Examination October 2020

B.Sc. S.Y (Sem-III)

2156 Physics -VIII Modern and Nuclear Physics

Time: One Hour   **Max. Marks: 25**

Instructions

Solve any 25 questions from Q.1 to Q.30

1 Particles making up light beam are called as

(A)Protons   (B)Photons   (C)electrons   (D)none of the above

2 The strength of photoelectric current is directly proportional to

(A)Intensity of light   (B)wavelength of light   (C)velocity of light   (D)all of the above

3 Which of the following has smallest wavelength

(A)Visible light   (B)Ultraviolet light   (C)Infrared light   (D)X-rays

4 The intensity of X-rays is determined by

(A)Size of cathode   (B)Filament Voltage   (C)Filament Current   (D)None of the above

5 How many nucleons are in the $_{10}Ne^{20}$ atom

(A)12   (B)30   (C)18   (D)20

6 The binding energy is defined as

(A)The amount of energy required to break a nucleus apart into proton and neutron   (B)The amount of energy required to break a nucleus apart into proton and electron   (C)The amount of energy required to break a nucleus apart into electron and neutron   (D)The amount of energy released when neutrons change energy levels

7 "When nuclear radiations pass through the counter, gas ionization is produced." This is the principle of which of the following detector

(A)Proportional counter   (B)Flow counter   (C)Scintillation counter   (D)G. M. counter

8 Which of the following acts as a quenching gas in G. M. Counter?

(A)Alcohol   (B)Argon gas   (C)Krypton   (D)Hydrogen gas

9 At the threshold frequency, the kinetic energy of photoelectrons is ____

(A)Less than threshold frequency   (B)Greater than threshold frequency   (C)Zero   (D)None of these

10 Photoelectric cells are used to convert ____

(A)light energy into mechanical energy   (B)electric energy into light energy   (C)light energy into magnetic field   (D)Light energy to electrical energy

11 Wavelength of ultra violet light is more than x-rays, what is the velocity of X-rays in vacuum

(A)Less than c   (B)Greater than c   (C)Equal to c   (D)none of the above

12 Calculate minimum applied potential required to produce X-rays of 2 A^0 wavelength

(A)5200 V   (B)6200 V   (C)7200 V   (D)8200 V

13 Which of the following gases are used in proportional counter as an ionization gas

(A)Alcohol   (B)Neon gas   (C)Krypton gas   (D)Heavy water

14 The ionization chamber works in the region of

(A)0 to 30 volts   (B)30 to 250 volts   (C)250 to 500 volts   (D)500 to 700 volts

15 What force is responsible for the radioactive decay of the nucleous

(A)Gravitational force   (B)Weak Nuclear force   (C)Strong Nuclear force   (D)Electromagnetic force

16 The atomic mass number is equivalent to ____

(A)The number of neutrons in the atom   (B)The number of protons in the atom   (C)The number of nucleons in the atom   (D)None of these

17 The Bragg's equation will not have any solution if

(A) $\lambda < 2d$ (B) $\lambda > 2d$ (C) $2\lambda < d$ (D) $\lambda > d$

18 The production of continues X-ray spectrum is the result of

(A)Compton effect   (B)Photoelectric effect   (C)Inverse Photo-electric effect   (D)none of the above

19 The phenomenon which points towards the corpuscular nature of electromagnetic wave is

(A)Diffraction   (B)Interference   (C)Polarization   (D)photoelectric effect

20 The photo-electric effect involves only

(A)Bound electron   (B)Free electrons   (C)Both bound and free electrons   (D)None of these

21 The mass defect is given by

(A)Mass defect = M – A   (B)Mass defect = M – Z   (C)Mass defect = M – (A + Z)   (D)Mass defect = (M + A) – Z

22 An unknown chemical element is presented by the following formula : $_zX^A$. what is the name of index Z and A respectively

(A)Orbital quantum number & Principle quantum number respectively   (B)Atomic mass number and atomic number respectively   (C)Principle quantum number and orbital quantum number respectively   (D)Atomic number & Atomic mass number respectively

23 _____ counter works on the principle of "Avalanche spread along the whole length of central wire"

(A)Ionization chamber   (B)Proportionality Counter   (C)G. M. Counter   (D)Betatron

24 A Van de Graaff accelerator can accelerate charge particles upto ____

(A)10 MeV   (B)50 MeV   (C)80 MeV   (D)100 MeV

25 Energy of 1 eV corresponds to which of the following wavelength

(A)1100 nm   (B)1150 nm   (C)1352 nm   (D)1242 nm

26 The lowest wavelength limit of continuous spectra and the accelerating potential of X-ray tube has the relation as

(A) $\lambda \min \alpha\ V$ (B) $\lambda \min\ \alpha\ 1/V$ (C) $\lambda \min\ \alpha\ 1/2V$ (D)None of the above

27 The binding energy of nucleus is of the order of a few _____

(A)Electron volts   (B)ergs   (C)joules sec   (D)Mega electron volts

28 The nuclear shell model is based on which of the following principle

(A)Pauli's exclusive   (B)Faradays electromagnetic   (C)coulombs electrostatic   (D)all of these

29 A cyclotron can accelerate

(A)Beta particles   (B)Alpha particles   (C)High-velocity gamma rays   (D)high velocity X-rays

30 _____ is also called as frequency modulated cyclotron.

(A)Betatron   (B)synchrocyclotron   (C)synchrotron   (D)Van de Graaff generator