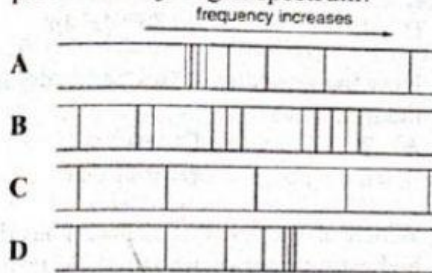


OBJECTIVE QUESTIONS

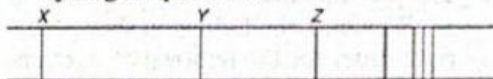
- 1 How many spectral lines can be formed in the line spectrum of the hydrogen atom for the first four energy levels?

A 4 C 6
B 5 D 7

- 2 Which of the following best represents part of the hydrogen spectrum?



- 3 The diagram shows some spectral lines in the Balmer series of the atomic hydrogen spectrum.



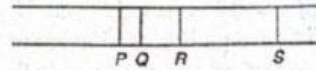
How do the frequency and wavelength of the lines change from X to Z in this series?

	Frequency	Wavelength
A	Decreases	Increases
B	Increases	Decreases
C	Decreases	Decreases
D	Increases	Increases

- 4 Which electronic transition will produce the spectral line with the highest frequency in the hydrogen spectrum?

A $n = 3$ to $n = 1$
B $n = 4$ to $n = 2$
C $n = 5$ to $n = 3$
D $n = 6$ to $n = 4$

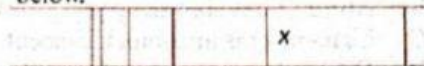
- 5 The diagram below shows four lines in the Balmer series of the emission spectrum of hydrogen atom.



Which statement about the above spectrum is correct?

- A All the lines P, Q, R and S have distinct colours.
B Line Q is formed when electrons move from energy level $n = 2$ to energy level $n = 1$.
C Line R has a higher frequency than line Q.
D Line S has the shortest wavelength.

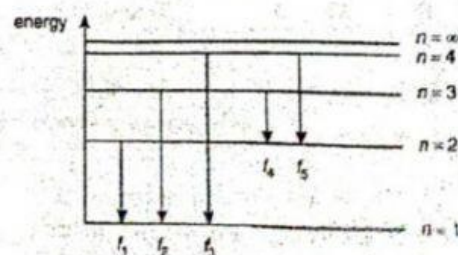
- 6 Some emission spectral lines in the Balmer series are shown in the diagram below.



Line X is caused by the electronic transition from

- A $n = 2$ to $n = 1$
B $n = 3$ to $n = 1$
C $n = 3$ to $n = 2$
D $n = 4$ to $n = 2$

- 7 The energy level diagram for hydrogen atom below shows several electronic transitions with frequencies f_1, f_2, f_3, f_4 and f_5 .



Which of the following statements is true of the above diagram?

- A f_1 represents the convergence limit of the Lyman series.
- B f_1, f_2 and f_3 represent lines in the Lyman series.
- C f_4 and f_5 are used to calculate the difference between the energy levels of $n = 4$ and $n = 5$.
- D The frequency of f_1 is lower than that of f_4 .

- 8 One of the lines in the Lyman series has a wavelength of 102.7 nm. What is the energy of this electronic transition?

[The Planck's constant, h , is 6.63×10^{-34} J s and the speed of light, c , is 3.00×10^8 m s⁻¹]

- A 1.937×10^{-18} J
- B 6.456×10^{-27} J
- C 6.809×10^{-32} J
- D 6.763×10^{-41} J

Clone STPM 2014/P1/Q18

- 9 An element Q has a valence electronic configuration of $3d^6 4s^2$. Which statement is true about Q ?

- A The proton number of Q is 28.
- B Atom Q has six valence electrons.
- C Element Q is an s -block element.
- D Q^{3+} ion is more stable than Q^{2+} ion.

- 10 Copper(I) sulphide is a component of chalcocite ore which is one of the sources of copper metal. In which orbitals are valence electrons of copper(I) ion and sulphide ion found? [Proton numbers of S and Cu are 16 and 29 respectively.]

	Copper(I) ion	Sulphide ion
A	3d	3p
B	3d	3s and 3p
C	4s	3p
D	4s and 3d	3s and 3p

STPM 2010/P1/Q4

- 11 The electronic configuration of X^{2+} ion is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3$. Which statement is true about element X ?

- A Atom X has one valence electron.
- B The proton number of element X is 21.
- C An atom of X has four energy levels filled with electrons.
- D The valence electronic configuration of atom X is $3d^5 4s^1$.

- 12 Which of the following is **not** a d -block element?

- A $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$
- B $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$
- C $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2$
- D $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^1$

- 13 How many electrons can be filled into the d -orbitals?

- A 2
- B 6
- C 10
- D 14

- 14 Which of the following species has the highest number of unpaired electrons?

- A Mg^{2+}
- B Al^{3+}
- C S
- D Cl

- 15 The proton number of an element X is 38. Which of the following shows the right order for the removal of electrons from their orbitals to form X^{3+} ion?

	First	Second	Third
A	5s	5s	4p
B	5p _x	5p _y	5s
C	4p _z	4p _y	4p _x
D	4s	4p _z	3d

- 16 Which orbital diagram shows the filling of electron(s) based on Hund's rule?

- A

1		
1	1	
- B

1	1	
1	1	
- C

1	1	1
1	1	1
- D

1	1	1
1	1	1

Clone STPM 2014/P1/Q3

- 17 An atom of element Z has nucleon number 55 and thirty fundamental uncharged particles in its nucleus. What is the electronic configuration of a Z^{2+} ion?

- A $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5$
- B $1s^2 2s^2 2p^6 3s^2 3p^6 3d^4 4s^1$