Section : **Chemistry**

Q.1 What is the mass percentage of NaCl in the solution if 1.75g of NaCl is dissolved in 5.85g of water.
1. 23.02
2. 29.9
3. 23.98
4.25.00

Options 1. 1
2. 2
3. 3
4. 4

Q.2 The aqueous solutions of the following salts were electrolyzed for 30 min with a current of 20 amp. Arrange the following in the increasing order of the amount of metal deposited at the cathode.

(A) WCl_6

(B) $ZnSO_4$

(C) $HfCl_4$

(D) $AgNO_3$

(Atomic mass of: W =184 u, Zn = 65 u, Hf = 178 u and Ag = 108u)
Choose the correct answer from the options given below:
1. (A), (B), (C), (D)
2. (B), (A), (C), (D)
3. (B), (A), (D), (C)
4. (D), (C), (B), (A)

Options 1. 1
2. 2
3. 3
4. 4

Q.3 How much current is needed to pass for 1 sec for depositing a metal with a mass equal to double of its electrochemical equivalent?
1. 1 amp
2. 2 amp
3. 4 amp
4. 0.5 amp

Options 1. 1
2. 2
3. 3
4. 4

Q.4 Choose the examples of first order reactions.
(A) Artificial radioactive decay of unstable nuclei
(B) Hydrogenation of ethylene
(C) Thermal decomposition of HI on gold surface
(D) Decomposition of N2O
Choose the correct answer from the options given below:
1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options 1. 1
2. 2
3. 3
4. 4

Q.5 Which of the following amine do not respond to Hinsberg test?
1. Aniline
2. N-Methyl aniline
3. N,N-Dimethyl aniline
4. o-Toluidine

Options 1. 1
2. 2
3. 3
4. 4

Q.6 Match List-I with List-II

List-I	List-II
(A) Coupling reaction	(I) Primary amines
(B) Hofmann's degradation	(II) Aromatic amines
(C) Isocyanide test	(III) Phenols and aromatic amines
(D) Diazonium salts	(IV) Amide to amine

Choose the correct answer from the options given below:
1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
4. (A) - (III), (B) - (II), (C) - (IV), (D) - (I)

Options 1. 1
2. 2
3. 3
4. 4

Q.7 Toluene on chlorination in presence of UV light gives
1. Benzyl Chloride
2. Benzal Chloride
3. p- Chlorotoluene
4. o-Chlorotoluene

Options 1. 1
2. 2

3. 3

4. 4

Q.8 **Which of the following amine will not undergo acylation reaction?**

1. Methylamine
2. Ethylamine
3. N,N-Diethyl aniline
4. N-Methylmethanamine

Options 1. 1

2. 2

3. 3

4. 4

Q.9 **Which of the following compounds will respond to iodoform test?**

(A) Acetone
(B) Ethyl methyl ketone
(C) Acetophenone
(D) Pentan-2-one
Choose the correct answer from the options given below:
1. (A), (B) and (C) only
2. (A), (B) and (D) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options 1. 1

2. 2

3. 3

4. 4

Q.10 **The compound resistant to oxidation is**

1. Carbonic acid
2. t-Butanol
3. Ethyl alcohol
4. Methyl alcohol

Options 1. 1

2. 2

3. 3

4. 4

Q.11 **The final product of 1-chlorobutane and 2-chlorobutane when treated in KOH (alcohol) gives:**

1. 1-butene
2. 3-butene
3. Both 1-butene & 2-butene
4. 2-butene

Options 1. 1

2. 2

3. 3

4. 4

Q.12 **Vitamin B12 is a coordination compound of _____**

1. Cu
2. Fe
3. Mg
4. Co

Options 1. 1

2. 2

3. 3

4. 4

Q.13 **The reduction of cyclohexanone with LiAlH4 will give:**

1. Cyclohexanol
2. Cyclohexanaldehyde
3. Benzoic acid
4. Phenol

Options 1. 1

2. 2

3. 3

4. 4

Q.14 **On the basis of following observations arrange the following compounds in increasing order of mol of AgCl precipitated per mol of the compound with excess of AgNO3**

Formula	Secondary valences	Solution conductivity
(A) PdCl2.4NH3	4	1:2 electrolyte
(B) NiCl4.2K	4	2:1 electrolyte
(C) CoCl3.4NH3	6	1:1 electrolyte
(D) CrCl3.6H2O	6	1:3 electrolyte

Choose the correct answer from the options given below:
1. (C), (A), (B), (D)
2. (B), (C), (A), (D)
3. (C), (A), (D), (B)
4. (D, (A), (C), (B)

Options 1. 1

2. 2

3. 3

4. 4

Q.15 **Acetaldehyde on treatment with Fehling's solution gives a precipitate of**

1. Cu2O
2. Cu
3. CuO
4. Cu2O2

Options 1. 1

2. 2
3. 3
4. 4

Q.16 Which type of amine produces N2 when treated with HONO?
1. Primary amine
2. Secondary amine
3. Tertiary amine
4. Quaternary ammonium salt

Options 1. 1
2. 2
3. 3
4. 4

Q.17 Reaction of phenol with chloroform in the presence of sodium hydroxide gives salicylaldehyde. The reaction is known as
1. Reimer-Tiemann reaction
2. Kolbe's reaction
3. Williamson synthesis
4. Claisen Smith Condensation reaction

Options 1. 1
2. 2
3. 3
4. 4

Q.18 The Grignard reagent can be prepared by using magnesium in dry ether on
1. C2H5OH
2. C2H5Br
3. C2H6
4. C2H5NO2

Options 1. 1
2. 2
3. 3
4. 4

Q.19 The correct order of increasing acidic strength is
(A) Ethanol
(B) Phenol
(C) Chloroacetic acid
(D) Acetic acid
Choose the correct answer from the options given below:
1. (A), (B), (D) (C)
2. (A), (D), (B) (C)
3. (C), (D), (B), (A)
4. (B), (C), (A), (D)

Options 1. 1
2. 2
3. 3
4. 4

Q.20 **Which of the following statements are correct?**
(A) A solution which obeys Raoult's law strictly is called an ideal solution.
(B) A solution which shows deviations from Raoult's law is called a real solution.
(C) If T_b is the boiling point of the solvent and T is the boiling point of the solution, then the difference in boiling points ($\Delta T_b = T_b - T$) is called elevation of boiling point.
(D) The elevation of boiling point is related to the lowering of vapor pressure.
Choose the correct answer from the options given below:
1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options 1. 1
2. 2
3. 3
4. 4

Q.21 Match List-I with List-II

List-I	List-II
Materials	**Conductivity (S m^{-1})**
(A) Gold	(I) 1.0×10^{-16}
(B) Germanium	(II) 1.2×10
(C) Glass	(III) 4.5×10^{3}
(D) Graphite	(VI) 2.0

Choose the correct answer from the options given below:
1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options 1. 1
2. 2
3. 3

4. 4

Q.22 Arrange the following compounds in increasing order of reactivity towards Nucleophilic Substitution Reaction
(A) Chlorobenzene
(B) 4- Nitrochlorobenzene
(C) 2,4 - Dinitrochlorobenzene
(D) 2,4,6-Trinitrochloronitrobenzene

Choose the correct answer from the options given below:
1. (A), (B), (C), (D)
2. (A), (B), (D), (C)
3. (B), (A), (D), (C)
4. (C), (B), (D), (A)

Options 1. 1
2. 2
3. 3
4. 4

Q.23 Decreasing order of basicity for the following compounds:
(A) Ethylamine
(B) Diethylamine
(C) Ammonia
(D) Benzenamine
Choose the correct answer from the options given below:
1. (A), (B), (C), (D)
2. (A), (C), (B), (D)
3. (B), (A), (C), (D)
4. (C), (B), (D), (A)

Options 1. 1
2. 2
3. 3
4. 4

Q.24 Match the wavelength of light absorbed given in List-I with the color of light absorbed in List-II

List-I	List-II
Wavelength of light absorbed(nm)	Colour of light absorbed
(A) 535	(I) Yellow
(B) 475	(II) Red
(C) 600	(III) Blue
(D) 498	(IV) Blue Green

Choose the correct answer from the options given below:
1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (IV), (B) - (II), (C) - (I), (D) - (III)
4. (A) - (IV), (B) - (I), (C) - (II), (D) - (III)

Options 1. 1
2. 2
3. 3
4. 4

Q.25 $CuSO_4$ is colorless but $CuSO_4.5H_2O$ is blue in color. Which of the following statements is **incorrect** about the color of $CuSO_4.5H_2O$?

1. in $CuSO_4.5H_2O$ water act as ligand
2. crystal field splitting takes place in $CuSO_4.5H_2O$
3. presence of SO_4^{2-} ion in coordination sphere imparts the color of $CuSO_4.5H_2O$
4. *d-d* transition takes place in $CuSO_4.5H_2O$

Options 1. 1
2. 2
3. 3
4. 4

Q.26 Which of the following statements, for the reaction of type $A \rightarrow B$, are correct?

(A) The initial rates for a second order reaction depend on the square of the concentration of the reactant
(B) The half-life is the time for half of the reactant to be consumed
(C) The expression for rate of second order reaction is $r = k[2A]^2$
(D) The half-life of a second-order reaction depends on the initial concentration

Choose the correct answer from the options given below:
1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options 1. 1
2. 2
3. 3
4. 4

Q.27 Extra close brace or missing open brace
$A(s) + 2B^+(aq) \rightarrow A^{2+}(aq) + 2B(s)$
1. 1.556
2. 15.56
3. 1.12
4. 3.92

Options 1. 1

2. 2
3. 3
4. 4

Q.28 The following statements predict the temperature dependence on the rate of reaction:
(A) Increase in temperature increases the rate of reaction.
(B) Increase in temperature decreases the rate of reaction.
(C) Increase in temperature by 10 °C doubles the reaction rate.
(D) An increase in temperature by 10 °C triples the rate of reaction.

Choose the correct answer from the options given below:
1. (A) and (C) only
2. (B) and (D) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options
1. 1
2. 2
3. 3
4. 4

Q.29 What is the oxidation number of the metal of $[Co(H_2O)(CN)(ox)_2]^{2-}$ coordination entity?

1. +5
2. +1
3. +3
4.+2

Options
1. 1
2. 2
3. 3
4. 4

Q.30 The order of kinetics of S_N1 reactions is:

1. First
2. Zero
3. Second
4. Third

Options
1. 1
2. 2
3. 3
4. 4

Q.31 The units of rate of reaction and rate constant are identical for a
1. Fractional order reaction
2. Zero order reaction
3. First order reaction
4. Second order reaction

Options
1. 1
2. 2
3. 3
4. 4

Q.32 Which of the following is not true with reference to evaporation of liquid?
1. The liquids having low inter-molecular forces evaporate faster.
2. The higher the temperature, the higher is the rate of evaporation.
3. Larger the surface area, larger is the rate of evaporation.
4. The evaporation rate follows the order of Water > Alcohol > Ether.

Options
1. 1
2. 2
3. 3
4. 4

Q.33 The rate of a first order reaction at a constant temperature

1. Increases as the reaction proceeds
2. Decreases as the reaction proceeds
3. May increase or decrease as the reaction proceeds
4. Remains constant as the reaction proceeds

Options
1. 1
2. 2
3. 3
4. 4

Q.34 "Wood spirit " is
1. Methanol
2. Ethanol
3. Propanol
4. Phenol

Options
1. 1
2. 2
3. 3
4. 4

Q.35 Match solution in List-I with nature of solute and solvent List-II

List-I	List-II
Solution	Solute and Solvent
(A) Amalgam of mercury in sodium	(I) solid in liquid
(B) An alloy	(II) liquid in gas
(C) A saturated solution of KCl	(III) liquid in solid
(D) Chloroform in nitrogen gas	(IV) Copper in gold

Choose the correct answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options 1. 1
2. 2
3. 3
4. 4

Q.36 The reagent used to convert propanol to 1-bromopropane is:
1. PBr3
2. Br2
3. CH3Br
4. CBr3

Options 1. 1
2. 2
3. 3
4. 4

Q.37 Colligative properties are applicable to:

1. dilute solution
2. solid solutions
3. concentrated solutions
4. only aqueous solution

Options 1. 1
2. 2
3. 3
4. 4

Q.38 Which one represents the correct reduction reaction for the $Cu^{2+}|Cu$ half-cell?

1. $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$
2. $Cu^{2+}(aq) \rightarrow Cu(s) + 2e^-$
3. $Cu(s) \rightarrow Cu^(aq) + 2e^-$
4. $Cu^{2+}(aq) + 2e^- \rightarrow Cu^+(s) + e^-$

Options 1. 1
2. 2
3. 3
4. 4

Q.39 The Lucas reagent will react fastest with:
1. $(CH_3)_3COH$
2. CH_3CH_2OH
3. $CH_3(CH_2)_2OH$
4. $CH_3CH(CH_3)OH$

Options 1. 1
2. 2
3. 3
4. 4

Q.40 Match List-I with List-II

List-I	List-II
(A) Fermentation of glucose	(I) Invertase
(B) Methanol	(II) Zymase
(C) Ethanol	(III) Poisonous even in small amounts
(D) Fermentation of sucrose	(IV) Solvent in paint industry

Choose the correct answer from the options given below:
1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options 1. 1
2. 2
3. 3
4. 4

Q.41 Read the passage carefully and answer the questions

Biomolecules are the organic compounds present as an essential constituents of living organisms in different cells. The
molecules are generally termed as macromolecules, which are carbohydrates, enzymes, nucleic acids, amino acids and proteins
etc. Carbohydrates are classified as sugars and non-sugars include sucrose, glucose, fructose, starch and cellulose. Enzymes are
coordinated with various chemical reactions in nucleic acid. Nucleic acids are found in living organisms made up of proteins and
natural polymers. Two types that are generally found in biological systems are DNA and RNA nucleic acid. Amino acids are
bifunctional groups of carboxyl and amino groups. Proteins are a class of biologically important compounds. They are crucial
to virtually all processes in living systems. Some of them are hormones, which serve as chemical messengers that coordinate
certain biochemical activities.

Cane sugar on boiling with HCl or H2SO4 hydrolysis yields

1. Two molecules of glucose
2. 1:1 mixture of Glucose and Fructose
3. Two molecules of fructose
4. No Reaction

Options 1. 1

2. 2

3. 3

4. 4

Q.42 Read the passage carefully and answer the questions

Biomolecules are the organic compounds present as an essential constituents of living organisms in different cells. The molecules are generally termed as macromolecules, which are carbohydrates, enzymes, nucleic acids, amino acids and proteins etc. Carbohydrates are classified as sugars and non-sugars include sucrose, glucose, fructose, starch and cellulose. Enzymes are coordinated with various chemical reactions in nucleic acid. Nucleic acids are found in living organisms made up of proteins and natural polymers. Two types that are generally found in biological systems are DNA and RNA nucleic acid. Amino acids are bifunctional groups of carboxyl and amino groups. Proteins are a class of biologically important compounds. They are crucial to virtually all processes in living systems. Some of them are hormones, which serve as chemical messengers that coordinate certain biochemical activities.

Glucose when treated with Bromine water forms
1. Saccharic acid
2. Gluconic acid
3. Glyceric acid
4. Glycerladehyde

Options 1. 1

2. 2

3. 3

4. 4

Q.43 Read the passage carefully and answer the questions

Biomolecules are the organic compounds present as an essential constituents of living organisms in different cells. The molecules are generally termed as macromolecules, which are carbohydrates, enzymes, nucleic acids, amino acids and proteins etc. Carbohydrates are classified as sugars and non-sugars include sucrose, glucose, fructose, starch and cellulose. Enzymes are coordinated with various chemical reactions in nucleic acid. Nucleic acids are found in living organisms made up of proteins and natural polymers. Two types that are generally found in biological systems are DNA and RNA nucleic acid. Amino acids are bifunctional groups of carboxyl and amino groups. Proteins are a class of biologically important compounds. They are crucial to virtually all processes in living systems. Some of them are hormones, which serve as chemical messengers that coordinate certain biochemical activities.

Starch is a polymer of saccharides known as

1. Glucose
2. Fructose
3. Sucrose
4. Cellulose

Options 1. 1

2. 2

3. 3

4. 4

Q.44 Read the passage carefully and answer the questions

Biomolecules are the organic compounds present as an essential constituents of living organisms in different cells. The molecules are generally termed as macromolecules, which are carbohydrates, enzymes, nucleic acids, amino acids and proteins etc. Carbohydrates are classified as sugars and non-sugars include sucrose, glucose, fructose, starch and cellulose. Enzymes are coordinated with various chemical reactions in nucleic acid. Nucleic acids are found in living organisms made up of proteins and natural polymers. Two types that are generally found in biological systems are DNA and RNA nucleic acid. Amino acids are bifunctional groups of carboxyl and amino groups. Proteins are a class of biologically important compounds. They are crucial to virtually all processes in living systems. Some of them are hormones, which serve as chemical messengers that coordinate certain biochemical activities.

The disaccharide present in milk is known as
1. Sucrose
2. Lactose
3. Maltose
4. Galactose

Options 1. 1

2. 2

3. 3

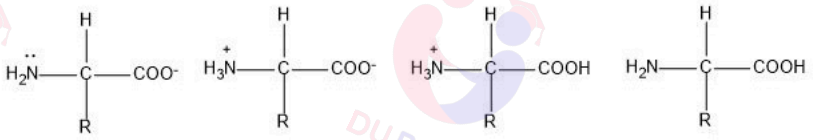
4. 4

Q.45 Read the passage carefully and answer the questions

Biomolecules are the organic compounds present as an essential constituents of living organisms in different cells. The molecules are generally termed as macromolecules, which are carbohydrates, enzymes, nucleic acids, amino acids and proteins etc. Carbohydrates are classified as sugars and non-sugars include sucrose, glucose, fructose, starch and cellulose. Enzymes are coordinated with various chemical reactions in nucleic acid. Nucleic acids are found in living organisms made up of proteins and natural polymers. Two types that are generally found in biological systems are DNA and RNA nucleic acid. Amino acids

are
bifunctional groups of carboxyl and amino groups. Proteins are a class of biologically important compounds. They are crucial
to virtually all processes in living systems. Some of them are hormones, which serve as chemical messengers that coordinate
certain biochemical activities.

The zwitterionic form of amino acid is



(A) (B) (C) (D)

1. (A)
2. (B)
3. (C)
4. (D)

Options 1. 1
2. 2
3. 3
4. 4

Q.46 Read the passage carefully and answer the questions

The transition metals and their compounds are known for their catalytic activity. This activity is ascribed to their ability to adopt
multiple oxidation states and to form complexes. Vanadium(V) oxide (in Contact Process), finely divided iron, and nickel (in
Catalytic Hydrogenation) are some of the examples. Catalysts at a solid surface involve the formation of bonds between reactant
molecules and atoms of the surface of the catalyst (first row transition metals utilise 3d and 4s electrons for bonding). This has
the effect of increasing the concentration of the reactants at the catalyst surface and also weakening of the bonds in the
reacting molecules (the activation energy is lowering). Also because the transition metal ions can change their oxidation states,
they become more effective as catalysts.

In the Wacker process the oxidation of ethene to ethanal is catalysed by _____

1. TiCl4
2. PdCl2
3. MnO2
4. KMnO4

Options 1. 1
2. 2
3. 3
4. 4

Q.47 Read the passage carefully and answer the questions

The transition metals and their compounds are known for their catalytic activity. This activity is ascribed to their ability to adopt
multiple oxidation states and to form complexes. Vanadium(V) oxide (in Contact Process), finely divided iron, and nickel (in
Catalytic Hydrogenation) are some of the examples. Catalysts at a solid surface involve the formation of bonds between reactant
molecules and atoms of the surface of the catalyst (first row transition metals utilise 3d and 4s electrons for bonding). This has
the effect of increasing the concentration of the reactants at the catalyst surface and also weakening of the bonds in the
reacting molecules (the activation energy is lowering). Also because the transition metal ions can change their oxidation states,
they become more effective as catalysts.

Reaction between iodide and persulphate ions takes place as follows:

$2I^- + S_2O_8^{2-} \rightarrow I_2 + 2SO_4^{2-}$

Which of the following catalyses the above reaction?

1. Fe^{2+}
2. Fe^{3+}
3. Mn^{2+}
4. Sn^{2+}

Options 1. 1
2. 2
3. 3
4. 4

Q.48 Read the passage carefully and answer the questions

The transition metals and their compounds are known for their catalytic activity. This activity is ascribed to their ability to adopt
multiple oxidation states and to form complexes. Vanadium(V) oxide (in Contact Process), finely divided iron, and nickel (in
Catalytic Hydrogenation) are some of the examples. Catalysts at a solid surface involve the formation of bonds between reactant
molecules and atoms of the surface of the catalyst (first row transition metals utilise 3d and 4s electrons for bonding). This has

the effect of increasing the concentration of the reactants at the catalyst surface and also weakening of the bonds in the
reacting molecules (the activation energy is lowering). Also because the transition metal ions can change their oxidation states,
they become more effective as catalysts.

Which of the following catalyses the oxidation of SO2 in the manufacture of sulphuric acid?
1. Vanadium(V) oxide
2. finely divided iron
3. nickel
4. Vanadium(II) oxide

Options 1. 1
2. 2
3. 3
4. 4

Q.49 Read the passage carefully and answer the questions

The transition metals and their compounds are known for their catalytic activity. This activity is ascribed to their ability to adopt
multiple oxidation states and to form complexes. Vanadium(V) oxide (in Contact Process), finely divided iron, and nickel (in
Catalytic Hydrogenation) are some of the examples. Catalysts at a solid surface involve the formation of bonds between reactant
molecules and atoms of the surface of the catalyst (first row transition metals utilise 3d and 4s electrons for bonding). This has
the effect of increasing the concentration of the reactants at the catalyst surface and also weakening of the bonds in the
reacting molecules (the activation energy is lowering). Also because the transition metal ions can change their oxidation states,
they become more effective as catalysts.

$TiCl_4 + Al(CH_3)_3$ is used as a catalyst in:

1. Ziegler-Natta catalysis
2. Haber's process
3. Contact process
4. Sandmeyer reaction

Options 1. 1
2. 2
3. 3
4. 4

Q.50 Read the passage carefully and answer the questions

The transition metals and their compounds are known for their catalytic activity. This activity is ascribed to their ability to adopt
multiple oxidation states and to form complexes. Vanadium(V) oxide (in Contact Process), finely divided iron, and nickel (in
Catalytic Hydrogenation) are some of the examples. Catalysts at a solid surface involve the formation of bonds between reactant
molecules and atoms of the surface of the catalyst (first row transition metals utilise 3d and 4s electrons for bonding). This has
the effect of increasing the concentration of the reactants at the catalyst surface and also weakening of the bonds in the
reacting molecules (the activation energy is lowering). Also because the transition metal ions can change their oxidation states,
they become more effective as catalysts.

Which of the following is incorrect about the ability of catalytic action of transition metals?
1. ability to form complexes
2. ability to adopt multiple oxidation states
3. weakening of the bonds in the reacting molecules-catalyst complex
4. formation of bonds between reactant molecules and catalyst

Options 1. 1
2. 2
3. 3
4. 4