

1) What is the formula of the compound whose name is Fe (III) carbonate?

- a)  $\text{Fe}_2\text{CO}_3$                       b)  $\text{FeCO}_3$                       c)  $\text{Fe}_3(\text{CO}_3)_2$   
d)  $\text{Fe}_2(\text{CO}_3)_3$                       e) no answer is correct

2) What is the oxidation number of iodine in the ion whose formula is  $\text{IO}_6^{5-}$  ?

- a) III                      b) IV                      c) V                      d) VI                      e) no answer is correct

3) Calculate the mass of calcium sulfate containing 20 g of calcium:

( $A_r(\text{Ca}) = 40$  ;  $A_r(\text{S}) = 32$  ;  $A_r(\text{O}) = 16$ )

- a) 68 g                      b) 34,0 g                      c) 44,0 g                      d) 18,0                      e) no answer is correct

4) Calculate the number of chlorine atoms in 0,2 mol of  $\text{PCl}_3$ :

- a)  $1,45 \cdot 10^{24}$                       b)  $3,61 \cdot 10^{23}$                       c)  $7,23 \cdot 10^{23}$                       d)  $3,61 \cdot 10^{22}$                       e) no answer is correct

5) The electronic configuration of aluminium atom ( $_{13}\text{Al}$ ) is:

- a)  $1s^2 2s^2 2p^6 3s^2$                       b)  $1s^2 2s^2 2p^4$                       c)  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$   
d)  $1s^2 2s^2 2p^6 3s^2 3p^1$                       e) no answer is correct

6) Calculate the volume of  $\text{CO}_2$  produced by the complete combustion of 78 g of ethyne (acetylene) ( $t = 0^\circ\text{C}$ ,  $p = 101,3 \text{ kPa}$ ):

- a)  $134,4 \text{ dm}^3$                       b)  $67,2 \text{ dm}^3$                       c)  $22,4,4 \text{ dm}^3$                       d)  $15,5 \text{ dm}^3$                       e) no answer is correct

7) Select the the most electronegative element among the following:

- a) Mg                      b) C                      c) I                      d) Cl                      e) S

8) Calculate the mass of silver contained in 8.5 g of silver nitrate ( $A_r(\text{Ag}) = 108$ ;  $A_r(\text{N}) = 14,0$ ;  $A_r(\text{O}) = 16,0$ ):

- a) 1,63 g                      b) 3,10 g                      c) 54 g                      d) 2,7 g                      e) no answer is correct

**9) Select the compound with covalent bonds:**

- a)  $\text{CCl}_4$       b)  $\text{CaCl}_2$       c)  $\text{K}_2\text{S}$       d)  $\text{Na}_2\text{O}$       e) no answer is correct

**10) Which of the following elements is lying in the third period of the periodic table:**

- a) P      b) He      c) Li      d) O      e) no answer is correct

**11) The solution of urea was prepared by mixing  $6 \text{ dm}^3$  of the solution with concentration  $0,1 \text{ mol.dm}^{-3}$  and  $4 \text{ dm}^3$  solution with concentration  $0,7 \text{ mol.dm}^{-3}$ . What is the final concentration?**

- a)  $0,200 \text{ mol.dm}^{-3}$       b)  $0,340 \text{ mol.dm}^{-3}$       c)  $0,600 \text{ mol.dm}^{-3}$       d)  $0,300 \text{ mol.dm}^{-3}$   
e) no answer is correct

**12 Calculate the mass of HCl in  $300 \text{ cm}^3$  of  $0,6 \text{ M}$  solution ( $A_r(\text{Cl}) = 35,0$ ):**

- a) 4 g      b) 6,3 g      c) 2,3 g      d) 40 g      e) no answer is correct

**13) Select the correct answer: To neutralize  $25 \text{ cm}^3$  of  $0,20 \text{ M}$  KOH you need:**

- a)  $25 \text{ cm}^3$  of  $0,40 \text{ M}$  hydrochloric acid  
b)  $20 \text{ cm}^3$  of  $0,25 \text{ M}$  hydrochloric acid  
c)  $50 \text{ cm}^3$  of  $0,10 \text{ M}$  hydrochloric acid  
d)  $25 \text{ cm}^3$  of  $0,10 \text{ M}$  hydrochloric acid  
e) no answer is correct

**14) The solution of NaOH has concentration  $\text{pH}=11$  (at  $T=25^\circ\text{C}$ ). What is the concentration of the solution?**

- a)  $1 \cdot 10^{-2} \text{ mol.l}^{-1}$       b)  $1 \cdot 10^{-3} \text{ mol.l}^{-1}$       c)  $1 \cdot 10^{-10} \text{ mol.l}^{-1}$       d)  $1 \cdot 10^{-11} \text{ mol.l}^{-1}$   
e) no answer is correct

**15) The solution of calcium chloride has concentration  $0,04 \text{ mol/l}$ . What is the concentration of chloride anions in the solution?**

- a)  $0,02 \text{ mol/l}$       b)  $0,04 \text{ mol/l}$       c)  $0,06 \text{ mol/l}$       d)  $0,08 \text{ mol/l}$       e) no answer is correct

**16) Select the acid-base conjugate pair according to Bronsted theory among the following:**

- a)  $\text{NH}_4^+$ ;  $\text{OH}^-$       b)  $\text{NH}_3$ ;  $\text{H}_3\text{O}^+$       c)  $\text{OH}^-$ ;  $\text{H}_3\text{O}^+$       d)  $\text{NH}_4^+$ ;  $\text{NH}_3$       e) no answer is correct

**17) Select the strong electrolyte:**

- a)  $\text{CH}_3\text{COOH}$       b)  $\text{NH}_3$       c)  $\text{HNO}_3$       d)  $\text{H}_2\text{CO}_3$       e) no answer is correct

18) What is the pH of potassium hydroxide solution, if  $c = 2 \text{ mmol.dm}^{-3}$ ?

- a) 12,70      b) 11,30      c) 9,00      d) 2,70      e) no answer is correct

19) Which of the following salts provides alkaline aqueous solution?

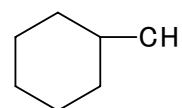
- a)  $\text{NaNO}_3$       b)  $\text{FeSO}_4$       c)  $\text{NH}_4\text{Cl}$       d)  $\text{HCOONa}$       e) no answer is correct

20) Select one redox reaction among the following:

- a)  $2 \text{KCl} + \text{Ba}(\text{NO}_3)_2 \rightarrow \text{BaCl}_2 + 2 \text{KNO}_3$   
b)  $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$   
c)  $2 \text{NO} + 2 \text{O}_2 + \text{H}_2\text{O} \rightarrow 2 \text{HNO}_3$   
d)  $\text{NaOH} + \text{HNO}_3 \rightarrow \text{H}_2\text{O} + \text{NaNO}_3$   
e) no answer is correct

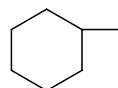
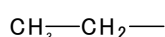
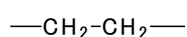
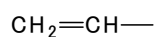
21) Select the correct name for the following compound:

- a) methyl-cyclohexane      b) toluene      c) xylene      d) phenol      e) no answer is correct



22) Select the group that is named vinyl:

- a)                              b)                              c)                              d)                              e) no answer is correct



23) Which of the following compounds will be formed by dehydrogenation of 1-butanol:

- a) butyric acid      b) butanal      c) 2-butanon      d) 3-butanon  
e) no answer is correct

24) Which of the following compounds will be formed by the hydration of ethene?

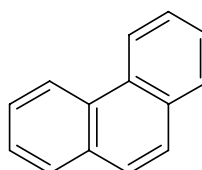
- a) ethanol      b) ethin      c) ethanal      d) ethan      e) no answer is correct

25) Which of the following molecular formulas is the correct molecular formula of benzylalcohol?

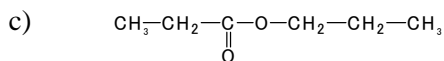
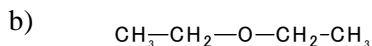
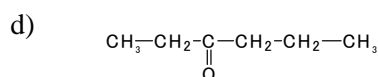
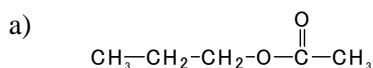
- a)  $\text{C}_7\text{H}_6\text{O}$       b)  $\text{C}_6\text{H}_8\text{O}_2$       c)  $\text{C}_5\text{H}_8\text{O}_2$       d)  $\text{C}_6\text{H}_8\text{O}$       e) no answer is correct

26) The common name of the following compound is:

- a) naphthalene      b) anthracene      c) pyrene  
d) phenanthrene      e) no answer is correct



27) Select the formula of propyl-acetate among the following compounds:



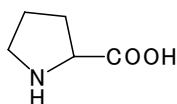
e) no answer is correct

28) Find the product of cyclohexanone hydrogenation:

a) phenol      b) benzoic acid      c) benzylalcohol      d) cyclohexanol

e) no answer is correct

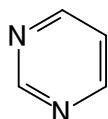
29) Give the correct common name of the standard amino acid whose condensed structural formula is:



a) threonine      b) phenylalanine      c) proline

d) tryptophan      e) no answer is correct

30) The name of given heterocycle is:



a) imidazol      b) pyrimidine      c) pyrazol      d) pyrrol      e) no answer is correct

31) The heterocycle contained in adenine is named:

a) purine      b) pyrimidine      c) indol      d) pyridine      e) no answer is corect

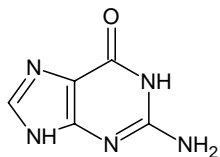
32) In which of the following disaccharides is contained fructose?

a) sucrose      b) maltose      c) lactose      d) cellobiose      e) no answer is correct

33) How many carbon atoms are contained in the amino acid with the common name leucine:

a) 5      b) 6      c) 7      d) 4      e) no answer is correct

34) What is the name of the given compound:



- a) adenine      b) thymine      c) uracil      d) guanine  
e) no answer is correct

35) What type of bond is typical for primary structure of proteins?

- a) ester      b) peptide      c) disulfide      d) glycosidic      e) no answer is correct

36) What are the components of nucleotides?

- a) nitrogen base and phosphate      b) nitrogen base and pentose  
c) nitrogen base, pentose, and phosphate      d) pentose and phosphate  
e) no answer is correct

37) The hydrogenation of oleic acid gives:

- a) palmitic acid      b) linolenic acid      c) stearic acid      d) linoleic acid  
e) no answer is correct

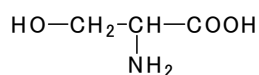
38) Amino acid containing imidazole ring is named:

- a) leucine      b) histidine      c) threonine      d) cysteine  
e) no answer is correct

39) Which interaction stabilizes the secondary structure of proteins?

- a) hydrogen bonds      b) peptide bonds      c) disulfide bridges      d) ionic interactions  
e) no answer is correct

40) Select the name of amino acid :



- a) alanine      b) prolin      c) cysteine      d) aspartic acid      e) no answer is correct