

BACHELOR OF SCIENCE (RADIOLOGY & IMAGING TECHNOLOGY) (CBCS-2019 COURSE)
B.Sc. (R&IM) Sem III : WINTER :- 2021
SUBJECT: RADIOLOGY PHYSICS

Day : Friday
Date 11/2/2022

W-22509-2021

Time : 10:00 AM-12:00 PM
Max. Marks: 60

N.B.

- 1) There are **THREE** sections as
Section – A : Objective Type Questions : 20 Marks.
Section – B : Long Answer Questions : 20 Marks.
Section – C : Short Answer Questions : 20 Marks.
- 2) Section A is given on **SEPARATE** sheet and has to be answered on **SAME** sheet. This sheet should be completed within **first 20 minutes** of starting of the examination. The sheet with Section A will be collected by Supervisor at the end of 20 minutes.
- 3) You have to make such kind of mark in the box of the appropriate answers.

Seat No. : _____

SECTION – A

M.C.Q.

(20)

- 1) The nucleus of an atom is composed of: I Electrons; II Protons; III Neutrons; IV Positrons.
 - a) I, II and III only
 - b) II and III only
 - c) III only
 - d) IV only
- 2) The energy needed to remove an electron from the shell is called :
 - a) Binding energy
 - b) Transition energy
 - c) Energy levels
 - d) Balance energy
- 3) In a neutral atom, the number of electrons is equal to:
 - a) Atomic number
 - b) Number of Photons
 - c) Number of nucleons
 - d) Number of neutrons
- 4) Who is the father of Radiology?
 - a) Godfrey Hounsfield
 - b) Wilhelm Roentgen
 - c) Peter Manfield
 - d) Christian Donald

P.T.O.

- 5) What are the two mechanisms by which X-rays are produced?
- a) Coherent scattering and photoelectric effect
 - b) Bremsstrahlung and characteristic
 - c) Compton effect and pair production
 - d) Annihilation and Photodisintegration
- 6) Which of the following parts of the X-ray tube contains the filament and focusing cup?
- a) Anode
 - b) Cathode
 - c) Transformer
 - d) Rectifier
- 7) How are X-rays produced?
- a) By radioactive decay
 - b) By interaction of electrons with matter
 - c) By bombarding a proton in to a nucleus
 - d) By interaction of a neutron with matter
- 8) Which of the following does not improve the heat capacity of the X-ray tube?
- a) Rotating anode
 - b) Small target angle
 - c) Large focal spot
 - d) Thermionic emission
- 9) Which is the most penetrating electromagnetic radiation?
- a) Infrared
 - b) Ultrasound
 - c) Gamma rays
 - d) Radio waves
- 10) The main interaction responsible for diagnostic imaging is :
- a) Coherent scattering
 - b) Compton effect
 - c) Photoelectric effect
 - d) Pair production

Total Marks Obtained :

Signature of the Invigilator

Signature of the Examiner

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Section – A : Objective Type Questions : 20 Marks.
Section – B : Long Answer Questions : 20 Marks.
Section – C : Short Answer Questions : 20 Marks.
- 2) Section – B has four long answer questions and **ANY TWO** questions have to be answered.
- 3) Section – C has six answer questions and **ANY FOUR** questions have to be answered.
- 4) Section – B and C should be written in **SAME** answer sheet.

SECTION – B

Long answer questions (**attempt ANY TWO**) (20)

- 1) Describe in detail about rectification and rectifiers used in an X-ray machine.
- 2) Using a diagram, describe in detail the different parts of an X-ray tube. Write in short about the X-ray production in an X-ray tube.
- 3) Explain in detail about the different interactions of X-rays with matter. Draw diagram wherever possible.
- 4) Describe in detail about the different properties of X-rays and electromagnetic rays.

SECTION – C

Short answer questions (**attempt ANY FOUR**) (20)

- 1) Write in short about collimation. Write in short about different types of collimators.
- 2) How is heat produced in an X-ray tube dissipated?
- 3) What are the different factors affecting quality of radiographs? Describe them in brief.
- 4) What are grids, their types and artifacts related to grids?
- 5) What are Electromagnetic radiations?
- 6) Write a short note on X-ray artifacts.

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