Benha University 2nd level exam .,May 2017

Faculty of science Biotechnology group

Zoology department Radiobiology

Physiology subdivision Time allowed:2hrs

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**Answer the following questions**

**a)Complete the following (10 marks)**

1-The force of nuclear stability is …………..

2-All charged particles are …………… radiation.

3-Sources of radiation are …….,……and…….

4-The ……….is more effective amino acid in radio-protective

Product

5-Modes of radio-active decay are ….,….and ……

**b)Choose the correct answer(10 marks)**

1-exposure to doses of radiation over long time produce

(Chronic – Acute ) effects .

2-Therapeutic radiation is given (Fractional – All at once).

3-Alpha particles are ( Ionizing – Non ionizing ) radiation.

4-The damage which is irreversible and irreparable leads irrevocably

to cell death is ( lethal – potentially lethal – sublethal ) .

5-Electromagnetic radiation include ( Xrays- neutron- electron ).

**c)what are(20 marks)**

1-Direct and indirect action of radiation.

2-The mechanism of radiation protectors.

3-Relative biologic effectiveness.

4-Effect of oxygen on radiation.

5-Ionizing and non ionizing radiation.

**d)Explain the following**:

1-Effect of low and high dose of ultraviolet radiation on the cell (10 marks).

2-Bone marrow cells and their sensitivity to radiation.(10 marks).

3-Radiation effect on the : (15 marks)

a)Vascular system.

b)Circulating erythrocytes.

c)Oral cavity and esophagus.

 4-Effect of high dose radiation for long time on the liver(5 marks)

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**The Answer:**

a)

1-It is the force which hold component of nucleus together in small distance.

2-Indirect ionizing radiation.

3-Low level,large level and diagnostic and therapeutic.

4-Cystine.

5-Alpha decay , Bˉ and B+

b)

1-Chronic

2-Fractional

3-Ionizing

4-Lethal

5-X ray

c)

1-Direct acyion is the damage or mutation occurs at the site where radiation energy is deposited

Indirect action is the radiation initially acts on water molecules to cause ionizing water forming free radicals which are highly reactive atoms and molecules react with and alter essential molecules that come in contact with them which cause biological damage.

2)-The mechanism of action of radiation protectors is competing for the radiation to produce free radicals.

-The radiation protectors produce hydrogen atom to ionized molecules in the cell cause reduction of free radicals make neutralization of free radical leading to restoring of molecules to its original pre-irradiated state .

3-The amount of cellular damage by specific radiation dose.

$$RBE=\frac{x}{R}$$

X is dose of x ray.R is dose of test radiation required for equal biological effect.

LETα RBE

4-Oxygen pre-irradiation on the tissue give small effect.

Oxygen during irradiation on the tissue give dramatic effect.

Oxygen after irradiation give small effect.

5-Ionizing radiation is higher energy electromagnetic waves gamma or heavy particles beta and alpha.It needs high enough energy to pull electron from orbit.

It is a type of radiation is able to disrupt atoms and molecules on which they pass through giving rise to ions and free radicals .

-Non ionizing radiation is lower energy electromagnetic waves not enough energy to pull electrons from orbit but can excite the electron.