Sarajevo School of Science and Technology

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Entrance Exam: **CHEMISTRY**

Name: _____

Show that one of the provided answers is the solution of the problem. Circle the correct answer.

1. Which substance could be decomposed by chemical reactions?

   1. water

   2. sugar

   3. mercury

   4. argon

   A: 1, 2 B: 2, 3 C: 3, 4 D: 2, 4

2. What is the volume of 8.8g CO_2 at STP Mw (CO_2) = 44

A. 22.4 L
B. 2.24 L
C. 44.8 L
D. 4.48 L

3. Under the symbol of 2 SO_3 you may understand

   1. 2 moles of SO_3
   2. 2 molecules of SO_3
   3. 6 moles of O_2
   4. $2 \times 6 \times 10^{23}$ O atoms

   A: 1, 2 B: 2, 3 C: 3, 4 D: 1, 2, 3

4. Which of the following atoms are isotopes of each other?

   1. X: 11 protons, 12 neutrons
   2. Y: 11 protons, 11 neutrons
   3. V: 12 protons, 11 neutrons
   4. W: 11 protons, 13 neutrons

   A: 1, 3 B: 1,2,4 C: all of them D: none of them .

5. Which main energy shell can accommodate a maximum number of 8 electrons?
A. 1
B. 2
C. 3
D. all of them

6.An element has the electronic configuration of $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^2$. The number of valence electrons is

A. 2
B. 4
C. 12
D. 14

7. Which group of the periodic table is called halogens?

A. II A
B. IV A
C. VI A
D. VII A

8. Magnesium forms an ion with a charge of

A. 1+ by loosing one electron
B. 1- by gaining one electron
C. 2+ by loosing two electrons
D. 2- by gaining two electrons

9. Which molecules contain polar covalent bonds?

1. CO_2
2. CCl_4
3. F_2
4. KF

A: 1,2 B: 2, 4 C: 1, 2, 3 D: 2, 3, 4

10. Ionic bond is likely to form between the atoms of

1. C and Br
2. Ca and I
3. P and Cl
4. O and Na

A: 1, 2 B: 2, 3 C: 2, 4 D: 1, 2, 4

11. Which of the following changes will shift the reaction at equilibrium to the left

$2\ H_2S\ (g) <=> 2\ H_2\ (g) + S_2\ (g)\ \Delta H = +41\ kJ$

1. increase the concentration of H_2S
2. decrease the temperature
3. increase the pressure
4. increase the concentration of H_2

A: 1, 2 B: 1, 2, 3 C: 2, 3, 4 D: 1, 2, 3, 4

12. Which solution contains the largest amount of glucose?

A. 0.5 L 2 M solution
B. 50 mL 0.2 M solution
C. 1000 mL 1 M solution
D. 0.25 L 5 M solution

13. Choose the solution with the highest hydronium ion concentration.

A. pH = 2 HCl solution
B. pH = 2 acetic acid solution
C. 0.1 M HCl solution
D. 0.1 M acetic acid solution

14. The oxidation number of Mn in MnO_4^- is

A. +1
B. +8
C.+7
D. –7