BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – B.Sc.(MRIT)-2022/B.Sc.(MRIT)-2023/B.Sc.(MRIT)-2024

Course Name – Fundamental Physics & Radiological Physics

Course Code - BMRITC202

(Semester II)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify the correct unit of impedance.

a) Volt b) Ohm
c) Henry d) Coloumb

(ii) Which of the following has a minimum wavelength?

a) gamma rays b) infrared rays
c) blue light d) microwave

(iii) Identify the vector quantity among the options provided.

a) Electric field b) Charge
c) Work done d) Potential

(iv) Recognize that X-rays are filtered out of human body by using.

a) cadmium absorbers b) carbon absorbers
c) copper absorbers d) aluminum absorbers

(v) Select the correct option: the electromagnetic waves which are mainly used as a treatment for cancer.

a) Alpha-rays b) Beta -rays
c) X-rays d) Gamma rays

(vi) Select the half-life of a radioisotope.

a) the time taken for half of the nuclei in any given sample to decay. b) the same for all isotopes of the same element.
c) the number of nuclei of that radioisotope that will decay in half an hour. d) the time taken for half of the nuclei in any given sample to disappear.

(vii) Relate Cyclotrons are used to accelerate which of the given below?

a) Atoms b) Protons
c) Neutrons d) Electrons

(viii) What is the relation between frequency (f) and angular frequency (ω)?

a) $\omega = 2\pi f$ b) $\omega = 2f$
c) $\omega = \pi f$ d) $\omega = f$

(ix) What is the form of curve which represents Ohm's law ?

a) exponential b) straight line
c) cubic d) sinusoid

(x) Which of the following is not electromagnetic wave?

a) Red light b) Beta rays
c) X-rays d) Gamma rays

(xi) What gets transported when a sound wave moves from one location to another?

a) Momentum b) Density
c) Energy d) Nothing

(xii) Identify in which of the following medium sound cannot travel.

a) Solids b) Gasses
c) Liquids d) Vacuum

(xiii) Which of the following is the fastest process of heat transfer?

a) Conduction b) Convection
c) Radiation d) Insolation

(xiv) What is the correct explanation of X-ray emission in X-ray tube ?

a) Acceleration of atoms b) Acceleration of neutrons
c) Acceleration of electrons d) Acceleration of protons

(xv) What is the use of Zener diode ?

a) Amplifier b) Oscillator
c) Rectifier d) Voltage regulator

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define effective dose? (3)
3. State some applications of electromagnetic waves. (3)

4. What is the magnitude of displacement current in the case of steady electric fields in a conducting wire? Calculate the frequency of green light of wavelength 560 nm. (3)

5. Explain briefly the Newton's law of cooling. (3)

6. Justify what is an "effective dose"? (3)

OR

Express which units are used for measuring radiation dose? (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Two bulbs are marked 220 V-100 W and 220 V-50 W respectively. They are connected in series to 220 V mains. Find the ratio of heats generated in them. (5)

8. Express the process of nuclear fission and its properties. (5)
9. Distinguish between conduction and displacement current. Explain why red light of electromagnetic spectrum is used as danger signal. (5)

10. Distingush between n-type and p-type semiconductor. (5)

11. What is difference between Zener breakdown and avalanche breakdown? (5)

12. Explain beam limiting device? (5)

OR

How can we evaluate the performance of grid? Explain? (5)

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