

**SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH**

(A DEEMED TO BE UNIVERSITY)

**B.Sc. Allied Health Sciences Second Year (Semester-III)**

**February – 2019 Examination**

**B.Sc. Radiotherapy Technology (RTT)**

**Time : 3 Hrs.**

**[Max. Marks: 100]**

**Paper-I**

**Fundamentals of Physics**

**Q.P Code: J3550**

*Your answers should be specific to the questions asked.*

*Draw neat labeled diagrams wherever necessary.*

**LONG ESSAY**

**2 X 10 = 20 Marks**

- 1 Describe about structure of atom : isotopes, isobars, isomers and isotones
- 2 Write a neat diagram X-ray tube and label its parts. Write in detail about the each of these parts.

**SHORT ESSAY (Answer any Ten)**

**10 X 5 = 50 Marks**

- 3 Explain and give examples of applications of Kirchhoff's laws
- 4 Transformer and types of losses involved in the functioning of transformers
- 5 Conductors and semiconductors.
- 6 Radioactive equilibrium and its types with neat graph for each type.
- 7 Define the units Gray, Sivert & Roentegen.
- 8 Difference between Half-wave and Full-wave rectifier.
- 9 Enumerate the Factors affecting the quality and quantity of x-rays produced from a X-ray tube.
- 10 Photoelectric effect and Compton effect
- 11 What is Activity and its SI unit? Define the terms Half life and Curie?
- 12 Cooling methods of X-ray tube.
- 13 Quantum theory of radiation(Planck's constant)
- 14 X-ray spectrum.

**SHORT ANSWERS (Answer any Ten)**

**10 X 3 = 30 Marks**

- 15 Radioactive disintegration law and Ohm's law.
- 16 Electric charges and units of electric charge.
- 17 Activity and Half-life
- 18 Properties of X-rays.
- 19 Power , velocity and frequency
- 20 p-n junction diode.
- 21 Florescence and Phosphorescence.
- 22 Radium properties
- 23 Tungsten properties
- 24 Insulator and fuses
- 25 Ionization and excitation
- 26 Radionuclides used in medicine.

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**Paper-II**

**Radiation safety**

**Q.P Code : J3560**

*Your answers should be specific to the questions asked.*

*Draw neat labeled diagrams wherever necessary.*

**LONG ESSAY**

**2 X 10 = 20 Marks**

- 1 Photoelectric effect and Compton effect with its particular interactions.
- 2 Write about structure of atom in detail.

**SHORT ESSAY (Answer any Ten)**

**10 X 5 = 50 Marks**

- 3 Electromagnetic radiation and its properties.
- 4 Characteristic x-rays.
- 5 Bremsstrahlung x-rays.
- 6 Pair production.
- 7 Chromosomal aberration.
- 8 Half value thickness and Tenth value thickness.
- 9 X-ray spectrum with graph.
- 10 Define Isotopes, Isobars, Isotones & Isomers with suitable examples for each.
- 11 Workload, use factor, occupancy factor and distance.
- 12 Interaction of charged particle with matter.
- 13 Different types of shielding materials.
- 14 TLD and its importance

**SHORT ANSWERS (Answer any Ten)**

**10 X 3 = 30 Marks**

- 15 Time, Distance and Shielding.
- 16 Properties of X-rays.
- 17 Natural background radiation.
- 18 Ionization and excitation.
- 19 Equivalent dose.
- 20 Effective dose.
- 21 Dose limits to radiation worker and public.
- 22 Kerma and Absorbed dose.
- 23 LD 50/60.
- 24 Acute, sub-acute and chronic effect.
- 25 Deterministic and stochastic effect.
- 26 Mutation and its types.

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**Paper-III**

**Medical Physics**

**Q.P Code : J3570**

*Your answers should be specific to the questions asked.*

*Draw neat labeled diagrams wherever necessary.*

**LONG ESSAY**

**2 X 10 = 20 Marks**

- 1 Describe various quality assurance gadgets used with x-ray equipments.
- 2 Principle and construction of Image intensifiers. Mention the function of each layer. Write about the advantages of using intensifiers?

**SHORT ESSAY (Answer any Ten)**

**10 X 5 = 50 Marks**

- 3 What are the uses of electrical energy with few example?
- 4 Write a neat labeled diagram of X-ray tube and write about the function of each of part?
- 5 Capacitor discharge mobile equipment.
- 6 Name the factors influencing quality of X-rays and explain them in brief.
- 7 Explain the parts of X-ray tube and function of each of them?
- 8 Rectifiers and their role in X-ray production.
- 9 Transformer and its uses.
- 10 Method of viewing the intensified image.
- 11 How is electricity generated? Mention 4 main sources of electricity?
- 12 What is the disadvantage of using stationary anode in Mobile x-ray unit. How does it influence the heat production, longevity of target and X-ray quality?
- 13 Properties of X-ray. How is Photoelectric effect important for generating good quality X-ray images.
- 14 What is Mammogram? Procedure and Uses of Mammography.

**SHORT ANSWERS (Answer any Ten)**

**10 X 3 = 30 Marks**

- 15 Wisconsin test cassette.
- 16 Beam centering device.
- 17 Conductors and semiconductors.
- 18 Focal spot test tool.
- 19 Multi section cassette.
- 20 Cones and grid ratio.
- 21 Tube current and Tube voltage.
- 22 Test of kilo voltage and timer.
- 23 Properties of x-ray.
- 24 Capacitor and insulator.
- 25 Earthing and fuses.
- 26 Step wedge.