

FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS
IMAM UNIVERSITY



101Phys. Mid1 exam
1st semester
2014

NAME:

ID:

Section:

تعليمات هامة:

- 1-يمنع منعاً باتاً استخدام المترجم أو ما يسمى بالاطلس.
- 2-يمنع استخدام الجوال أو الجهاز اللوحي كألة حاسبة.
- 3- اجابتان لنفس السؤال تلغي درجته.

خاص بالأستاذة		
السؤال	المستحقة الدرجة	الدرجة المكتسبة
الأول	5	
الثاني	7	
الثالث	8	
المجموع	20	

دعواتنا لكن بالتوفيق

Constant:

$$g = 9.8 \text{ m/s}^2$$

Q1: Choose the correct answer and write the letter on it in the following table: (one point each)

5

1	2	3	4	5

1-An object is lifted to some height and then dropped. During the drop, which of the following is increased (Neglecting air resistance) ?

- A. gravitational potential energy
- B. kinetic energy
- C. total mechanical energy
- D. both B and C

2-Machine A does 100 J of work in 10 s. Machine B does 100 J of work in 5 s. Which machine has the greatest power output?

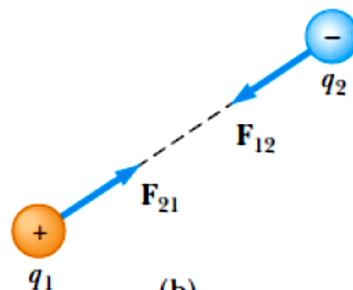
- A. Machine A
- B. Machine B
- B. The power output is the same.
- D. It cannot be determined

3- The electric charge is a quantized quantity

- A. False.
- B. True.
- C. Depend on the sing.
- D. Depend on distance

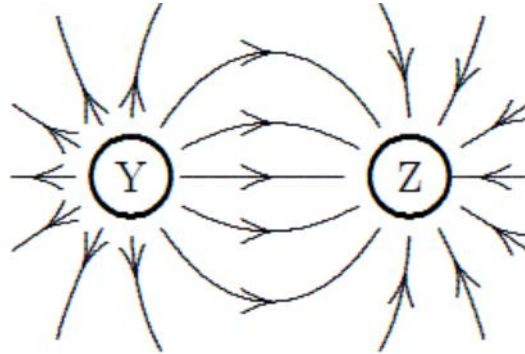
4- If there are two charges $+q$ and $-q$ as shown in the figure. The relation between the forces is:

- A. $\vec{F}_{12} = \vec{F}_{21}$
- B. $\vec{F}_{12} = -\vec{F}_{21}$
- C. $\vec{F}_{12} = 2 \vec{F}_{21}$
- D. $\vec{F}_{12} = -2 \vec{F}_{21}$



5. The diagram shows the electric field lines in a region of space containing two small charged spheres (Y and Z). Then:

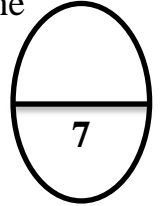
- A. Y is negative and Z is positive and they have the same magnitude.
- B. Y is negative and Z is positive and they have different magnitudes.
- C. Y is positive and Z is negative and they have the same magnitude.
- D. Y is positive and Z is negative and they have different magnitudes.



Q.2

An airplane of mass 89,000 kg is flying at an altitude of 12,500 m and a velocity of 120m/s. The airplane then dives to an altitude of 6,500 m. Assume that friction and drag can be ignored and that the airplane increases its velocity during the dive;

a) Find the velocity of the plane at the new altitude. (3 points)



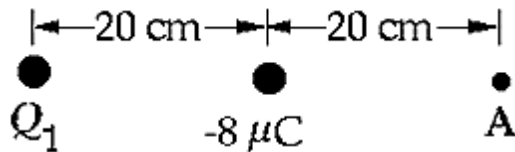
b) Find the gravitational potential energy of the plane at the new altitude.
(3 points)

c) What is the total mechanical energy? (1 point)

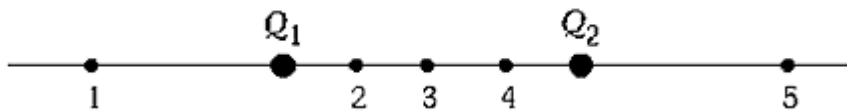
Q.3

a) The electric field at point A is zero. What is charge Q_1 ? (3 points)

8



Charges $Q_1 = -q$ and $Q_2 = +4q$ are placed as shown. Of the five positions indicated by the numbered dots, the one at which the electric field is zero is



b) If all the charges are 15 cm from the origin (the crossing point of the vertical and horizontal lines) in the above figure and $Q = +3.0 \mu\text{C}$, then calculate the net force on a charge of $+Q$ placed at the origin. (5 points)

