

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. Imaging Technology (IMT)

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 Describe X-ray production along with neat labeled diagram of X-ray tube.
- 2 Explain about production of artificial radioactive isotopes and write some radionuclides used in medicine.

SHORT ESSAY (Answer any Ten)

10 X 5 = 50 Marks

- 3 Quantum theory of radiation (Planck's constant)
- 4 Describe the structure of a Helium atom.
- 5 Mention 3 naturally occurring radioactive material and mention the properties of alpha, beta and gamma radiation.
- 6 Radioactive equilibrium.
- 7 Write circuit diagram and explain in detail the two Kirchhoff's laws.
- 8 Factors affecting quality and quantity of x-rays in a diagnostic x-ray machine
- 9 X-ray spectrum.
- 10 Conductors and semiconductors
- 11 Difference between Half-wave and Full-wave rectifier.
- 12 Conductivity of electricity through gases at low pressure.
- 13 Characteristic and Bremsstrahlung X-rays.
- 14 Cooling method of X-ray tube.

SHORT ANSWERS (Answer any Ten)

10 X 3 = 30 Marks

- 15 Name 3 artificial radioisotopes produced in nuclear reactor.
- 16 Radioactive disintegration law and Ohm's law.
- 17 Coulomb's law and circuits law.
- 18 Define power and energy with unit.
- 19 Thermionic emission.
- 20 p-n junction diode.
- 21 Inverse square law.
- 22 Properties of X-rays.
- 23 Write about cathode in x-ray.
- 24 Radionuclides used in medicine.
- 25 Florescence and Phosphorescence.
- 26 Step-up transformer.

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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 What is the principle of radiation protection and explain about effect of time distance and shielding.
- 2 What are the biological effect of radiation? Explain in detail.

SHORT ESSAY (Answer any Ten)

10 X 5 = 50 Marks

- 3 Electromagnetic radiation
- 4 X-ray spectrum with graph.
- 5 Compton effect with atomic structure.
- 6 Explain the events happening during transmission of X-rays through a medium. Define HVT and TVT
- 7 Natural background radiation.
- 8 Chromosomal aberration and biological dosimetry
- 9 Direct and indirect effect of radiation.
- 10 Workload, use factor, occupancy factor and distance.
- 11 Difference between stochastic and deterministic effect.
- 12 What is a Pocket dosimeter? Write 2 applications of pocket dosimeter.
- 13 Explain the Principle and use of Thermoluminescence dosimeter in Radiation safety?
- 14 What is Survey meter and contamination monitor.

SHORT ANSWERS (Answer any Ten)

10 X 3 = 30 Marks

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

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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 Explain the different components of a diagnostic x-ray tube.
- 2 Describe the construction of mammography x-ray tube . Give a detailed account of mammography procedures.

SHORT ESSAY (Answer any Ten)

10 X 5 = 50 Marks

- 3 What are the uses of electrical energy with proper example?
- 4 Explain about High Tension(HT) cable.
- 5 Write briefly about construction and function of Filament circuit in X-ray machine.
- 6 Use of shunts and fuses.
- 7 Draw a neat labeled diagram of Rotating anode x-ray tube and name its parts and their function?
- 8 Mention the types of Filters in X-ray tube. What are their advantages?
- 9 Name the types of grids used in radiology and mention advantages of each.?
- 10 Funtion of Potter-Bucky Diaphragm in an X-ray machine?
- 11 What is the advantage of Image intensifiers and explain its parts with a diagram?.
- 12 Method of viewing the intensified image.
- 13 Write about Mobile x-ray unit.Its advantages and disadvantages
- 14 Explain in detail about parts and functioning of MMR unit.

SHORT ANSWERS (Answer any Ten)

10 X 3 = 30 Marks

- 15 Uses of electrical energy
- 16 Wisconsin test cassette.
- 17 Focal spot test tool.
- 18 Multi section cassette.
- 19 Beam centering device.
- 20 Feeder cables.
- 21 Earthling and fuses
- 22 Cones and grid ratio.
- 23 Tube voltage and tube current
- 24 Step wedge.
- 25 Half-wave rectifier.
- 26 Ammeter and voltmeter

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