

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH

(A DEEMED TO BE UNIVERSITY)

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

September 2021 Examination

B.Sc. Imaging Technology

Time : 3 Hrs.

[Max. Marks : 100]

Paper-I

Fundamentals of Physics

Q.P Code : J3350

*Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary.*

LONG ESSAY

2 X 10 = 20 Marks

- 1 What is Radioactive Equilibrium and discuss about transient and secular equilibrium with examples.
- 2 Write in detail about theory and construction of Transformer and its types with neat diagram.

SHORT ESSAY (Answer any Ten)

10 X 5 = 50 Marks

- 3 Write about the structure of the atom and Define excitation and ionization.
- 4 Construction and working of x-rays.
- 5 Name the different types of interactions of radiation with matter and explain pair production in detail with one clinical application?
- 6 Conductivity of electricity through gases at low pressure.
- 7 Explain Nuclear fission and Nuclear fusion - with examples.
- 8 Define rectifier. What are the types of rectifier and anyone in detail.
- 9 Factors affecting the quality and quantity of x-rays.
- 10 Principles of Semiconductors
- 11 Quantum theory of radiation(Planck's constant)
- 12 Name different types of radiation interaction with matter and explain about photoelectric effect.
- 13 Capacitors and insulators.
- 14 Electromagnetic radiation and its properties.

SHORT ANSWERS (Answer any Ten)

10 X 3 = 30 Marks

- 15 Concept of electron volt.
- 16 Ohm's law and coulomb's law
- 17 Electric charges and units of electric charge.
- 18 p-n junction diode.
- 19 Inverse square law.
- 20 Electric potential and potential difference.
- 21 Characteristic X-rays.
- 22 Properties of tungsten target.
- 23 Radionuclides used in medicine.
- 24 Radium properties.
- 25 Specific gamma ray emission.
- 26 Properties of X-rays.

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Paper-II

Radiation safety

Q.P Code : J3360

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

2 X 10 = 20 Marks

- 1 Write the principle of Radiation safety. Explain TDF in detail. Define Equivalent dose, Effective dose, Tissue weighting factors and radiation weighting factor in radiation safety
- 2 Describe about the structure of atom.

SHORT ESSAY (Answer any Ten)

10 X 5 = 50 Marks

- 3 Explain about Natural background radiation.
- 4 Compton effect with atomic structure.
- 5 What is Linear and Mass attenuation coefficient.
- 6 Explain structure of cell. How does radiation cause cell death? Explain somatic and Hereditary mutations
- 7 X-ray spectrum with graph.
- 8 Write 5 properties of X-rays and explain its production in brief
- 9 Direct and indirect effect of radiation.
- 10 Types of Interaction of X-rays with matter and explain in detail about Pair production
- 11 Write a neat labeled diagram of x-ray spectrum and explain its components?
- 12 What is Survey meter used for ? What is its working principle?
- 13 Write in detail about Thermoluminescence dosimeter. Also write a neat labeled diagram and mention
- 14 What are GM counter and Scintillation detector

SHORT ANSWERS (Answer any Ten)

10 X 3 = 30 Marks

- 15 Absorbed dose and exposure
- 16 Properties of X-rays.
- 17 Fluorescence and phosphorescence
- 18 Velocity , frequency and wavelength
- 19 Contamination monitor
- 20 Filters and its types.
- 21 Somatic effect and hereditary effect
- 22 Dose limits to radiation worker and public.
- 23 Interaction of neutron with matter.
- 24 HVT and TVT
- 25 Proportional counter
- 26 Half-life and tenth-life.



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Paper-III

Medical Physics

Q.P Code : J3370

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

2 X 10 = 20 Marks

- 1 Describe in detail 5 basic tests to be performed as a part of routine QA for conventional X-ray machine?
- 2 Write briefly about Bucky, Tube housing, Glass envelope, Target material, Anode and cathode

SHORT ESSAY (Answer any Ten)

10 X 5 = 50 Marks

- 3 Explain the process of X-ray production with a neat labeled diagram of X-ray tube
- 4 What are fuses and what is earthing? What is the importance of these safety mechanism in X-ray machine?
- 5 What is Tube voltage? How does it influence the quality of X-rays? How is it controlled?
- 6 Explain Tomography. Write few of its applications?
- 7 What is rectifier and its types and explain about half-wave rectifier.
- 8 Explain in detail about Cones & Diaphragm tubes? What are they used for
- 9 What is Tomography?
- 10 Space charge compensation
- 11 Filament circuit with neat diagram & explain.
- 12 What are the factors influencing the quality of diagnostic x-ray beam?
- 13 Spectrum of X-rays produced from a typical diagnostic X-ray machine
- 14 Cine-fluorography

SHORT ANSWERS (Answer any Ten)

10 X 3 = 30 Marks

- 15 What is Heel effect?
- 16 Ammeter and voltmeter
- 17 Step wedge
- 18 Failure of x-ray tube
- 19 Wisconsin test cassette.
- 20 What are the uses of electrical energy with proper example?
- 21 Earthing and Insulation.
- 22 primary , leakage and scattered radiation.
- 23 Beam centering device.
- 24 Step wedge.
- 25 Use of shunts and fuses
- 26 Spinning test tool