SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH

(A DEEMED TO BE UNIVERSITY)

B.Sc. Imaging Technology Second Year Semester-III
February 2020 Examination

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 theory and construction of Transformer and its types with neat diagram.

2 Explain conductors, insulators and semiconductors in brief.

SHORT ESSAY (Answer any Ten) **10 X 5 = 50 Marks**

3 Describe the structure of the atom. Define atomic number, mass number.

4 Characteristic x-rays and Bremsstrahlung X-rays.

5 Radioactive equilibrium and its types with examples for each.

6 State 2 Kirchhoff's laws and their application.

7 Cooling method of X-ray tube.

8 Photoelectric effect and Compton effect with neat diagram.

9 X-ray spectrum.

10 Factors affecting the quality of x-rays.

11 What is rectifier and its types and explain about full-wave rectifier.

12 Mutual induction and Self-induction circuits with neat labeled diagram.

13 Charge and mass of alpha, beta and gamma radiation.Enumerate the properties of each.

14 Name two artificial radioisotopes clinically usefull that are produced in nuclear reactor. What are their half lives and their clinical applications?

SHORT ANSWERS (Answer any Ten) **10 X 3 = 30 Marks**

15 Properties of X-rays.

16 Inverse square law.

17 P-n junction diode.

18 Electric charges and units of electric charge.

19 Ohm's law and coulomb's law

20 Electron volt.

21 Properties of tungsten target.

22 Write about the filters.

23 Characteristic X-rays.

24 Name any three radioactive nuclides and give explain.

25 Florescence and Phosphorescence.

26 Electric potential and potential difference.

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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 Write about the different types of detectors for different types of radiation measurement.

2 Describe in detail about thermoluminescence dosimeter. Mention other types of personal monitoring devices? Advantage and disadvantages of each of them in comparison with TLD?

SHORT ESSAY (Answer any Ten) **10 X 5 = 50 Marks**

3 Types of Chromosomal aberration induced by radiation

4 Write in brief about the different shielding materials used in Radiotherapy

5 Differentiate between stochastic and deterministic effect with example.

6 Application of Ionization chamber for QA in Radiotherapy department, mention its principle?

7 Enumerate Biological effects of radiation and explain the dose limits for each effect

8 Principle of Radiation protection.

9 Define Radioactivity, flux and fluence with their respective unit.

10 Explain in detail the concepts of Workload ,use factor , occupancy factor in layout planning

11 Define Equivalent dose, Effective dose, Tissue weighting factors and radiation weighting factor

12 Calculation for workload in cobalt 60

13 Linear and mass attenuation coefficient.

14 Explain Photoelectric effect with its particular interactions

SHORT ANSWERS (Answer any Ten) **10 X 3 = 30 Marks**

15 Equivalent dose.

16 Time, Distance and Shielding.

17 Properties of X-rays.

18 Electron orbit and energy levels.

19 Interaction of neutron with matter.

20 Effective dose.

21 Natural background radiation.

22 Dose limits to radiation worker and public.

23 Exposure and Half-life

24 HVT and TVT

25 Kerma and Absorbed dose.

26 Ionization and Excitation

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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 Describe various quality assurance gadgets used with x-ray equipment's.

2 Explain the different components of a diagnostic x-ray tube.

SHORT ESSAY (Answer any Ten) **10 X 5 = 50 Marks**

3 Define Fuses, Circuit breakers, Earthing and Insulation?

4 What is the use of shunts and fuses in an x-ray machine.

5 What are the QA tests for X-ray machine?

6 Write briefly about focal spot? How does its size impact the image quality? What techniques are used to reduce the size of focal spot?

7 Bremsstrahlung x-rays and Charecteristic X-rays

8 Magnification radiography and subtraction radiography

9 Write about fluoroscopy in detail.

10 What is C-arm? Where is it used?

11 Cordless mobile X-ray equipment

12 Subtraction Radiography

13 Factors that influence the quality of X-ray image produced

14 Which meters are commonly found in diagnostic X-ray machine

SHORT ANSWERS (Answer any Ten) **10 X 3 = 30 Marks**

15 Focal spot test tool.

16 Failure of x-ray tube.

17 Beam centering device.

18 Feeder cables.

19 Earthling and Insulation

20 Tube current and Tube voltage.

21 Step wedge.

22 Half-wave rectifier.

23 Write about properties of tungsten and molybdenum

24 Write about properties of x-rays

25 Ammeter and voltmeter

26 Wisconsin test cassette.

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