magnitude of 12. When its tail is at the origin it lies between the positive  $x$ -axis and the negative  $y$ -axis and makes an angle of  $30^\circ$  with the  $x$ -axis. Its  $y$  component is:

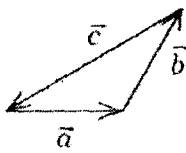
- A)  $6/\sqrt{3}$
- B) -6
- C) 6
- D)  $-6\sqrt{3}$

8- A dart is thrown horizontally toward X at 20m/s as shown. It hits Y 0.1 s later. The distance XY is:

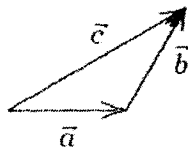
- A) -2m
- B) -0.05m
- C) -0.5m
- D) -1m



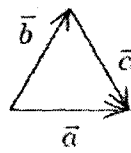
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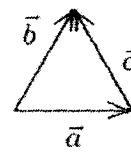
A



B



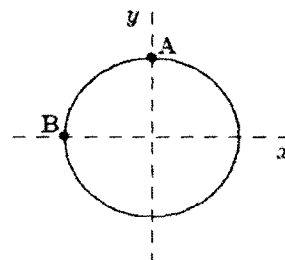
C



D

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- $(6\text{m/s})\hat{i}$  and  $-(12\text{m/s}^2)\hat{i}$ , respectively
- $(6\text{m/s})\hat{j}$  and  $(12\text{m/s}^2)\hat{i}$ , respectively
- $(6\text{m/s})\hat{i}$  and  $(2\text{m/s}^2)\hat{j}$ , respectively



- 7) A person weighing  $0.70$  kN rides in an elevator that has an upward acceleration of  $1.5$   $\text{m/s}^2$ . The force of the elevator on the person is:

- $0.11$  kN
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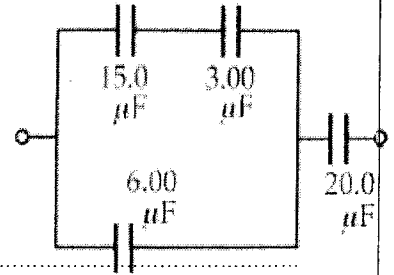
- $+60$  J
- $+84$  J
- $+72$  J
- $+48$  J

**PART II : Answer the following questions**

**(35 marks)**

**1- Four capacitors are connected as shown in the opposite figure, (10 marks)**

- a- Find the equivalent capacitance
- b- if the applied potential between the two terminals equal 15 V, Find the charge on the capacitor (20  $\mu\text{F}$ ) .



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**2- A parallel-plate air capacitor of capacitance of 100 pF has a charge of magnitude 0.1  $\mu\text{C}$  on each plate. The distance between plates is 0.5 mm. Find**

- a- The potential difference between the plates **(8 marks)**
- b- The area of each plate
- c- The electric field magnitude between the plates

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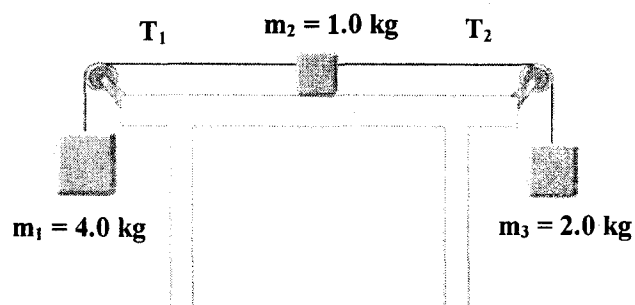
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- 3) Three objects are connected on the table as shown. The table has a coefficient of kinetic friction of 0.35. The objects have masses 4.0 kg, 1.0 kg and 2.0 kg, and the pulleys are frictionless. (a) Determine the acceleration of each object and their directions. (b) Determine the tensions in the two cords.







**FINAL EXAMINATION**

Academic Year	2016/2017 G		
Semester	<input checked="" type="checkbox"/> First	<input type="checkbox"/> Second	<input type="checkbox"/> Summer
Course Title	General Physics 2 - code(P105)		
Exam duration	2 hours	Time :( 9 - 11 )	Date: 9/1/2017

**Physical constants:**

Electron charge $e = 1.6 \times 10^{-19} \text{ C}$	$m_e = 9.11 \times 10^{-31} \text{ Kg}$	$m_p = 1.67 \times 10^{-27} \text{ Kg}$
$k_e = 9 \times 10^9 \text{ N m}^2 / \text{C}^2$	$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{N.m}^2$	

**PART I: Choose the correct answer for (15) only of the following questions and arranged them on the next table (15 marks)**

No. of phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
correct answer															

- The unit of electric potential difference is :
  - Coulombs per joule
  - Volts per coulomb
  - Joules per coulomb
  - Newton per coulomb
- The ratio of charge stored to electric potential difference is called the:
  - Resistance
  - Capacitor
  - Current
  - Capacitance
- The maximum electric flux ( $\Phi_E$ ) that can be produced by a uniform electric field of magnitude ( $E = 10 \text{ N/C}$ ) through a circular surface of radius 1 m is:
  - $10 \pi \text{ N.m}^2/\text{C}$
  - $\pi /10 \text{ N.m}^2/\text{C}$
  - $1 \text{ N.m}^2/\text{C}$
  - $10 \text{ N.m}^2/\text{C}$
- The electric field between two charged, parallel metal plates is 6500 N/C. The plates are 12 cm apart. The electric potential difference between them is:
  - $7.8 \times 10^{-3} \text{ V}$
  - $7.8 \times 10^2 \text{ V}$
  - $7.8 \times 10^4 \text{ V}$
  - $7.8 \times 10^5 \text{ V}$

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**B. Problems: Answer the following questions. [5 marks]**

1. A spring stretches by 25.0 cm when a 0.500-kg mass is suspended from its end.
  - a. Determine the spring constant. **[2.5 marks]**
  - b. How much elastic potential energy is stored in the spring when it is stretched this far? **[2.5 marks]**

5- The unit of the current ( Ampere) is equivalent:

- a- C.S                                      b- C/S                                      c- N.C                                      d- C/N

6- The electric field lines for a positive point charge:

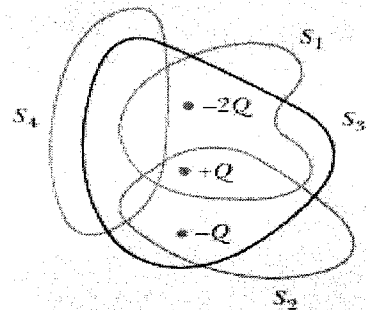
- a- Form circles                                      b- Point radically outward  
c- Point radically inward                                      d- No correct answer

7- The inverse of the conductivity ( $\sigma$ ) is called:

- a- Capacitance                                      b- Resistivity                                      c- Potential                                      d- Current

8- According to Gauss' law, the net electric flux ( $\Phi_E$ ) through the surfaces in the next figure are equal:

- a- For surface  $S_1$   $\Phi_E = \dots\dots\dots$   
b- For surface  $S_2$   $\Phi_E = \dots\dots\dots$   
c- For surface  $S_3$   $\Phi_E = \dots\dots\dots$   
d- For surface  $S_4$   $\Phi_E = \dots\dots\dots$



9- Two capacitors are identical. They can be connected in series or in parallel. If you want the largest equivalent capacitance for the combination, do you connect them in :

- a- In series                      b- In parallel                      c- do the combination have the same capacitance

10- In the parallel combination of the resistors , the equivalent resistor is:

- a- greater than any individual resistor  
b- smaller than any individual resistor  
c- equal the sum of the individual resistor  
d- equal the total current of the combination

11- Farad is equal:

- a- Coulomb/Volt                      b- Coulomb. Volt                      c- Volt /Coulomb                      d- Volt/ ohm

12-If a dielectric material is inserted between capacitor plates, then:

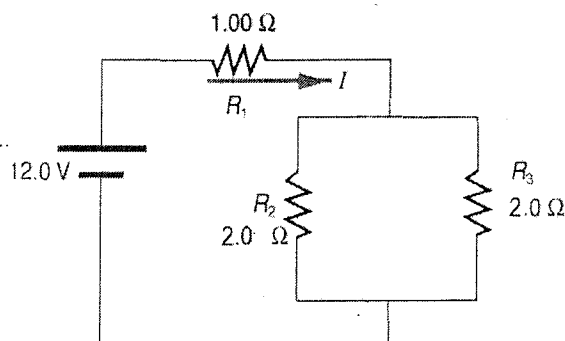
- a- The charge on the capacitor increases                      b- The capacitance increases  
c- The charge on the capacitor decreases                      d- The capacitance decreases

13- A  $3 \mu\text{F}$  capacitor is connected in series with a  $6 \mu\text{F}$  capacitor and a 12-V battery for a long time. The charge on the  $3.0\text{-}\mu\text{F}$  capacitor is:

- a-  $24 \mu\text{C}$                       b-  $36 \mu\text{C}$                       c-  $48 \mu\text{C}$                       d-  $6 \mu\text{C}$

4- a- An infinite line charge ( $\lambda = 5.0 \mu\text{C/m}$ ) passes through the axis of a coaxial cylindrical Gaussian surface (radius  $r = 0.20 \text{ m}$  and length  $L = 0.40 \text{ m}$ ). Find:  
The magnitude of the electric field ( $E$ ) at a point  $P$  on the surface. (3 marks)

b-If the potential difference of the battery is 12 volt in the corresponding circuit, Find:  
a- The total resistance for the two resistances connected in parallel (4 marks)  
b-The total resistance  
c-The total current passes in the circuit



Questions Finished  
With my best wishes

5- An object is thrown vertically upward such that it has a speed of 25 m/s when it reaches  $(2/3)$  of its maximum height above the launch point. The maximum height is:

- A) 64.3 m
- B) 95.7 m
- C) 32.0 m
- D) 48.5 m

6- If the rectangular coordinates of a point are given by  $(2, y)$  and its polar coordinates are  $(r, 30^\circ)$ , the value of  $y$  and  $r$ , respectively is:

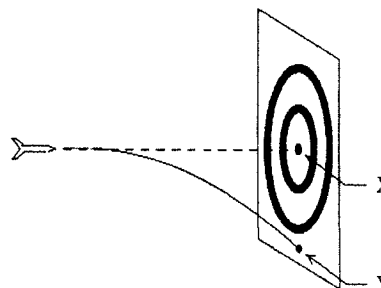
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- B) 3.46, 1.73
- C) 1.31, 2.15
- D) 2.25, 2.51

7- A vector has a magnitude of 12. When its tail is at the origin it lies between the positive  $x$ -axis and the negative  $y$ -axis and makes an angle of  $30^\circ$  with the  $x$ -axis. Its  $y$  component is:

- A)  $6/\sqrt{3}$
- B) -6
- C) 6
- D)  $-6\sqrt{3}$

8- A dart is thrown horizontally toward X at 20m/s as shown. It hits Y 0.1 s later. The distance XY is:

- A) -2m
- B) -0.05m
- C) -0.5m
- D) -1m





Course Title: General Physics (1) - Code: P100 - Final Examination (50 %)  
. A.S. Alamir (Coordinator)

Constants: acceleration due to gravity  $g = 9.8 \text{ m/s}^2$  vertically downward

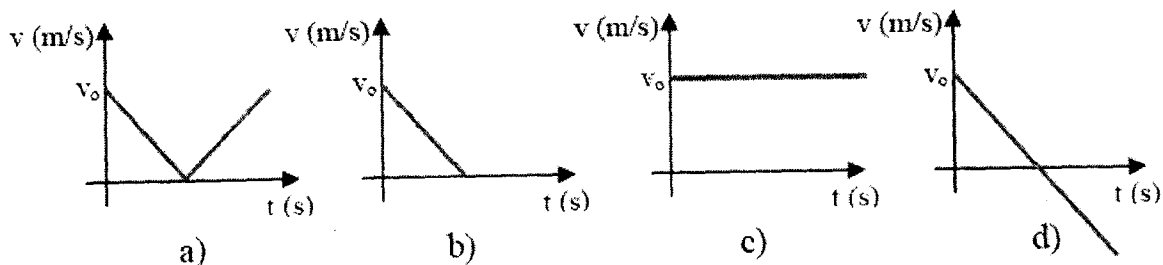
**Part I- Choose the correct answer:**

**(16 Marks)**

1) Which of the following quantities has the same dimensions as kinetic energy,  $\frac{1}{2}mv^2$ ? Note:  $[a]=[g]= [LT^{-2}]$ ;  $[h]= [L]$  and  $[v]= [LT^{-1}]$

- a.  $ma$
- b.  $mvx$
- c.  $mvt$
- d.  $mgh$

2) An object is thrown vertically upward with an initial velocity ( $v_0$ ). Which one of the following graphs describes the object velocity versus time?



3) A ball is thrown upward. While the ball is free fall, its acceleration:

- a. remains constant
- b. decreases
- c. increases and then decreases
- d. decreases and then increases

4) One object is thrown vertically upward with an initial velocity of 100 m/s and another object with an initial velocity of 10 m/s. The maximum height reached by the first object will be that of the other is:

- a. 10 times
- b. 100 times
- c. 1000 times



Course Title: General Physics (1) - Code: P100 - Final Examination (50 %)  
A.S. Alamir (Coordinator)

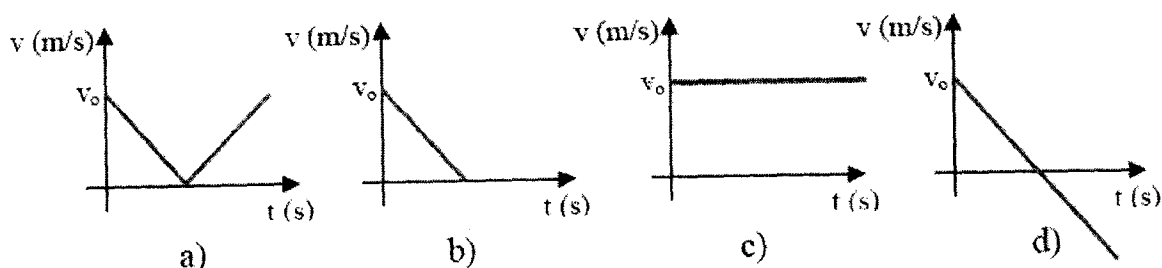
**Constants:** acceleration due to gravity  $g = 9.8 \text{ m/s}^2$  vertically downward

**Part I- Choose the correct answer:**

**(16 Marks)**

- 1) Which of the following quantities has the same dimensions as kinetic energy,  $\frac{1}{2}mv^2$ ? Note:  $[a]=[g]= [LT^{-2}]$ ;  $[h]= [L]$  and  $[v]= [LT^{-1}]$
- ma
  - mvx
  - mvt
  - mg

- 2) An object is thrown vertically upward with an initial velocity ( $v_0$ ). Which one of the following graphs describes the object velocity versus time?



- 3) A ball is thrown upward. While the ball is free fall, its acceleration:

- remains constant
- decreases
- increases and then decreases
- decreases and then increases

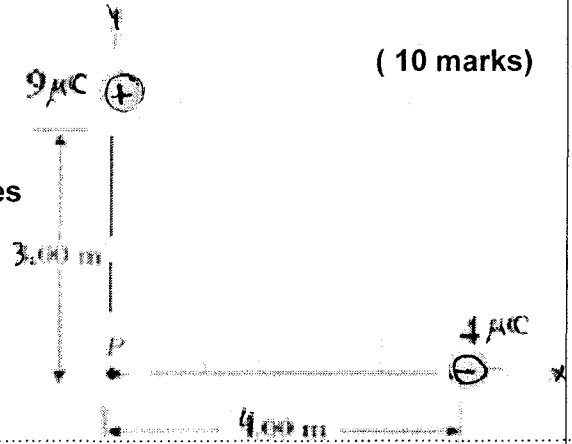
- 4) One object is thrown vertically upward with an initial velocity of 100 m/s and another object with an initial velocity of 10 m/s. The maximum height reached by the first object will be that of the other is:

- 10 times
- 100 times
- 1000 times
- 10,000 times

3- Based on the opposite figure, Find

( 10 marks)

- a- The total electric potential due to the two charges at point P.
- b- The resultant electric field due to the two charges at the same point P and its direction.



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Assuit University  
Faculty of Science  
Department of Physics



First Semester 2016 - 2017  
Date: 9 / 1 / 2017  
Time: 2 hours

Course Title: General Physics (1) – Code: P100 – Final Exam (50%)

Part I- Choose the correct answer:

(22 Marks)

1- During a short interval of time the speed  $v$  in m/s of an automobile is given by  $v = at^2 + bt^3$ , where the time  $t$  is in seconds. The units of  $a$  and  $b$  are respectively:

- A)  $m\ s^2$ ;  $m\ s^4$
- B)  $s^3/m$ ;  $s^4/m$
- C)  $m/s^2$ ;  $m/s^3$
- D)  $m/s^3$ ;  $m/s^4$

2- The quantity with the same units as force times time,  $Ft$ , with dimensions is  $MLT^{-1}$ :

- A)  $mv$
- B)  $mvr$
- C)  $rmv^2$
- D)  $ma$

3- A particle moves along the  $x$  axis from  $x_i$  to  $x_f$ . Of the following values of the initial and final coordinates, which results in the displacement with the largest magnitude?

- A)  $x_i = 4m, x_f = 6m$
- B)  $x_i = -4m, x_f = -8m$
- C)  $x_i = -4m, x_f = 2m$
- D)  $x_i = -4m, x_f = 4m$

4- Starting at time  $t = 0$ , an object moves along a straight line. Its coordinate in meters is given by  $x(t) = 75t - t^3$ , where  $t$  is in seconds. When it momentarily stops its acceleration is:

- A) 0
- B)  $-73\ m/s^2$
- C)  $-30\ m/s^2$
- D)  $-9.8\ m/s^2$

**Part II- Solve the following three problems:**

**(21 Marks)**

- 
- 1) A particle starts from rest at  $x = 0$  and moves for 10 s with an acceleration of  $+2.0 \text{ cm/s}^2$ . For the next 20 s, the acceleration of the particle is  $-1.0 \text{ cm/s}^2$ .  
What is the position of the particle at the end of this motion?

**Part III- Solve only two (2) out the following (3) problems: (13 Marks)**

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- 1) Assume that the force ( $F$ ) acting on a particle of a mass ( $m$ ) moving in a circular path of radius ( $r$ ) with uniform speed ( $v$ ) is proportional to  $m^a$ ,  $r^b$  and  $v^c$ . Using the dimensional analysis determine the values of  $a$ ,  $b$  and  $c$ , then write the simplest equation for the force ( $F$ ).