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

**(A DEEMED TO BE UNIVERSITY)**

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

**February – 2018 Examination**

## B.Sc. Radiotherapy Technology (RTT)

**Time: 3 Hrs.** **[Max. Marks: 100]**

**Paper-I**

**FUNDAMENTALS OF PHYSICS**

**Q.P Code : RTT301CC**

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

**LONG ESSAY** **2 X 10 = 20 Marks**

1. Discuss transient and secular radioactive equilibrium.
2. With a neat sketch, explain the construction and working principle of a medical X-ray tube.

**SHORT ESSAY** (**Answer any Ten)** **10 X 5 = 30 Marks**

3. Derive $1 + \tan^2 x = \sec^2 x$ and $1 + \cot^2 x = \text{cosec}^2 x$ starting from $\sin^2 x + \cos^2 x = 1$.
4. Complete the following: (i) log (uv) = _____, (ii) log (u/v) = _____.
5. Enumerate the properties of alpha, beta and gamma rays.
6. Draw a simple diagram of an atom. Define atomic number and mass number.
7. State Coulomb's law and Ohm's law. Briefly explain them.
8. Write the expressions to calculate the (i) Equivalent resistance for resistors connected in series and in parallel, (ii) Equivalent capacitance for capacitors connected in series and in parallel.
9. What is self and mutual inductance? Write expressions and explain the terms.
10. What is thermionic emission?
11. Differentiate between step-up and step-down transformer.
12. What are Bremsstrahlung and characteristic X-rays? How do they originate?
13. Define anode and anode angle. Differentiate between fixed and rotating anode.
14. Discuss the factors influencing X-emission.

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

15. What is inverse square law?
16. Define isotope. Give an example.
17. What is half life? Write an expression for half-life.
18. Complete 1 ci = _____ Bq.
19. Draw a simple half wave rectifier circuit.
20. What is (i) Ionization and (ii) Excitation.
21. List a few radioactive materials used in medicine.
22. State Kirchoff's law.
23. Define p-n junction.
24. Define electron volt (eV).
25. List the ideal characteristics for an target material.
26. What are soft and hard X-rays? In general, how do you generally remove soft components?

* * *

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

**(A DEEMED TO BE UNIVERSITY)**

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

**February 2018 Examination**

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

**Time : 3 Hrs.** **[Max. Marks : 100]**

## Paper – III
## Medical Physics
**Q.P Code : RTT303CC**

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

**LONG ESSAY** **2 X 10 = 20 Marks**

1. Describe the construction of mammography X-ray tube. Give a detailed account of mammography procedures?
2. Explain the types of grids and uses?

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

3. Use of electrical energy.
4. Explain the line voltage drop.
5. Describe about the self rectified X-ray generator with diagram.
6. Grid controlled X-ray tube.
7. Types of Grids.
8. Describe the construction of image intensifier.
9. What are cones?
10. Discuss about anode rotation and anode inclination.
11. What is Shunt? What is its use?
12. Use of Spinning top and step wedge.
13. Wisconsin test cassette.
14. Explain the light beam diaphragm QA?

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

15. Moving grids.
16. Explain about the tungsten target?
17. Fuses.
18. 3-Phase transformer.
19. Draw a full wave rectifier waveform?
20. What is heel effect?
21. What is line voltage drop?
22. Name the materials used to make added filters.
23. Auto timers.
24. What is direct fluoroscopy?
25. How to check generator output.
26. What are the merits of rotating anode?

* * *

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

**(A DEEMED TO BE UNIVERSITY)**

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

**February – 2018 Examination**

## B.Sc. Radiotherapy Technology (RTT)

**Time: 3 Hrs.** **[Max. Marks: 100]**

**Paper-II**

**RADIATION SAFETY**

**Q.P Code : RTT302CC**

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

**LONG ESSAY** **2 X 10 = 20 Marks**

1. What are the biological effects of radiation?
2. What are the dose limits recommended by AERB for radiation worker and general public.

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

3. Defined absorbed dose? Explain with units.
4. Explain about Personal Monitoring Devices.
5. Maximum Permissible exposure limits.
6. Explain Radioactive Decay.
7. Explain Photo electric effect.
8. Explain ALARA Principle?
9. Explain LD50/60.
10. Explain about Fluorescence and Phosphorescence.
11. Stochastic and Non-stochastic effect.
12. Explain about natural background radiation.
13. Describe the properties of X-rays.
14. Explain the liquid scintillation detector.

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

15. What do you understand by the term “Quality factor” as applied to biological effects of radiation.
16. Define Attenuation?
17. What is flux?
18. Define half life? Give two examples.
19. What is use factor? Explain.
20. Draw the cell and explain the parts.
21. What is chromosomal aberration?
22. Explain the effect on photographic emulsion.
23. Explain the principle of TLD dosimeter.
24. Define Ionization and excitation.
25. What kind of survey meter used for Linac Radiation survey? Why?
26. Difference between Personnel Monitoring and Area monitoring device?

* * *