Step Academy official

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CLASS	10th
SUBJECT	Chemistry
TOTAL MARKS	
Paper Type	

Choose the correct answer.

1. Which of the following does not happen, when a system is at equilibrium state?

(A) Forward and reverse reactions stop

(B) Forward and reverse rates become equal

(C) Concentration of reactants and products stop changing

(D) Reaction continues to occur in both the directions.

2. For a reversible reaction $K_C = \frac{[C]^2}{[A][B]}$ Which substance is product of the reaction?

(A) A **(B)** B **(C)** Both a and b **(D)** C

3. Which of the following reaction will not have any units of Kc?

(A) $H_{2(g)} + CO_{2(g)} \rightleftharpoons H_2O_{(g)} + CO_{(g)}$

(B) $N_{2(g)} + O_2 \rightleftharpoons 2NO_{(g)}$

(C) $2A_{(g)} + B_{(g)} \rightleftharpoons 3AC_{(g)}$

(D) All of these

4. Concentration of reactants and products at equilibrium remains unchanged if:

(A) concentration of any reactant or product is not changed

(B) temperature of the reaction is not changed

(C) pressure or volume of the system is not changed.

(D) all of the above are observed

5. What are the units for $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{2(g)}$

(A) $mol.dm^{-3}$ **(B)** $mol^2.dm^6$ **(C)** $dm^3.mol^{-1}$ **(D)** No units

6. For which reactions, Kc has units of $mol.dm^{-3}$.

(A) $2NO_{2(g)} \rightleftharpoons N_2O_{4(g)}$

(B) $2NO_{2(g)} \rightleftharpoons N_2O_{4(g)}$

(C) $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{5(g)}$

(D) $2ICl_{(g)} \rightleftharpoons I_{2(g)} + Cl_{2(g)}$

7. Active mass means:

(A) total mass of reactants

(B) total mass of products

(C) total mass of reactants and products

(D) mass of substance in moles per dm^3 in a dilute solution

8.

Which is true about the equilibrium state?

(A) The forward reaction stops.

(B) The reverse reaction stops.

(C) Both forward and reverse reactions stops.

(D) Both forward and reverse reactions continue at the same rate.

9. In an irreversible reaction equilibrium is:

(A) established quickly **(B)** established slowly **(C)** never established **(D)** established when reaction stops

10.
When a mixture of H2 and is sealed in a flask and temperature is kept at 25oC, following equilibrium is established.
$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$ Which substance or subtances will be present in the equilibrium mixture?

(A) H_2 and I_2 **(B)** HI only **(C)** H_2 only **(D)** H_2, I_2 and HI

11.
Milk of magnesia contains $Mg(OH)_2$. It is used as antacid. It neutralizes excess stomach acid. Which salt is formed in this reaction?

(A) $MgSO_4$ **(B)** $MgCO_3$ **(C)** $MgCl_2$ **(D)** MgO

12. NH_3 cannot be classified as a base by:

(A) Lewis theory **(B)** Bronsted-Lowry theory **(C)** Arrhenius theory **(D)** All of these theories

13. Consider the following reaction? $H_2O + HCl \rightleftharpoons H_3O^+ + Cl^-$
Which species is an electron pair acceptor in this reaction?

(A) H^2O **(B)** HCl **(C)** H^3O^+ **(D)** None

14. A drain cleaner solution contains 1.0×10^{-8} M, OH concentration. This solution is:

(A) acidic **(B)** basic **(C)** neutral **(D)** cannot be predicted

15. Which of the following is a Lewis base?

(A) BF_3 **(B)** HCl **(C)** $AlCl_3$ **(D)** F

16. Which of the following is a Lewis base?

(A) BF_3 **(B)** HCl **(C)** $AlCl_3$ **(D)** F

17.

An aqueous solution of NaOH is used as a drain cleaner. If the concentration of OH- ions in this solution is 1.0×10^{-5} M, the concentration of H^+ ions in it would be?

(A) 1.0×10^{-5} M **(B)** 1.0×10^{-7} M **(C)** 1.0×10^{-9} M **(D)** 1.0×10^{-14} M

18. In the following reaction which species is donating an electron pair? $NH_3 + BF_3 \rightarrow H_3N - BF_3$

(A) H **(B)** B **(C)** N **(D)** BF_3

19. Choose Lewis acid:

(A) CN **(B)** $\ddot{N}H_3$ **(C)** H_2O **(D)** H^+

20. Which of the following cannot be classified as Arrhenius acid?

(A) HNO_3 **(B)** H_2CO_3 **(C)** CO_2 **(D)** H_2SO_4

21. Ammonia is a base, because it:

(A) Ionizes in water to OH^- ions **(B)** Contains OH group **(C)** Can accept an electron pair **(D)** Can accept proton

22. Which of the following is an alcohol?

(A) CH_3-CH_2-O-CH_2-CH_3 **(B)** CH_3-CH_2-COOH **(C)** C_6H_5-OH **(D)** CH_3-CH_2-OH

23. Which compound is not a saturated hydrocarbon?

(A) CH_3-CH_3 **(B)** CH_4 **(C)** CH_3-CH=CH_2 **(D)** CH_3-CH_2-CH_3

24. Stem "But" stands for how many Carbon atoms.

(A) 2 **(B)** 3 **(C)** 4 **(D)** 5

25. Formic acid contains functional group:

(A) -OH **(B)** -CO- **(C)** -COOH **(D)** -CHO

26. CH_3-CH_2-CH_3 is the chemical formula for:

(A) Ethane **(B)** Propane **(C)** Butane **(D)** Pentane

27. In which of the following compounds, oxygen is attached to two alkyl carbon atoms?

(A) alcohol **(B)** phenol **(C)** ether **(D)** ester

28. The functional group of amines is:

(A) -OH **(B)** -COOH **(C)** $-NH_2$ **(D)** -CHO

29. Pitch is produced by:

(A) Coal **(B)** Coal tar **(C)** Coal gas **(D)** Petroleum

30. Condensed structural formula for butane is:

(A) $CH_3 - CH_2 - CH_3$ **(B)** $CH_3CH_2CH_2CH_3$ **(C)** $CH_3 - CH_2- CH_2- CH_2- CH_3$ **(D)** CH_3-CH_3

31. The functional group is found in:

(A) alcohols **(B)** Ketones **(C)** Carboxylic acids **(D)** esters

32. Ethene and ethyne can be differentiated by:

(A) Hydrogenation **(B)** Bromine water **(C)** Strong alkaline aqueous solution of $KMnO_4$ **(D)** Hydrohalogenation

33. By dehydration we mean, the removal of:

(A) Hydrogen **(B)** Water **(C)** Halogen **(D)** Hydrogen halide

34. Which process produces an alkane?

(A) Combustion **(B)** Hydration **(C)** Dehydration **(D)** Hydrogenation

35. Which substance reacts with $KMnO_4$ to produced oxalic acid?

(A) Ethane **(B)** Ethene **(C)** Ethyne **(D)** Ethyl alcohol

36. Which is used for dehydrohalogenation?

(A) Br_2 water **(B)** Conc. H_2SO_4 **(C)** Al_2O_3 **(D)** Alcoholic KOH

37. Which reacts explosively with methane?

(A) F_2 **(B)** Cl_2 **(C)** Br_2 **(D)** I_2

38. Which molecule contains a carbon-carbon double bond?

(A) Ethane **(B)** Ethene **(C)** Ethyne **(D)** Ethyl alcohol

39. The reduction of alkyl halides takes place in the presence of:

(A) Al_2O_3 at 350^0C **(B)** Conc. H_2SO_4 at 170^0C **(C)** Zn + Dust **(D)** Zn + HCl

40.

By dehydration we mean, the removal of:

(A) Hydrogen **(B)** Water **(C)** Halogen **(D)** Hydrogen halide

41. Ethene and ethyne can be differentiated by:

(A) Hydrogenation **(B)** Bromine water **(C)** Strong alkaline aqueous solution of $KMnO_4$ **(D)** Hydrohalogenation

42. Soaps and detergents are made from:

(A) proteins **(B)** carbohydrates **(C)** fats and oils **(D)** all of these

43. Glucose is a:

(A) tetrose **(B)** pentose **(C)** disaccharide **(D)** hexose

44. Which is not a protein?

(A) gelation **(B)** antibodies **(C)** enzymes **(D)** cholesterol

45. Which is not a source of starch?

(A) wheat **(B)** rice **(C)** cotton **(D)** potato

46. Which is not a dextrose sugar:

(A) glucose **(B)** mannose **(C)** galactose **(D)** fructose

47. Plants convert glucose into:

(A) starch **(B)** lipids **(C)** proteins **(D)** amino acids

48. Raffinose $C_{18}H_{32}O_{16}$ is a:

(A) monosaccharide **(B)** disaccharide **(C)** oligosaccharide **(D)** polysaccharide

49. Which is not present in DNA.

(A) deoxyribose sugar **(B)** ribose sugar **(C)** phosphate unit **(D)** nitrogen base

50. Raffinose, $C_{18}H_{32}O_{16}$ on hydrolysis forms _____ simple sugars.

(A) 1 **(B)** 2 **(C)** 3 **(D)** 3 to 9

51. Which compound found in every living cell, serves as the information and control center?

(A) amino acid **(B)** protein **(C)** lipid **(D)** DNA

52. The ozone layer is found in.

(A) The troposphere **(B)** The mesosphere **(C)** The thermosphere **(D)** The stratosphere

53. Which is/are responsible for acid rain?

(A) SO_2 **(B)** NO_2 **(C)** Both NO_2 and SO_2 **(D)** O_3

54. Which layer is closest to the Earth?

(A) The stratosphere **(B)** The troposphere **(C)** The mesosphere **(D)** The thermosphere

55. Which gas has highest percentage in the air:

(A) O_2 **(B)** CO_2 **(C)** N_2 **(D)** O_3

56. Stratosphere extends up to:

(A) 12 km **(B)** 15 km **(C)** 50 km **(D)** 80 km

57. Troposphere extends up to:

(A) 50 km **(B)** 12 km **(C)** 18 km **(D)** 80 km

58. Which is reddish brown gas?

(A) NO **(B)** NO_2 **(C)** SO_2 **(D)** O_3

59. Lowest temperature in stratosphere is:

(A) -5^0C **(B)** -55^0C **(C)** 5^0C **(D)** 55^0C

60. The outermost layer of earth atmosphere is:

(A) The mesosphere **(B)** The stratosphere **(C)** The troposphere **(D)** The thermosphere

61. Most air pollution is caused by:

(A) Ozone **(B)** Acid rain **(C)** Carbon monoxide **(D)** The burning of fossil fuels

62. Which is used to remove permanent hardness in water?

(A) slaked lime **(B)** washing soda **(C)** boiling water **(D)** all of these

63. The density of water is maximum at:

(A) 0^0C **(B)** 4^0C **(C)** 100^0C **(D)** -4^0C

64. Heating calcium hydrogen carbonate produces.

(A) CO_2 **(B)** H_2O **(C)** $CaCO_3$ **(D)** All of these

65. Which salt causes temporary hardness in water?

(A) magnesium sulphate **(B)** calcium sulphate **(C)** both calcium sulphate and magnesium sulphate **(D)** magnesium hydrogen carbonate

66. Which of the following is not a water born disease?

(A) hepatitis **(B)** typhoid **(C)** dysentery **(D)** anemia

67. Percentage of sodium chloride in sea water is:

(A) 0.02 **(B)** 3.4 **(C)** 97 **(D)** 2

68. Which human activity results in contamination of water bodies?

(A) livestock waste **(B)** pesticides **(C)** septic tanks **(D)** all of these

69. Which human activity results in contamination of water bodies?

(A) livestock waste **(B)** pesticides **(C)** septic tanks **(D)** all of these

70. Which salt does not cause the water to become hard?

(A) calcium hydrogen carbonate **(B)** magnesium hydrogen carbonate **(C)** magnesium sulphate **(D)** sodium chloride

71. Which of the following in not a raw material for the manufacture of soda ash.

(A) ammonia **(B)** carbon monoxide **(C)** brine **(D)** lime stone

72.
The separation of minerals from gangue is called concentration. Which of the following methods is used for concentration?

(A) smelting **(B)** roasting **(C)** refining **(D)** floatation

73.
Calcination is the process in which sodium hydrogen carbonate is heated to get sodium carbonate. Which is not obtained in this process?

(A) CO_2 **(B)** CO **(C)** Na_2CO_3 **(D)** H_2O

74. Percentage of nitrogen in urea is:

(A) 35 **(B)** 21.2 **(C)** 80 **(D)** 46.6

75. In electrolytic refining of copper, _____ is used as anode.

(A) pure copper **(B)** impure copper **(C)** copper sulphate **(D)** electrolytic tank

76. Chemical formula of slaked lime is:

(A) $CaCO_3$ **(B)** CaO **(C)** $Ca(OH)_2$ **(D)** $CaCl_2$

77. Which of the following steps is not used in the extraction process of metalls:

(A) roasting **(B)** smelting **(C)** flotation **(D)** bessemerization

78. What happens when ammonium carbamate is distilled with steam?

(A) ammonia is produced **(B)** carbon dioxide is released **(C)** urea is produced **(D)** urea solution is produced

79.
A mixture of Cu_2S and FeS called matter is produced in one of the metallurgical operations in the extraction of copper. The name of this operation is.

(A) smelting **(B)** roasting **(C)** bessemerization **(D)** electro-refining

80. The naturally occurring metallic compounds are called as:

(A) ore **(B)** gangue **(C)** mineral **(D)** rock

Write short answers of the following questions.

1 . Differentiate between forward and reverse reactions.

2 . State conditions for equilibrium.

3 . What is the importance of equilibrium constant for a chemical reaction?

4 . Following reaction can occur during lightning storms
$3O_{2(g)} \rightleftharpoons 2O_{3(g)}$ For this reaction write (b) Determine the units of equilibrium constant.

5 .
Coal reacts with hot steam to form CO and H2. These substances react further in the presence of a catalyst to give methane and water vapour. $CO_{(g)} + 3H_{2(g)} \rightarrow CH_{4(g)} + H_2O_{(g)}$
(a) Write forward and reverse reactions for it.

6 .
Coal reacts with hot steam to form CO and H2. These substances react further in the presence of a catalyst to give methane and water vapour. $CO_{(g)} + 3H_{2(g)} \rightarrow CH_{4(g)} + H_2O_{(g)}$
(c) Determine units for Kc.

7 .
Write equilibrium constant expression for each of the following reactions. (b) $CO_{(g)} + 2H_{2(g)} \rightleftharpoons CH_3OH_{(g)}$

8 .
Write equilibrium constant expression for each of the following reactions. (d) $4HCl_{(g)} + O_{2(g)} \rightleftharpoons 2Cl_{2(g)} + 2H_2O_{(g)}$

9 . Determine the units of equilibrium constants for the following reactions. (d) $N_{2(g)} + 2O_{2(g)} \rightleftharpoons 2NO_2$

10 . Describe the macroscopic characteristics of an equilibrium reaction.

11 . Write the equation for the self-ionization of water.

12 .
Ammonium hydroxide and nitric acid react and produce ammonium nitrate and water. Write balanced chemical equation for this neutralization reaction.

13 .
Write balanced chemical equations for the following neutralization reactions. (ii) Sulphuric acid + Sodium hydroxide → Sodium sulphate + water.

14 . Identify Bronsted-Lowry acids or bases in the following reaction. (i) $HNO_3 + H_2O \rightarrow H_3O^+ + NO_3^-$

15 . Identify Lewis acid and Lewis base in the following reactions.
(i) $F^- + BF_3 \rightarrow [BF_4]^+$

16 . Identify Lewis acid and Lewis base in the following reactions.
(iii) $NH_3 + AlCl_3 \rightarrow [H_3N - AlCl_3]$

17 .
Classify the following solutions as acidic, basic or neutral. (ii) A solution that has hydrogen ion concentration 1.0×10^{-10} M.

18 .
Classify the following solutions as acidic, basic or neutral. (iv) A solution that has hydroxyl ion concentration 1.0×10^{-10} M.

19 .
Identify Bronsted acids and Bronsted bases in the following reactions. (ii) $HCO^-_{3(g)} + H_2O_{(l)} \rightleftharpoons CO^{-2}_{3(aq)} + H_3O^+_{(aq)}$

20 .
Identify Bronsted acids and Bronsted bases in the following reactions. (iv) $HCl_{(aq)} + HCO^-_{3(aq)} \rightleftharpoons H_2CO_{3(aq)} + Cl^-_{(aq)}$

21 . Identify Bronsted acids and Bronsted bases in the following reactions. (vi) $H_2S + NH_3 \rightleftharpoons NH_4^+ + HS^-$

22 .
Identify the Lewis acids and the Lewis bases in the following reactions. (ii) $B(OH)_{3(s)} + OH^-_{(aq)} \rightarrow B(OH)^-_{4(aq)}$

23 .
Identify the Lewis acids and the Lewis bases in the following reactions. (iv) $OH^-_{(aq)} + Al(OH)_{3(s)} \rightarrow Al(OH)^-_{4(aq)}$

24 . Classify water as proton donor or proton acceptor.

25 .
Write equations showing the ionization of the following as Bronsted-Lowery acids. (a) $HNO_{2(aq)}$ (b) $HCN_{(aq)}$

26 . What is catenation?

27 . Give three examples of alkyl groups.
(i) Methyl CH_3-
(ii) Ethyl CH_3CH_2-
(iii) Propyl $CH_3-CH_2-CH_2-$

28 . What is the difference between an alkane and an alkyl radical?

29 .

Identify the following compounds on the basis of functional groups they contain and encircle the functional group.
(i) CH_3-CH=CH_3

30 .
What is the name of the alkyl group obtained by removing an end hydrogen atom from (i) propane (ii) ethane

31 .
Identify the type of following compounds as an alcohol, aldehyde or ketone: (a) HCHO, which is used to manufacture polymers, such as urotropine which is used to treat urinary tract infection.

32 .
Identify the type of following compounds as an alcohol, aldehyde or ketone: (c) CH_3CH_2OH, which is used in the preparation of many organic substances such as plastics, cosmetics, tinctures etc.

33 . Give three examples of unsaturated hydrocarbons?

34 . What do you mean by dehydration reaction? Give one example.

35 . How can you convert methane into carbontetrachloride?

36 . How can you convert ethyl chloride into ethane?

37 . Draw electron dot and cross structure for Propane?

38 . Draw electron dot and cross structure for Propene?

39 . Decide, whether sucrose is a disaccharide or monosaccharide. Give reason.

40 . Write the formula of an amino acid and identify functional groups in it?

41 . Distinguish between mono, di- and tri-saccharides. Give examples.

42 . Explain hydrogenation of vegetable oil?

43 . Explain the use of dextrose in drips?

44 . List two main sources of acid rain?

45 . Define atmosphere?

46 . List the impurities present in rain water?

47 . In what ways, industrial wastes pollute water?

48 . List some waterborne diseases?

49 . Give chemical equation for the reaction of slaked lime with alum?

50 . Give chemical equation for the reaction that occurs when temporary hard water is boiled?

51 . How are urea prills produced?

52 .

Write chemical reactions that take place during carbonation in Solvay process?

53 . Write chemical reactions that take place during urea formation?

54 .
Petroleum is a mixture of several compounds, which are separated in a refinery. What is the name of the apparatus used for this purpose?

55 .
Petroleum is a mixture of several compounds, which are separated in a refinery. Write name of the fraction that represents gases?

Write detailed answers of the following questions.

1 .
Bacteria in our mouth feed on small particles of food stuck to out teeth and change it into acid. Explain how using toothpaste of pH 10 can help to prevent the acid from damaging our teeth?

2 .
Given a molecular formula of a compound containing C, H and O and single bonds. List all the possible functional groups this compound can have?

3 .
Polyvinyl chloride (PVC) is a polymer, it is used for making vinyl sheets, drainage pipes, wire insulation etc. It is obtained from vinyl chloride.
Classify Vinyl chloride as saturated or unsaturated compound.

4 . Water adds to ethene according to the following reaction.
Identify functional groups in the reactant and product molecules.

5 . Write chemical equation for the preparation of propene from $CH_3 - CH_2 - CH_2 - OH$

6 . Write structural formulas for the products which are formed when 1-butene is reacted with H2/Ni

7 . Write a chemical equation to show the preparation of an alkane from an alkene and an alkyne?

8 .
Write a chemical equation to show the preparation of ethyne from dehalogenation of 1,2 dihalide and a tetrahalide?

9 . List some industrial uses of ethene and ethyne?

10 . Identify A, B, C, D in the following reaction.

Propene $\xrightarrow{Br_2}$ A $\xrightarrow{\text{alcohol KOH}}$ B

Ethyalcohol $\xrightarrow{\text{Conc } H_2SO_4}$ C $\xrightarrow{Br_2}$ D

11 . Differentiate between ethene and ethyne?

12 . Write structural formula of an amino acid containing four carbon atoms.

13 . Draw the structure of the molecules. A protein containing two amino acids.

14 . What three elements are important in both proteins and carbohydrates?

15 . Explain temperature variation in stratosphere and troposphere?

16 . Describe the sources of air pollutants?

17 . Describe ozone depletion and the effects?

18 . Differentiate between stratosphere and troposphere?

19 . Why is global warming often referred to as the greenhouse effect?

20 . Sulphur dioxide is a common pollutant from burning coal. State two effects caused by this pollutant?

21 . There have been various attempts to remove sulphur from coal before it is burned. Illustrate.

22 . Certain human activities are responsible for a significant increase in greenhouse effect, argue?

23 . What is hard water? Why is it sometimes undersirable?

24 . How can buildings made of limestone be affected by acid rain?

25 . List some disadvantages of water hardness?

26 . How does hard water differ from soft water?

27 . Explain how hard water hampers the cleansing action of soap?

28 . What are some health effects of biological contamination of water?

29 . What are some health effects of biological contamination of water?

30 . Public health depends on water quality. Give arguments.

31 .
The following chemical equation is about a calcium compound. Comp A + $Ca(OH)_2$ Comp B + H_2O
Comp B + H_2CO_3 Comp C
Name and give the formula of (1) Compound A (2) Compound C

32 .
The following chemical equation is about a calcium compound. Comp A + $Ca(OH)_2$ Comp B + H_2O
Comp B + H_2CO_3 Comp C
Compound C is soluble in water. Write a balanced chemical equation to show what happens when its aqueous solution is treated with washing soda?

33 . It is advisable to wash hands well with soap after using bathrooms, evaluate it?

34 . Evaluate the advantages of waste water treatment?

35 . State five specific products made from crude oil?

36 . Draw flow sheet diagram of Solvay process?

37 . Make a list of raw materials for Solvay process?

38 . Relate the study of chemistry to careers in industry?

39 . Petroleum is a sources of fuels. Name two fuels which are not obtained from petroleum?

40 . The table below lists some petroleum fractions with their approximate boiling points.

Fraction	Approximate Boiling Point/0C
P	Below 20
Q	35 - 70
R	170 - 250
S	350 - 500

(a) Name the process by which the fractions are obtained from petroleum?
(b) Which fraction will contain the shortest chain molecules?
(c) Which fraction will contain the longest chain molecules?
(d) In what state will fraction P be at room temperature and pressure?