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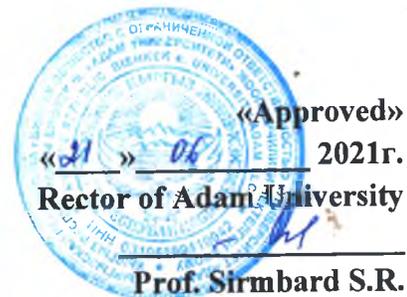
2021г.

Rector of Adam University

Prof. Sirmbard S.R.

**Program of
Entrance examinations (testing)
for applicants with foreign citizenship
in Chemistry
for the 2021-2022 academic year**

2021 year



Tests for entrance exams in Chemistry

Variant № 1

1. In which year was the Valence bond theory introduced?

- a) 1927
- b) 1920
- c) 1930
- d) 1935

2. The oxygen molecule is paramagnetic. It can be explained by

- a) Resonance
- b) Hybridisation
- c) Valence bond theory
- d) Molecular orbital theory

3. Bond angle of 120° is found in

- a) PH_3
- b) NCl_3
- c) ClF_3
- d) BCl_3

4. Which of the following has sp^3 hybridisation?

- a) NF_3 , BF_3
- b) SiF_4 , BeH_2
- c) H_2S , BF_3
- d) NF_3 , H_2O

5. Hybridisation of $[\text{Ni}(\text{CN})_4]^{2-}$ is

- a) dsp^2
- b) d^2sp^2
- c) sp^3
- d) d^2sp^3

6. Which of the following is correct for $[\text{Mn}(\text{CN})_6]^{3-}$?

- a) dsp^2 and square planar
- b) sp^3d^2 and octahedral
- c) d^2sp^3 and octahedral
- d) sp^3d^2 and tetrahedral

7. s-orbitals are nondirectional because of

- a) spherical symmetry
- b) their small size
- c) being first orbital
- d) All of the above

8. sp^2 hybridisation is present in

- a) C_2H_2
- b) C_2H_4
- c) $BeCl_2$
- d) C_2H_6

9. The hybridisation and geometry of XeF_4 are

- a) sp^3d^2 , square planar
- b) sp^3d^2 , octahedral
- c) sp^3d^3 , triangular planar
- d) sp^3d , trigonal bipyramidal

10. Which of the following is true for the formation of stable bonds according to valence bond theory?

- a) Greater overlapping between atomic orbitals
- b) Close proximity between two atoms
- c) Pairing of electrons having opposite spins
- d) All of the above

11. An aldehyde on reaction with primary amine forms

- a) ketone
- b) Schiff's base
- c) aromatic acid
- d) carboxylic acid

12. Which one of the following does not contain the $-COOH$ group?

- a) Picric acid
- b) Aspirin
- c) Benzoic acid
- d) Ethanoic acid

13. A compound having a bond angle 180° is

- a) alkyne
- b) alkane
- c) alkene
- d) cycloalkane

14. Among the following compounds, strongest acid is

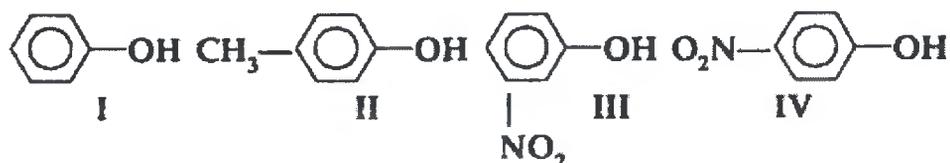
- a) $H-C \equiv C-H$
- b) C_6H_6
- c) C_2H_6

d) CH_3OH

15. The compound which gives the most stable carbonium ion on dehydration is

- a) $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$
- b) $(\text{CH}_3)_3\text{COH}$
- c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- d) $\text{CH}_3\text{CH OH CH}_2\text{CH}_3$

In the following compounds:



16. The order of acidity is

- a) $\text{III} > \text{IV} > \text{I} > \text{II}$
- b) $\text{I} > \text{IV} > \text{III} > \text{II}$
- c) $\text{II} > \text{I} > \text{III} > \text{IV}$
- d) $\text{IV} > \text{III} > \text{I} > \text{II}$

17 Which among the following is not an aromatic compound (in specific)?

- a) Naphthalene
- b) Aniline
- c) Pyridine
- d) Tropolone

18. Organic compounds are broadly classified as _____

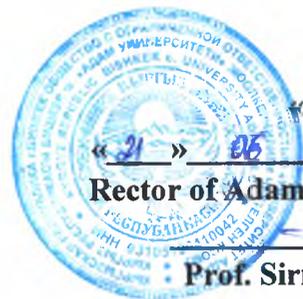
- a) Open chain compound and a cyclic compounds
- b) Open chain compounds and linear chain compounds
- c) Cyclic compounds and alicyclic compounds
- d) alicyclic compounds and acyclic compounds

19. Aliphatic compound is the other name for _____

- a) Acyclic compounds
- b) Alicyclic compounds
- c) Ring compounds
- d) Closed chain compounds

20. Which among the following is not an example of Acyclic compound?

- a) Acetaldehyde
- b) Ethane
- c) Cyclopropane
- d) Isobutane



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Variant № 2

1. Which among the following is not an example of alicyclic compound?

- a) Cyclohexane
- b) Cyclohexene
- c) Tetrahydrofuran
- d) Acetic acid

2. Which among the following is not an aromatic compound (in specific)?

- a) Naphthalene
- b) Aniline
- c) Pyridine
- d) Tropolone

3. Which among the following is not an example of Acyclic compound?

- a) Acetaldehyde
- b) Ethane
- c) Cyclopropane
- d) Isobutane

4. Organic compounds can be classified even based upon the function groups. Identify the one which is not a functional group?

- a) Isocyanide
- b) Isocyano
- c) Carboxyl
- d) Carbonyl

5. Which among the following is not a class of organic compound?

- a) Carbonyl compound
- b) Nitro compound
- c) Amides
- d) Electro compounds

6. Cycloalkanes are associated with the general formula called _____

- a) C_nH_{2n+2}
- b) $C_nH_{2(n+2)}$
- c) C_nH_{2n+1-r}
- d) $C_nH_{2(n+1-r)}$

7. Cycloalkene exhibits aromatic character.

- a) True
- b) False

8. Which among the following compounds explodes on contact with oxygen?

- a) Cyclopropane
- b) Cyclobutane
- c) Cyclopentane
- d) Cyclohexane

9. In Alkenes the Carbon atoms are connected to each other by a _____

- a) Single bond
- b) Double bond
- c) Triple bond
- d) Not connected

10. Which among these is not a structural isomer of the compound C_4H_8 ?

- a) But-1-ene
- b) But-2-ene
- c) But-3-ene
- d) 2-methylpropene

11. Which of the following will have metal deficiency defect?

- a) NaCl
- b) FeO
- c) KCl
- d) ZnO

12. p-type semiconductors are formed When Si or Ge are doped with

- a) (a group 14 elements
- b) (b) group 15 elements
- c) (c) group 13 elements
- d) (d)group 18 elements

13. In Mendeleev's Periodic Table, gaps were left for the elements to be discovered later. Which of the following elements found a place in the Periodic Table later?

- a) Chlorine
- b) Silicon
- c) Oxygen
- d) Germanium

14. At the time of Mendeleev, the number of elements known was

- a. 63
- b. 65
- c. 62
- d. 64

15. The properties of eka-aluminium predicted by Mendeleev are the same as the properties of later discovered element:

- a. Scandium
- b. Germanium
- c. Gallium
- d. Aluminium

16. An atom of an element has the electronic configuration 2,8,2. To which group does it belong?

- a) 4th group
- b) 6th group
- c) 3rd group
- d) 2nd group

17. Where would you locate the element with electronic configuration 2, 8 in the Modern Periodic Table?

- a) Group 8
- b) Group 2
- c) Group 18
- d) Group 10

18. Element 'X' forms a chloride with the formula XCl_2 , which is a solid with high melting point. X would most likely be in the same group of the periodic table as:

- a) Si
- b) Mg
- c) Al
- d) Na

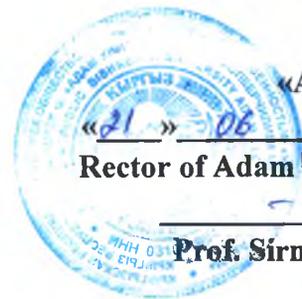
19. Carbon belongs to the second period and Group 14. Silicon belongs to the third period and Group 14. If atomic number of carbon is 6, the atomic number of silicon is

- a) 7
- b) 14
- c) 24
- d) 16

20. Pick out the chemically most reactive elements from the given triads.

Li, Na, K F, Cl, Br

- a) Li and F
- b) Li and Br
- c) K and F
- d) K and Br



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Tests for entrance exams in Chemistry

Variant № 3

1. What is the atomic number of element of period 3 and group 17 of the Periodic Table?
 - a) 10
 - b) 4
 - c) 17
 - d) 21
2. Which one of the following statements is not correct about the trends in the properties of the elements of a period on going from left to right?
 - a) The oxides become more acidic
 - b) The elements become less metallic
 - c) There is an increase in the number of valence electrons
 - d) The atoms lose their electrons more easily
3. The elements A, B and C belong to groups 1, 14 and 17 respectively of the Periodic Table. Which two elements will form ionic compounds?
 - a) A and B
 - b) A and C
 - c) B and C
 - d) None
4. An element X from group 2 of the Periodic Table reacts with Y from group 17 to form a compound. Give the formula of the compound.
 - a) XY_2
 - b) XY
 - c) X_2Y
 - d) $(XY)_2$
5. Metal 'M' is in the first group of the Periodic Table. What will be the formula of its oxide?
 - a) MO
 - b) M_2O
 - c) M_2O_3
 - d) MO_2
6. Name the neutral atom in the Periodic Table which has the same number of electrons as K^+ and Cl^- .
 - a) Helium
 - b) Argon
 - c) Neon
 - d) Krypton
7. An element X combines with oxygen to form an oxide XO. This oxide is electrically conducting. Write the formula of the compound formed when X reacts with chlorine.

- a) XCl_3
- b) XCl
- c) XCl_2
- d) XCl_5

8. An element X has mass number 40 and contains 21 neutrons in its atom. To which group of the Periodic Table does it belong?

- a) Group 1
- b) Group 4
- c) Group 2
- d) Group 3

9. An element 'A' belongs to the third period and group 16 of the Periodic Table. Find out the valency of A.

- a) Valency = 6
- b) Valency = 2
- c) Valency = 1
- d) Valency = 3

10. Which one of the following statements is not correct about the trends in the properties of the elements of a group on going down in a group?

- a) The chemical reactivity of metals increases.
- b) The metallic character of elements increases.
- c) The size of the atom increases.
- d) The valence electrons increase.

11. Which of the following set of elements is written in order of their increasing metallic character?

- a) Na Li K
- b) C Q N
- c) Mg Al Si
- d) Be Mg Ca

12. The atom of an element has electronic con-figuration 2, 8, 7. To which of the following elements would it be chemically similar?

- a) N(7)
- b) P(15)
- c) Na(11)
- d) F (9)

13. Which of the following alcohols gives 2-butene on dehydration by conc. H_2SO_4 ?

- a) 2-methyl propene-2-ol
- b) 2-methyl 1 -propanol
- c) Butane-2-ol
- d) Butane 1-ol

14. In terms of acidic strength, which one of the following is in the correct increasing order?

- a) Water < Acetic acid < Hydrochloric acid
- b) Water < Hydrochloric acid < Acetic acid
- c) Acetic acid < Water < Hydrochloric acid
- d) Hydrochloric acid < Water < Acetic acid

15. Which one of the following salts does not contain water of crystallisation?

- a) Blue vitriol
- b) Baking soda
- c) Washing soda
- d) Gypsum

16. How many water molecules does hydrated calcium sulphate contain?

- a) 5
- b) 10
- c) 7
- d) 2

17. What is the pH range of our body?

- a) 7.0 – 7.8
- b) 7.2 – 8.0
- c) 7.0 – 8.4
- d) 7.2 – 8.4

18. When copper oxide and dilute hydrochloric acid react, colour changes to

- a) white
- b) bluish-green
- c) blue-black
- d) black

19. Mole fraction of glycerine $C_3H_5(OH)_3$ in solution containing 36 g of water and 46 g of glycerine is

- a) 0.46
- b) 0.40
- c) 0.20
- d) 0.36

20. The molal elevation constant depends upon

- a) nature of solute.
- b) nature of the solvent.
- c) vapour pressure of the solution.
- d) enthalpy change.

Key in Chemistry

Variant №1

1 a	2d	3 d	4 d	5 a
6 c	7a	8 b	9 b	10d
11 b	12 a	13 a	14 d	15 b
16 d	17 c	18d	19a	20c

Variant №2

1 d	2 c	3 d	4 a	5 d
6 d	7 b	8 a	9 b	10 c
11 b	12 c	13 d	14 a	15 c
16 d	17 c	18 b	19 b	20 c

Variant №3

1 c	2 d	3 b	4 a	5 b
6 b	7 c	8 a	9 b	10 d
11 d	12 d	13 c	14 a	15 b
16 d	17 a	18 b	19 c	20 b