

[LB 0212]

AUGUST 2012

Sub. Code: 1902

B.Sc. RADIOTHERAPY TECHNOLOGY

FIRST YEAR

PAPER II – BASIC PHYSICS & RADIATION PHYSICS

Q.P. Code : 801902

Time : Three hours

Maximum : 100 marks

(180 Mins) Answer ALL questions in the same order.

I. Elaborate on:

**Pages Time Marks
(Max.)(Max.)(Max.)**

- | | | | |
|--|---|----|----|
| 1. Describe the diagnostic x-ray tube and explain the physics of production x-rays with neat diagram | 7 | 20 | 10 |
| 2. a. What is Radioactivity? | | | |
| b. Explain the various methods of producing artificial radioactivity. | 7 | 20 | 10 |
| 3. What are the main modes of interaction of radiation with matter? Explain briefly about the mode of integration of radiation with matter which is useful in diagnostic area. | 7 | 20 | 10 |

II. Write notes on:

- | | | | |
|---|---|----|---|
| 1. Describe the electromagnetic radiation spectrum. | 4 | 10 | 5 |
| 2. a. State Ohm's law. | | | |
| b. Derive the formula effective resistance when the resistors are connected in series and parallel. | 4 | 10 | 5 |
| 3. What is the law of electromagnetic induction? Describe the construction of Transformer. | 4 | 10 | 5 |
| 4. Explain how the alternation current is converted into direct current using Full wave rectifier. | 4 | 10 | 5 |
| 5. Derive the relationship between half life of an isotope and decay constant. | 4 | 10 | 5 |
| 6. What are the major components of nuclear reactor and explain how radioisotopes are produced in it. | 4 | 10 | 5 |
| 7. Define the following: | 4 | 10 | 5 |
| a. Roentgen | | | |
| b. Absorbed Dose | | | |
| c. Kerma | | | |
| 8. Describe briefly about free air ionization chamber. | 4 | 10 | 5 |

III. Short Answers on:

- | | | | |
|---|---|---|---|
| 1. What is mass defect? | 2 | 4 | 3 |
| 2. What is eddy current? | 2 | 4 | 3 |
| 3. What are the properties of x-rays? | 2 | 4 | 3 |
| 4. What are the factors influencing the quality and | | | |

quantity of x-rays?	2	4	3
5. Draw neat diagram of half wave rectifier.	2	4	3
6. List out the various radioisotopes used in medicine.	2	4	3
7. Explain briefly about the process of Pair production.	2	4	3
8. What are the sources of radiation?	2	4	3
9. Describe the characteristic curve of ionization chamber.	2	4	3
10. Write a short note on Thermoluminescence Dosimeter.	2	4	3

[LD 0212]

AUGUST 2013

Sub.Code :1902

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR
Paper II – BASIC PHYSICS & RADIATION PHYSICS**

Q.P. Code: 801902

Time: Three hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

3 x 10 = 30

1. Describe the Gamma Ray Spectrometer and its working.
2. Describe the Coolidge tube and its construction, design to generate X-rays.
3. Describe the construction and working of Auto transformer

II. Write notes on

8 x 5 = 40

1. Distinguish between Ionization and Excitation.
2. On what does the effect of X-rays on matter depend on?
3. State Faraday's laws of electromagnetic induction
4. Describe Pocket Dosimeter.
5. Find the magnetic field around a solenoid
6. What is polyphase AC generator?
7. Explain the construction and working of a Choke coil.
8. Obtain a relation between half-life period and Decay constant of a radioactive material.

III. Short answers on

10 x 3 = 30

1. Explain energy and Power .specify their units in S.I
2. What is eddy current?
3. What is a transformer?
4. Explain Coulomb's law.
5. What is Hysteresis?
6. What is Binding energy?
7. Define RMS value of A.C
8. Explain Kerma.
9. Explain half value layer.
10. Distinguish between fission and fusion

[LE 0212]

FEBRUARY 2014

Sub. Code :1902

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR
Paper II – BASIC PHYSICS & RADIATION PHYSICS**

Q.P. Code: 801902

Time: Three hours

Maximum : 100 Marks

Answer all questions

I. Elaborate on:

3 x 10 = 30

1. Describe the construction and working of a pocket Dosimeter.
2. Discuss the interaction of X and Gamma rays in the body.
3. Explain the principle of transformer. Discuss the construction and its working.

II. Write notes on:

8 x 5 = 40

1. Explain how you will convert a galvanometer into an ammeter.
2. What are eddy currents? Give their applications. How are they minimized?
3. Explain the variation of photoelectric current with applied voltage.
4. Discuss the differences between Film Dosimeter and TLD.
5. Deduce an expression for the force on a current carrying conductor placed in a magnetic field.
6. Explain the quality and intensity of x-rays and factors influencing them.
7. Explain Victorean electrometer.
8. Explain the working of a half-wave and full-wave rectification.

III. Short answers on:

10 x 3 = 30

1. What is a capacitor? Define its capacitance.
2. Explain induced e.m.f and current.
3. What are Isotopes? Give examples.
4. What is fluorescence?
5. Distinguish between conductors, Semi-conductor and Insulators.
6. Explain Permeability.
7. What is Solenoid?
8. What is Anode Heel effect?
9. What is LET?
10. Explain Dose equivalent.

[LF 0212]

AUGUST 2014

Sub.Code :1902

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR
PAPER II – BASIC PHYSICS & RADIATION PHYSICS**

Q.P. Code: 801902

Time: Three hours

Maximum : 100 Marks

Answer All Questions

I. Elaborate on:

(3x10=30)

1. Describe the methods of photon interaction with matter. Explain which interaction is useful for Radiology.
2. Describe the stationary anode x-ray tube with a neat diagram.
3. Quality and quantity of x-rays and the factors that influence quantity and quality of x-rays.

II. Write notes on:

(8x5=40)

1. Periodic table
2. Joule's law
3. Law of electromagnetic induction
4. Step up and step down transformer
5. Film badge
6. Switches and interlocks
7. Chain Reaction
8. Relative Biological effectiveness (RBE)

III. Short answers on:

(10x3=30)

1. Electron volt
2. Electric potential
3. Alternating current & DC current
4. Characteristic x-rays
5. Alpha particle
6. Define Gray
7. Half life period
8. LET
9. Dose equivalent
10. Nuclear fusion

[LG 0215]

FEBRUARY 2015

Sub.Code :1902

B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR
PAPER II – BASIC PHYSICS & RADIATION PHYSICS
Q.P. Code: 801902

Time: Three Hours

Maximum : 100 Marks

Answer All Questions

I. Elaborate on: **(3 x 10 = 30)**

1. What are quality and intensity of x-rays? Explain with graphs the factors that affect the quality and intensity of x-rays.
2. What is a radio isotope? Explain three methods of production of artificial radio isotopes.
3. With neat diagrams, explain the principle and working of half wave and full wave rectifiers. Mention the use of these rectifiers.

II. Write Notes on: **(8 x 5 = 40)**

1. Explain direct and alternating current.
2. Space charge effect and focusing cup
3. What is Compton interaction? Explain the factors that the Compton interaction depends on.
4. What is thimble ion chamber?
5. With neat diagrams explain Film badge and pocket dosimeters.
6. Draw and explain the magnetic hysteresis curve.
7. Auto transformer.
8. Periodic table.

III. Short Answers on: **(10 x 3 = 30)**

1. Explain series and parallel circuits of resistors and capacitors.
2. What are characteristic x-rays?
3. Define Kerma and absorbed dose
4. Define pair production.
5. What is Linear Energy Transfer (LET)?
6. What are the properties of alpha-rays?
7. An atom with mass number of 234 and atomic number of 92 emits an alpha particle, what will be the mass number and atomic number of the daughter element?
8. What is a three phase circuit?
9. What is a chain reaction in nuclear reactor?
10. Define Quality factor.
