

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. (Radiotherapy Technology) (Sem.-2)

BASIC RADIATION PHYSICS

Subject Code : BSRT-202-19

M.Code : 77738

Date of Examination : 08-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- (a) Name the periodic motion which is not oscillatory and why?
- (b) What is the difference between linear momentum and angular momentum?
- (c) What is the relation between mass number and radius of the nucleus?
- (d) What do you mean by charge independence of nuclear forces?
- (e) What is the cause of Radioactivity?
- (f) What are thermal neutrons?
- (g) What is the frequency of a 10 KeV photon?
- (h) Define mass absorption coefficient in relation to interaction of radiation with matter.
 - (i) What is the wavelength range of X-rays?
 - (j) Differentiate between hard and soft X-rays.

SECTION-B

2. a) An object of mass 10 kg falls from rest through a vertical distance of 20 m and acquires a velocity of 10 m/s. How much work is done by the push of air on the object. [3]
b) A truck weighing 1000 kg changes its speed from 36 km/h to 72 km/h in 2 minutes. Calculate the work done by the engine. [2]
3. State Bohr's postulates and use them to determine the expression for total energy of electron in a hydrogen atom in the n^{th} state. [5]
4. What is a nuclear reaction? Explain briefly the various types of nuclear reactions which may occur when a high energy particle approaches a nucleus. Make special mention of photo-disintegration. [5]
5. What do you mean by range of a moving charged particle? Write also the empirical range energy relations for different particles. [5]
6. Describe briefly the principles of transformers and auto-transformers used in x-ray circuits. [5]

SECTION-C

7. Explaining the use of absorbers and methods of enrichment of U^{235} . Give the construction, working and applications of a nuclear reactor.
8. Describe the three main processes of interaction of photons with matter by which radiation lose energy on passage through matter.
9. Describe the construction and working of a Coolidge tube. How can you control the intensity and quality of X-rays? Why should anti-cathode have high atomic number and high melting point?

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.