



BRAINWARE UNIVERSITY

Term End Examination 2023-2024

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

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) If force (F), velocity (V) and time (T) are taken as fundamental units then dimension of mass is

- a) $[FVT^{-1}]$
b) $[FVT^{-2}]$
c) $[FV^{-1}T^{-1}]$
d) $[FV^{-1}T]$

(iii) What is the value of 1 Joule in erg?

- a) 1 Joule = 10^7 erg
b) 1 Joule = 10 erg
c) 1 Joule = 10^3 erg
d) 1 Joule = 10^2 erg

(iv) SI unit of electric flux is

- a) Nm^2C^{-1}
b) Nm^2
c) NC^{-1}
d) Cm^{-1}

(v) Resistivity of a wire depends on

- a) volume
b) material
c) cross section area
d) length

(vi) Determine the beat frequency when two waves with frequencies of 258 Hz and 262 Hz are superposed.

- a) 2 Hz
b) 260 Hz
c) 4 Hz
d) 6 Hz

- (vii) Filters used in diagnostic X-ray tubes are made up of which element. Select the correct option.
- a) Aluminium
b) Copper
c) Tin
d) Lead
- (viii) Bones look white in x-ray photograph select the correct one.
- a) they are bad absorbers of x-rays
b) they reflect x-rays
c) they are good absorbers of x-rays
d) they are bad absorbers of ultraviolet rays
- (ix) Select the half-life of Radium-223 isotope?
- a) 3 days
b) 5 days
c) 11.4 days
d) 9.5 days
- (x) All of the following factors are required for the production of x rays. Select the incorrect option:
- a) A source of high velocity projectile electrons
b) A source of loosely bound (ionized) electrons
c) A target with a high atomic number
d) A strong magnetic field
- (xi) Relate Electron volt is a unit of
- a) Charge
b) Potential difference
c) Energy
d) Magnetic Force
- (xii) What is the freezing temperature of water in Fahrenheit scale ?
- a) 32 degrees
b) 0 degree
c) 100 degrees
d) 273 degrees
- (xiii) Choose the correct answer applicable for semiconductor.
- a) The number of free electrons is more than that in a conductor.
b) The number of free electrons increases with pressure.
c) There are no free electrons at any temperature.
d) There are no free electrons at 0 K.
- (xiv) A transistor is made of _____.
- a) chip
b) insulator
c) metal
d) semiconductor
- (xv) Which one is correct for a transistor?
- a) It has one pn junction.
b) It has two pn junction.
c) It has three pn junction.
d) It has four pn junction.

Group-B

(Short Answer Type Questions)

3 x 5=15

2. The time period T of a simple pendulum is described by $T = 2\pi \sqrt{\frac{l}{g}}$, where l is the length of the pendulum and g is acceleration due to gravity. Show that this equation is dimensionally correct. (3)
3. A sound source with a frequency of 780 Hz moves away from a stationary observer at a rate of 10 m/s. Determine the frequency that the observer hears. The speed of sound is 340 m/s. (3)
4. Explain the properties of X-rays (3)
5. Explain how are radiation classified? (3)
6. Justify what is an "effective dose"? (3)

OR

Justify what is a “committed dose”?

(3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Distinguish between HVL and TVL? (5)
8. Write down Kirchhoff’s law relating current and potential drops in electric circuit with necessary diagram. (5)
9. Discuss about electric field lines. Why two electric field lines cannot intersect with each other? Draw the electric filed lines for two equal and positive charges separated by some distance. (5)
10. Explain briefly the V-I characteristics of a p-n junction diode. (5)
11. Explain rotating anode x-ray tube? (5)
12. Analyze the radioactivity law. (5)

OR

Explain in detail the nuclear force.

(5)
