

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH

(A DEEMED TO BE UNIVERSITY)

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

July/August 2019 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 Write in detail about the parts of X-ray tube with neat diagram and explain the process and physics of X-ray production
- 2 What is rectifier and its types. Explain about it with neat circuit.

SHORT ESSAY (Answer any Ten)

10 X 5 = 50 Marks

- 3 Bremsstrahlung X-rays.
- 4 Mention the charge and mass carried by electron, neutron and proton. Where are they located inside the atom.
- 5 Mention mass and charge composition of alpha, beta and gamma radiation. Give two properties of each.
- 6 Mention types of Radioactive equilibrium and explain it in detail.
- 7 Capacitance and Capacitors- define and mention their application in radiology.
- 8 Difference between Half-wave and full-wave rectifier.
- 9 Components of Electromagnetic spectrum and the relationship between their wave length and frequency
- 10 Principles of Semiconductors
- 11 Name different types of interactions of radiation with matter & explain Nuclear disintegration in detail with one example?
- 12 Conductivity of electricity through gases at low pressure.
- 13 Production of artificial radioisotopes. Write examples and their clinical applications
- 14 Cooling method of X-ray tube.

SHORT ANSWERS (Answer any Ten)

10 X 3 = 30 Marks

- 15 Characteristic X-rays.
- 16 Radioactive disintegration law and Ohm's law.
- 17 Half-life.
- 18 Electric charges and units of electric charge.
- 19 Thermionic emission.
- 20 p-n junction diode.
- 21 Inverse square law.
- 22 Properties of X-rays.
- 23 Florescence and Phosphorescence.
- 24 Electric potential and potential difference.
- 25 Step-down transformer.
- 26 Semiconductors.

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Paper-II

Radiation safety

Q.P Code : J3360

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 : J3370

Your answers should be specific to the questions asked.

Draw neat labeled diagrams wherever necessary.

LONG ESSAY

2 X 10 = 20 Marks

- 1 Write briefly about Mammography and Subtraction radiography.
- 2 Write in detail about maintenance's of diagnostic X-ray machine. Write about the causes of failure of X-ray tubes?

SHORT ESSAY (Answer any Ten)

10 X 5 = 50 Marks

- 3 Space charge compensation.
- 4 Define Mass-Miniature Radiography (MMR) and write its uses.
- 5 What is High Tension (HT) cable? What is its function?
- 6 Advantages of using a Grid while taking x-ray. Mention its types.
- 7 What is rectifier and its types and explain about half-wave rectifier.
- 8 What are Filters in X-ray tubes? Mention their advantages?
- 9 What is Rotating anode x-ray tube? What are its advantages compared to stationary anode x-ray tube?
- 10 What is the advantage of using Potter-Bucky Diaphragms?
- 11 Image intensifiers.
- 12 What are the factors influencing the quality of diagnostic x-ray beam?
- 13 Portable x-ray unit.
- 14 Cine-fluorography.

SHORT ANSWERS (Answer any Ten)

10 X 3 = 30 Marks

- 15 What is Heel effect?
- 16 Beam centering device.
- 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 Ammeter and voltmeter.
- 24 Step wedge.
- 25 Use of shunts.
- 26 Spinning test tool.

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