Examination October 2020

B.Sc. T.Y (Sem-VI)

2011 Physics Paper-XIX (Atomic Molecular Physics & Laser)

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

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

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1   The Rutherford atomic model is also called, - - -

(A) Electron model   (B) Planetary model   (C) Solar model   (D) Quantum model

2   Principal quantum number can take integral values, - - -

(A) $n = 1, 3, 5,…$ (B) $n = -1, -2, -3, -4,…$ (C) $n = 2, 4, 6,…$ (D) $n = 1, 2, 3, 4,…$

3   The energy of rotational level for J= 0 is, - - -

(A) Infinite   (B) Zero   (C) Positive   (D) Negative

4   The acronym LASER constructed from, - - -

(A) Light amplification by stimulated emission and radiation   (B) Light amplification by stimulated emission of radiation   (C) Light amplification and stimulated emission of radiation.   (D) Laser amplification by stimulated emission of radiation.

5   If En is the energy of the electron in the outer orbit and Ep be the energy in inner orbit then,which of the following mathematical statement is correct?

(A) $E_p – E_n = h\nu$ (B) $E_n + E_p = h\nu$ (C) $E_n – E_p = h\nu$ (D) $E_n \square E_p = h\nu$

6   If n = 4, then orbital quantum number can have values, - - -

(A) 0,-1,-2,-3   (B) 0, 1, 2, 3   (C) 1, 2, 3, 4   (D) 0, 1, 2, 3, 5

7   The amount of scattering of light is inversely proportional to the fourth power of the wavelength is, - - -

(A) Raman effect   (B) Stefans law   (C) Huygens theory   (D) Rayleigh's law of scattering

8   First successful laser, using single crystal of ruby was built by, - - -

(A) Theodore H. Maiman   (B) Charles Hard Townes   (C) Kumar Patel   (D) Javan, Bennett; and Heriott

9   The radius of a Bohr orbit is directly proportional to, - - -

(A) The principal quantum number of that orbit   (B) The square of the principal quantum number of that orbit   (C) The square of the energy of electron of that orbit   (D) The cube of the principal quantum number of that orbit

10   The splitting of the spectral lines under the influence of magnetic field is called,- - -

(A) Zeeman effect   (B) Crompton effect   (C) Photoelectric effect   (D) Stark effect

11   According to Rayleigh's law of scattering, which colour of light scattered more?

(A) Yellow   (B) Red   (C) Blue   (D) Green

12   The LASER ray is highly, - - -

(A) Coherent   (B) Intensive   (C) Directional   (D) All of these

13   n H-atom, the energy of electron in ground state is, - - -

(A) -13.6 eV   (B) 13.6 J   (C) 136 eV   (D) 1.36 V

14   Which of the following relation is correct in j-j coupling?

(A) $j = l + s$ (B) $j = l \square s$ (C) $j = l – s$ (D) $j = l ÷ s$

15   Stokes and anti-stokes lines are observed in, - - -

(A) X-ray spectra   (B) Hydrogen spectra   (C) Molecular spectra   (D) Raman spectra

16   Ruby laser is a, - -

(A) Semiconductor laser   (B) Solid state laser   (C) Gaseous laser   (D) Liquid laser

17   Which series obtained in visible region?

(A) Lymen series   (B) Balmer series   (C) Brackett series   (D) Paschen series

18   'No two electrons can have same set of four quantum numbers', explained by, - - -

(A) Pauli Exclusion Principle   (B) Stark effect   (C) Zeeman effect   (D) Raman effect

19 White ray of light is made up from, - - -

(A) Three colour of light   (B) Six colour of light   (C) Seven colour of light   (D) White colour of light

20 Which of the following sources that has maximum brightness?

(A) Moon   (B) Lamp   (C) 10 watt electric bulb   (D) Laser

21 The total number of electron in hydrogen atom is, - - -

(A) 1   (B) 2   (C) 3   (D) 4

22 The principal quantum numbers, are denoted by, - - -

(A) P, Q, R, S,...   (B) I, II, III, IV,...   (C) a, b, c, d,...   (D) K, L, M, N, ...

23 National Science day is celebrated on, - - -

(A) 8 March   (B) 26 January   (C) 28 Febuary   (D) 28 July

24 He-Ne laser is, - - -

(A) Solid state laser   (B) Gaseous laser   (C) Semiconductor laser   (D) Free electron laser

25 The standard value of Rydberg constant is, - - -

(A) 1.097×10^{-7} per meter   (B) 1.097×10^{-10} per meter   (C) 1.097×10^{-15} per meter   (D) 1.097×10^{-5} per meter

26 All the three vector L, S, and J are - - -

(A) Parallel   (B) Anti-parallel   (C) Quantized   (D) Perpendicular

27 Generally Solid, liquid and gases are three states of, - - -

(A) Matter   (B) Water   (C) Molecule   (D) All of these

28 The energy gain by an electron when it jump from, - - -

(A) Excited state to ground state   (B) Ground state to ground state   (C) Ground state to excited state   (D) Exited state to same excited state

29 The charge on electron is, - - -

(A) Negative   (B) No charge   (C) Positive   (D) Nehative and positive both

30 The value of Planks constant is, - - -

(A) 6.63×10^{-24} JS   (B) 8.63×10^{-30} JS   (C) 6.63×10^{-34} JS   (D) 8.63×10^{-24} JS