

Chemistry [DPP]

Atomic Structure

DPP - 8

DPP-8

1. First and second excitation potentials of hydrogen atom (in eV) would be respectively
(A) 10.2, 12.1 (B) 12.1, 10.2
(C) 13.6, 3.4 (D) 3.4, 13.6
2. The separation energy of the electron present in the shell $n = 3$ is 1.51 eV. What is the energy in the first excited state ?
(A) -1.51eV (B) -3.4eV
(C) +1.51 (D) +3.eV
3. The energy required for the ionization of excited hydrogen atom would be (in eV)-
(A) 13.6
(B) >13.6
(C) <13.6
(D) None of these

4. What is the potential energy of the electron in the L-shell of the hydrogen atom?

- (A) -13.6eV (B) -6.8eV
(C) -10.2eV (D) -3.4eV

5. For ionising an excited hydrogen atom, the required in eV will be-

- (A) 3.4 or less
(B) More than 13.6
(C) Little less than 13.6
(D) 13.6

6. Supposing the energy (in arbitrary units) of the energy levels in the hydrogen atom is given as under:

Energy level	K	L	M	N...
	$n=1$	$n=2$	$n=3$	$n=4\dots n=\infty$
Energy	-864au.			Zero

the excitation energy needed to raise the electron from M level to $n = \infty$ would be :

- (A) 192 (B) 96
(C) 188 (D) 384

7. Circumference of the first orbit of hydrogen atom is given by the formula:

- (A) $\frac{22}{7} \alpha_0$ (B) $\frac{\pi \alpha_0}{2}$
(C) $\sqrt{4\pi} \alpha_0$ (D) $\pi \alpha_0$

8. Going from K-shell to N-shell in case of H-atom :

- (A) K.E. decreases
(B) Total energy decreases
(C) Potential energy decreases
(D) None of the above

9. What is the radius ratio for 2nd orbit of Li^{+2} ion 3rd orbit of Be^{+3} ion ?

- (A) 3 : 1 (B) 16 : 27
(C) 4 : 9 (D) 3 : 4

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- 15.** The energy of an electron in the first Bohr's orbit of H atom is -13.6eV . The possible energy value (s) of the excited state (s) for electron in Bohr's orbits of hydrogen is (are) :
- (A) -3.4eV (B) -4.2eV
(C) -6.8eV (D) $+6.8\text{eV}$
- 16.** Which electron transition in a hydrogen atom requires the largest amount of energy :
- (A) From $n = 1$ to $n = 2$
(B) From $n = 2$ to $n = 3$
(C) From $n = \infty$ to $n = 1$
(D) From $n = 3$ to $n = 5$
- 17.** Bohr's model of atom explains :
- (A) Zeeman effect
(B) Heisenberg's principle
(C) Stark effect
(D) None of these

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- 18.** Bohr's atomic theory gave the idea of :
- (A) Quantum numbers
 - (B) Shape of sublevels
 - (C) Nucleus
 - (D) Stationary states
- 19.** The ionization potential of hydrogen atom is 13.6 eV. The energy required to remove an electron from the $n = 2$ state of hydrogen atom is :
- (A) 27.2 eV
 - (B) 13.6 eV
 - (C) 6.8 eV
 - (D) 3.4 eV
- 20.** Ionisation of H-atom would produce
- (A) hydride ion
 - (B) hydronium ion
 - (C) proton
 - (D) hydroxyl ion

ANSWER KEY

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|------------|---|------------|---|------------|---|
| 1. | A | 2. | B | 3. | C |
| 4. | B | 5. | A | 6. | B |
| 7. | C | 8. | A | 9. | B |
| 10. | A | 11. | B | 12. | C |
| 13. | A | 14. | C | 15. | A |
| 16. | A | 17. | D | 18. | D |
| 19. | D | 20. | C | | |