Review questions :

1- ……shot a beam of positively charged alpha particles through a thin layer of gold foil.
   - A- Rutherford
   - B- Tesla
   - C- Volt
   - D- Bohr
   - E- Dalton

2- *E* =…….
   - A- Mc
   - B- mc^2.
   - C- Vc
   - D- All the above
   - E- Non of the above

3- The energy needed to move an electron through a potential difference of 1 volt
   - A- One volt.
   - B- One Ohm
   - C- One electron volt
   - D- One ampere
   - E- One Tesla

4- $^{238}_{92}U \rightarrow {}^{234}_{90}Th + {}^{?}_{2}He$
   - A- 3
   - B- 2
   - C- 1
   - D- 4
   - E- 5

5- $^{234}_{90}Th \rightarrow {}^{0}_{-1}e + {}^{234}_{?}Pa$
   - A- 235
   - B- 234
   - C- 90
   - D- 92
   - E- 91

6- $^{234}_{90}Th \rightarrow {}^{0}_{-1}e + {}^{?}_{91}Pa$
   - A- 234
   - B- 235
   - C- 90
   - D- 91
   - E- 92

7- As a particular number of radioactive atoms decay, it is logical that the amount of decay activity will ……..over time
   - A- Decrease
   - B- Increase
   - C- Be stable
   - D- May be any
   - E- Non of the above

8- Time necessary for exactly half of the radioactive atom to decay is called
   - A- Half life time
   - B- Half period
   - C- Half mass
   - D- All the above
   - E- Non of the above

Other questions

1- The time required for the quantity to fall to half of its initial value.
   a. Half life time
   b. Quarter life time
   c. Double life time
   d. Life time

2- 12 g of a radioactive material is kept in a certain place and after 50 days the remaining mass of that radioactive material is 0.75 g find the half life of this material.
   a. 12.5
   b. 15
   c. 20
   d. 30

3- On putting a radio active element in front of Geiger counter it reads 320 disintegration per min. and after 33 days it became 40 disintegration per min. Calculate the half life.
   a. 12.5
   b. 15
   c. 11
   d. 30

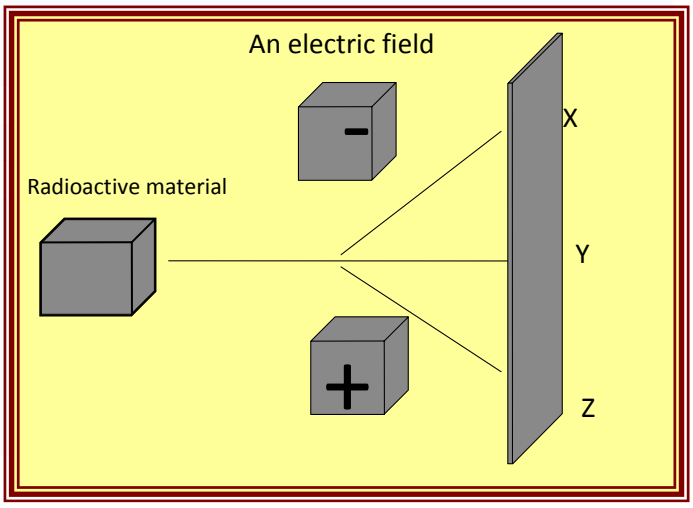
4- It is a natural decay (disintegration) of the nucleus of the atom of a radioactive element which results in invisible radiation being emitted from the nucleus.
   a. Natural radioactivity
   b. Artificial radioactivity
   c. Nuclear reactors
   d. Atomic reactors

5- $^{4}_{2}$ **He:** Which consists of 2 protons and 2 neutrons similar to the structure of the nucleus of the helium atom and it carries a positive charge is referred to as :
   a. An alpha particle
   b. A beta particle
   c. Gamma rays
   d. All the previous
   e. Non of the previous

6- $^{0}_{-1}$ **e:** *Which consists of negatively charged electrons* is referred to as :
   a. An alpha particle
   b. A beta particle
   c. Gamma rays
   d. All the previous
   e. Non of the previous

7- .An electromagnetic wave similar to X rays. is referred to as :
   a. An alpha particle
   b. A beta particle
   c. Gamma rays
   d. All the previous
   e. Non of the previous

Study the figure and answer questions 8-10



8- X is referred to as :
   a. An alpha particle
   b. A beta particle
   c. Gamma rays
   d. All the previous
   e. Non of the previous

9- Y is referred to as :

a. An alpha particle
b. A beta particle
c. Gamma rays
d. All the previous
e. Non of the previous

10- Z is referred to as :

a. An alpha particle
b. A beta particle
c. Gamma rays
d. All the previous
e. Non of the previous

Study the figure below and answer questions 11-13

11- X is referred to as :

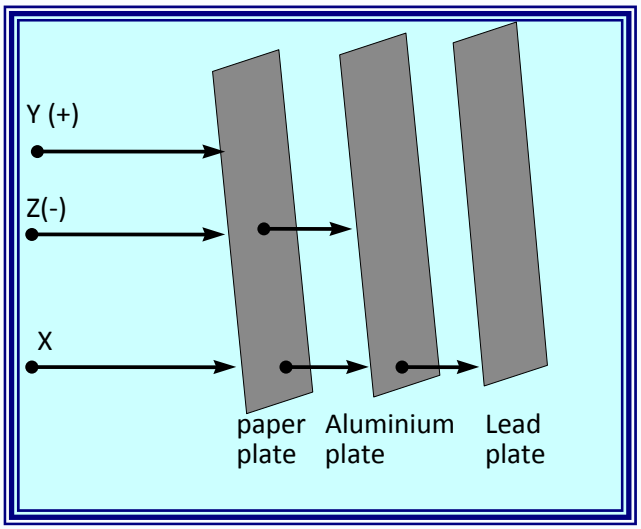
a. An alpha particle
b. A beta particle
c. Gamma rays
d. All the previous
e. Non of the previous

12- Y is referred to as :

a. An alpha particle
b. A beta particle
c. Gamma rays
d. All the previous
e. Non of the previous

13- Z is referred to as :

a. An alpha particle
b. A beta particle
c. Gamma rays
d. All the previous
e. Non of the previous



ROLE: $a = \frac{V - V_0}{t}$

Problems:

1- Goofy starts his car from rest to 50m\s in 10 seconds find the acceleration
2- Seif hit the brakes and stopped his car from a velocity of 100m\s in 5 seconds find the acceleration
3- Mena drove a car at a velocity of 50 m\s then she raised her velocity to 100m\s in 20 seconds find the acceleration
4- Ibrahim rides a bicycle at a velocity of 20m\sec he slows down to 5 in 3 seconds find the acceleration
5- May stopped her beach buggy from 80m\s in 8 seconds find the acceleration
6- Martina was playing tennis the ball changed its velocity from zero to 50m\s in 0.5 seconds find the acceleration
7- Falling body from rest its velocity just before hitting the ground was 80 m in 4 seconds find the acceleration
8- A body reached to a velocity of 20 m\s in 5 seconds find its starting velocity given that acceleration was $10 m\backslash s^2$
9- Complete the following table:

	Starting velocity	Final velocity	Time taken	Acceleration
A	120	20	6	
B	300	30	9	

C	25	5		4
D	180	80		4
E	200	150	25	
F	240		8	25
G	39		2	13
H		14	10	4
A		20	6	10
B	300		9	30
C	25		5	4
D	180		25	4
E	200	150		2
F	240	40	8	
G	39	13	2	
H	54	14		4

2- complete

1- What are the following abbreviations stand for:

a. a means ……

b. V means ……

c. V_0 means ……

d. t means ……

2- what the measuring unit for each of the following:

a. Velocity ……

b. Time ……

c. Acceleration……..

d. Displacement ……..

e. Nuclear Binding energy ……

3- Complete the following tables

ISOTOPE	**PROTONS**	**NEUTRONS**
protium $^{1}_{1}$**H**		
deuterium $^{2}_{1}$**H**		
tritium $^{3}_{1}$**H**		

ISOTOPE	PROTONS	NEUTRONS
$^{16}_{8}O$		
$^{17}_{8}O$		
$^{18}_{8}O$		

3- Write the scientific term for the following:

1 are different forms of the atom of an element having the same atomic number but different mass number.

2 is a small subatomic particle with a positive or negative charge.

3 is the energy required to bind the constituents of the nucleus together.

4: ……'s law Energy = converted mass x constant

5 constant of …… had been defined as : The work that can be obtained on the conversion of a mass of 1 gm.

6 is the work done in transferring one electron form one point to another when the potential difference between them equals 1 volt.

4- Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

____ 1. The nucleus of an atom is made up of
a. protons, electrons, and neutrons.
b. protons and neutrons.
c. electrons and protons.
d. electrons and neutrons.

____ 2. The atomic number of a given element is equivalent to
a. the proton number in the nucleus.
b. the neutron number in the nucleus.
c. the sum of the protons and neutrons in the nucleus.
d. the number of electrons in the outer shells.

____ 3. Rutherford's experiments involving the use of alpha particle beams directed onto thin metal foils demonstrated the existence of which of the following?
a. nucleus
b. positron
c. neutron
d. proton

____ 4. The mass number of a nucleus is the
a. number of neutrons present.
b. number of protons present.
c. difference in neutron and proton numbers.
d. sum of neutron and proton numbers.

____ 5. If there are 128 neutrons in Pb-210, how many neutrons are found in the nucleus of Pb-206?
a. 126
b. 130
c. 122
d. 124

____ 6. The binding energy of a nucleus is
a. the energy needed to remove one of the nucleons.
b. the average energy with which any nucleon is bound in the nucleus.
c. the energy released when nucleons bind together to form a stable nucleus.
d. the mass of the nucleus times c^2.

5- Short Answer

1. What are atoms that have the same atomic number but different neutron numbers.
2. Why do elements containing more than 83 protons have unstable nuclei?
3. List alpha, beta, and gamma radiations in order of decreasing speed.
4. Use alternative terms to identify the composition of alpha particles, beta particles, and gamma particles.
4. What is a half-life?

6- Problem

1. Calculate the binding energy of the copper-63 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{63}_{29}\mathrm{Cu}$ = 62.929 599 u; $^{1}_{1}\mathrm{H}$ = 1.007 825 u; m_n = 1.008 665 u)
2. Calculate the binding energy of the zinc-64 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{64}_{30}\mathrm{Zn}$ = 63.929 144 u; $^{1}_{1}\mathrm{H}$ = 1.007 825 u; m_n = 1.008 665 u)
3. Calculate the binding energy of the cobalt-59 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{59}_{27}\mathrm{Co}$ = 58.933 198 u; $^{1}_{1}\mathrm{H}$ = 1.007 825 u; m_n = 1.008 665 u)

4. Calculate the binding energy of the iron-56 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{56}_{26}\text{Fe}$ = 55.934 940 u; $^{1}_{1}\text{H}$ = 1.007 825 U; m_n = 1.008 665 u)

5. Calculate the binding energy of the potassium-39 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{39}_{19}\text{K}$ = 38.963 708 u; $^{1}_{1}\text{H}$ = 1.007 825 U; m_n = 1.008 665 u)

6. Calculate the binding energy of the chlorine-35 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{35}_{17}\text{Cl}$ = 34.968 853 u; $^{1}_{1}\text{H}$ = 1.007 825 u; , m_n = 1.008 665 u)

7. Calculate the binding energy of the sulfur-32 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{32}_{16}\text{S}$ = 31.972 071 u; $^{1}_{1}\text{H}$ = 1.007 825 u; m_n = 1.008 665 u)

8. Calculate the binding energy of the phosphorus-31 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{31}_{15}\text{P}$ = 30.973 762 U; $^{1}_{1}\text{H}$ = 1.007 825 u; m_n = 1.008 665 u)

9. Calculate the binding energy of the aluminum-27 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{27}_{13}\text{Al}$ = 26.981 534 u; $^{1}_{1}\text{H}$ = 1.007 825 U; m_n = 1.008 665 u)

10. Calculate the binding energy of the sodium-23 nucleus. (c^2 = 931.50 MeV/u; atomic masses: $^{23}_{11}\text{Na}$ = 22.989 767 u; $^{1}_{1}\text{H}$ = 1.007 825 U; m_n = 1.008 665 u)

7- how old are each of the following elements:

Parent	Daughter	H.L.T	(app.) H.L.T	Initial	Final	Age (Total time)
Beryllium-11	Boron-11	13.81	14	512	1	
Carbon -10	Boron- 10	19.225	19	64	½	
Carbon -15	Nitrogen -15	2.449	3	128	¼	
Nitrogen - 16	Oxygen 16	7.13	7	-----	25%	
Nitrogen - 17	Oxygen - 17	4.137	4	-----	¼ of the original	
Oxygen 19	Fluorine - 19	26.91	27	-----	12.5%	
Oxygen - 20	Fluorine - 20	13.51	14	98	6.125	
Fluorine - 20	Neon 20	11.0	11	112	3.5	
Oxygen - 21	Fluorine - 21	3.42	3	2000	15.625	
Fluorine - 21	Neon 21	4.158	4	1000	15.625	
Oxygen - 22	Fluorine - 22	2.25	2	4000	31.25	

Convert the following binary digits into decimal system:

1	111	101010	1000000
11	1111	11010101	1100000000
10	1011	1011111111	10000000000000
001	00111	11111111001	001000000000
101	101111	1011111	101000000000
0011	00111111	0011111	001110101010
1011	10111111	101111111	101111010101
1111	11111111	111111111111	111110101010
10000	100001111	10000110101010	1000011111111
10001	100011111	10001000011	10001111111111
10010	100111110	10010000001	100101111111
10011	10011111	10011010101	100111111111
10100	1011111100	10100101010	1010011111111
10110	10110111010	10110101010	101101111111111
10111	10111101010	1011111111	101110101010101
11000	110001010	11000000011	110001010101101
11001	110010101	11001010101	11001000001111
11011	110110101	110111111001	1101010101010
11100	1110011	111001111111	111001111111
11101	1111101001	1110111111111	111011111111
11110	1111000111011	11110111111	1111011111111111
1111	11110000000	1111111111111	11111111111111

Convert the following decimals into binary system:

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104
105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120

Problems

1- *A car has an initial velocity of 10 m/sec. It accelerates to a final velocity of 40 m/sec. in 12 seconds, Find its acceleration.*

2- *A cyclist starts from rest. He accelerates constantly at 1.5 m/sec^{-2}. Find his velocity after 8 sec.*

3- *A car traveling at 15 m/sec, it accelerates to 27 m/sec. in 8 sec. How far does it traveled?*

4- *An athlete runs-up to a long jump, she accelerates at 1.6 m/sec^2. For 6 seconds. Find the length of run-up she will need. What is her final velocity?*

5- *A car traveling at 10 m/sec. accelerates uniformly at 2 m/sec^2. Find its velocity in 5 sec. time.*

6- *A train slows from 20 m/sec. with a uniform deceleration of 2 m/sec^2. How long will it take t o reach 5 m/sec.*

7- *A body on a bicycle accelerated uniformly at 1 m/sec^2 for 10 sec. from an initial velocity of 4 m/sec. calculate the distance traveled in this time.*

8- *A train traveling at 15 m/sec. accelerates uniformly at 2 m/sec^2. for 15 sec/ find the distance traveled in this time.*

9- *A car travels with a velocity of 5 m/sec. It then accelerates uniformly and travels a distance of 50m. If the velocity reaches 15 m/sec. find the acceleration and the time to travel this distance.*

10-*A car starts from rest and accelerates at 2 m/sec^2 for 10 sec. Calculate (a) final velocity (b) distance traveled.*

11- *A girl on a bicycle accelerates from rest to 10 m/sec. in a distance of 50m find:*

a- *Her acceleration* b- *The time taken.*

12- *A body traveling with uniform velocity covers a distance of 840 meters in one minutes. What is its velocity in m/sec*

13- *A car has an initial velocity of 20 m/sec. It accelerates to a final velocity of 44 m/sec. in 6 seconds, Find its acceleration.*

14- *A cyclist starts from 10m/s. He accelerates constantly at 1.5 m/sec^{-2}. Find his velocity after 8 sec.*

15- A car traveling at 15 m/sec, it accelerates to 27 m/sec. in 8 sec. How far does it traveled?

16- An athlete runs-up to a long jump, she accelerates at 1.6 m/sec^2. For 6 seconds. Find the length of run-up she will need. What is her final velocity?

17- A car traveling at 10 m/sec. accelerates uniformly at 2 m/sec^2. Find its velocity in 15 sec. time.

18- A train slows from 20 m/sec. with a uniform deceleration of 4 m/sec^2. How long will it take t o reach 5 m/sec.

19- Samar starts to run from rest with an acceleration of 5m/s^2 find the distance it covered in 10 seconds

20- Zinab jumped from a car at a velocity of 10 m/s, she de-accelerates at 2m/sec^2 find time taken till she stops. Then find the distance she covered.

21- Arne jumped to the pool from rest, given that the height of the stand was 20m and acceleration due to gravity=10m\sec^2 find the velocity when he hits the water and find the time taken to reach water.

22- Yara rides her beach buggy at a velocity of 20m/s, she accelerates to 50m/s in 3 seconds find the acceleration

23 – Lobna drove from Cairo to Alex in 2 hours if the distance were 240 Km find the average velocity.

24- Pakinam starts from rest to 50 m/s in 5 seconds find acceleration and distance.

Remember the project due date is by the end of the month

Any physics or E. science picture from the web, bring it to your teacher to correct it, then print it in a professional print house

Use the following roles to complete the table:

$V=V_0+at$

$S=V_0t+1/2\ at^2$

$V^2 = V_0^2 + 2\ a\ s$

No	V	V_0	a	t
1.	**?**	**2**	**2**	**4**
2.	**?**	**0**	**4**	**5**
3.	**?**	**10**	**2**	**10**
4.	?	10	2	20
5.	?	5	5	11
6.	?	10	9	10
7.	10	?	2	4
8.	20	?	4	5
9.	30	?	2	10
10.	50	?	2	20
11.	60	?	5	11
12.	100	?	9	10
13.	10	**2**	?	4
14.	20	**0**	?	5
15.	30	**10**	?	10
16.	50	10	?	20
17.	60	5	?	11
18.	100	10	?	10
19.	10	**2**	2	?
20.	20	**0**	4	?
21.	30	**10**	2	?
22.	50	10	2	?
23.	60	5	5	?
24.	100	10	9	?

No	S	V_0	t	a
25.	**8**	**0**	**2**	**4**
26.	**50**	**0**	**5**	**4**
27	**110**	**2**	**5**	**8**
28	70	**4**	**5**	**4**
29	**8**	**0**	**2**	**4**
30	**50**	**0**	**5**	**4**
31	**110**	**2**	**5**	**8**
32	70	**4**	**5**	**4**
33	**8**	**0**	**2**	**4**
34	**50**	**0**	**5**	**4**
35	**110**	**2**	**5**	**8**
36	70	**4**	**5**	**4**
37	**8**	**0**	**2**	**4**
38	**50**	**0**	**5**	**4**
39	**110**	**2**	**5**	**8**
40	70	**4**	**5**	**4**

No	V	V_0	a	S
41	**?**	**0**	**2**	**4**
42	**?**	**0**	**.5**	**25**
43	**?**	**5**	**.5**	**75**
44	?	3	2	10
45	**4**	**?**	**2**	**4**
46	**5**	**?**	**.5**	**25**
47	**10**	**?**	**.5**	**75**
48	7	?	2	10
49	**4**	**0**	**?**	**4**
50	**5**	**0**	**?**	**25**
51	**10**	**5**	**?**	**75**
52	7	3	?	10
53	**4**	**0**	**2**	**?**
54	**5**	**0**	**.5**	**?**
55	**10**	**5**	**.5**	**?**
56	7	3	2	?