

Unit 6 - Week 5

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 Atomic Spectroscopy-I

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Assignment 5

 The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-04, 23:59 IST.

1) An atom does not have ____ degrees of freedom:

1 point

-
- Electronic
-
-
- Translational
-
-
- Nuclear spin
-
-
- Vibrational

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
Vibrational

2) Energy of a Hydrogen or Hydrogen like atom is given by:

0 points

-
- $E_n = \frac{-m_e \cdot Z^2 e^2}{2h^2 n^2 (4\pi\epsilon_0)^2}$
-
-
- $E_n = \frac{-m_e \cdot Z^2 e^4}{2h^2 n^2 (4\pi\epsilon_0)^2}$
-
-
- $E_n = \frac{-m_N \cdot Z^2 e^2}{2h^2 n^2 (4\pi\epsilon_0)^2}$
-
-
- $E_n = \frac{-m_e \cdot Z^2 e^4}{2h^2 n^2 (4\pi\epsilon_0)^2}$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $E_n = \frac{-m_e \cdot Z^2 e^4}{2h^2 n^2 (4\pi\epsilon_0)^2}$

3) The energy required for n=1 → n=2 transition in hydrogen atom is:

1 point

-
- 13.6 eV
-
-
- 12.1 eV
-
-
- 10.2 eV
-
-
- 3.4 eV

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
10.2 eV

4) The Lyman series of H-spectrum lies in the region:

1 point

-
- Infrared
-
-
- Visible
-
-
- Ultraviolet
-
-
- X-rays

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
Ultraviolet

5) For an atom, the selection criteria for an electronic transition in an atom is:

1 point

-
- $\Delta n = \text{unrestricted}, \Delta l = \pm 1$
-
-
- $\Delta n = \text{unrestricted}, \Delta l = 0$
-
-
- $\Delta n = \text{unrestricted}, \Delta l = \text{unrestricted}$
-
-
- $\Delta n = \pm 1, \Delta l = \pm 1$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $\Delta n = \text{unrestricted}, \Delta l = \pm 1$

 6) What is the total angular momentum (J) for 1s¹ electron of hydrogen:

1 point

-
- 1
-
-
- 1/2
-
-
- 3/2
-
-
- 1/2

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
1/2

 7) The correct notation for energy levels associated with 4s¹ electron is:

1 point

-
- ¹
- S
- _{1/2}
-
-
- ²
- S
- _{1/2}
-
-
- ²
- P
- _{1/2}
-
-
- ¹
- P
- _{1/2}

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
²S_{1/2}

8) The energy required to remove an electron in Hydrogen atom from n=10 state is:

1 point

-
- 13.6 eV
-
-
- 1.36 eV
-
-
- 0.136 eV
-
-
- 0.0136 eV

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
0.136 eV

9) The angular momentum of an electron in nth orbit is given by:

1 point

-
- nh
-
-
- $\frac{\hbar}{n}$
-
-
- $n^2 \hbar$
-
-
- $n \hbar$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $n \hbar$

10) In terms of Rydberg's constant R, the wave number of first Balmer line is:

1 point

-
- R
-
-
- 2R
-
-
- 5R/36
-
-
- 8R/9

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
5R/36

 11) The ionization energy for He⁺ ion is

1 point

-
- 3.4 eV
-
-
- 13.6 eV
-
-
- 54.4 eV
-
-
- 122 eV

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
54.4 eV

12) The magnetic moment (μ) of an electron can be related to spin angular momentum (S) as

1 point

-
- $\mu \propto S$
-
-
- $\mu \propto 1/S$
-
-
- $\mu \propto S^2$
-
-
- $\mu \propto \sqrt{S}$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $\mu \propto S$

 13) The obtained energy levels associated with 2p¹ electron on splitting due to spin-orbit coupling are

1 point

-
- ²
- P
- _{5/2}
- and
- ²
- P
- _{3/2}
-
-
- ²
- P
- _{3/2}
- and
- ²
- P
- _{1/2}
-
-
- ²
- D
- _{5/2}
- and
- ²
- D
- _{3/2}
-
-
- ²
- D
- _{3/2}
- and
- ²
- D
- _{1/2}

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
²P_{3/2} and ²P_{1/2}

 14) In Hydrogen atom fine structure, the transition of 2p¹ electron to 3d¹ will lead to

1 point

-
- Singlet spectrum
-
-
- doublet spectrum
-
-
- Compound doublet spectrum
-
-
- Triplet spectrum

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
Compound doublet spectrum

 15) Laguerre polynomial L_2^1 is equal to

1 point

-
- 2
-
-
- 2x
-
-
- 2x - 4
-
-
- x
- ²
- 4x + 2

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
2x - 4