

Answer all the questions.

Each question is followed by four options lettered A to D. Find the correct option for each question and shade in pencil on your answer sheet, the answer space which bears the same letter as the option you have chosen. Give only one answer to each question. An example is given below.

Which of the following elements reacts with water?

- A. Carbon
- B. Sodium
- C. Sulphur
- D. Iodine

The correct answer is Sodium which is lettered B and therefore answer space B would be shaded.

A B C D

Think carefully before you shade the spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. Which of the following arrangements is in order of increasing acid strength?
 - A. H_2O , $\text{C}_2\text{H}_5\text{OH}$, HCOOH
 - B. HCOOH , H_2O , $\text{C}_2\text{H}_5\text{OH}$
 - C. $\text{C}_2\text{H}_5\text{OH}$, HCOOH , H_2O
 - D. $\text{C}_2\text{H}_5\text{OH}$, H_2O , HCOOH
2. The relative molar mass of Calcium nitride is
[Ca = 40.0, N = 14.0]
 - A. 54.
 - B. 148.
 - C. 94.
 - D. 82.
3. What is the quantity of electricity that flows when a current of 0.5 A is passed through an electrolyte for 5 hrs 45 mins?
[1F = 96500C]
 - A. 0.11 F
 - B. 2.20 F
 - C. 0.22 F
 - D. 0.12 F
4. The current required to deposit 10.8 g of silver in 1hr 15 mins. is
[Ag = 108, 1F = 96500C]
 - A. 1.00 A
 - B. 2.14 A
 - C. 2.00 A
 - D. 1.50 A
5. Galvanization of iron is necessary to
 - A. protect it from corrosion.
 - B. give it more tensile strength.
 - C. make it more malleable.
 - D. remove impurities from it.
6. How many electrons are in ${}_{13}^{27}\text{Al}^{3+}$?
 - A. 10
 - B. 16
 - C. 14
 - D. 13

7. Which of the following gases dissolves in water to give an acidic solution?
- Chlorine
 - Nitrogen
 - Oxygen
 - Hydrogen
8. Carbon is used in the purification of drinking water to
- remove solid particles.
 - remove taste and odour.
 - disinfect the water.
 - reduce the salt content.
9. Variation in the chemical properties of metals are due to differences in their
- molar masses.
 - physical properties.
 - number of electron shells.
 - number of valence electrons.
10. Consider the reaction equation :
- $$X_{(g)} + Y_{(g)} \rightleftharpoons XY_{(g)} \quad \Delta H = +220 \text{ KJ mol}^{-1}$$
- If the temperature of the system is increased, the
- forward reaction would be favoured.
 - reaction would be slower.
 - reaction would be at equilibrium.
 - backward reaction would be favoured.
11. Which of the following formulae is an empirical formula?
- C_4H_{10}
 - H_2O_2
 - CH_4
 - C_2H_4
12. Consider the following electrochemical cell notation:
- $$Fe_{(s)} / Fe^{2+}_{(aq)} // Ag^{2+}_{(aq)} / Ag_{(s)}$$
- Which of the following statement about the cell is correct?
- Reduction occurs at the iron electrode.
 - The iron electrode functions as the anode.
 - Electrons flow from the silver electrode to the iron electrode.
 - Oxidation occurs at the silver electrode.
13. The pH of a slightly alkaline solution would likely be
- 2.
 - 12.
 - 8.
 - 7.
14. A decrease in the temperature of a reaction results in a decrease in reaction rate due to
- increased collision.
 - decrease in activation energy.
 - increased speed of molecules.
 - lower reaction energy.
15. The percentage purity of a sample of sodium hydroxide is 80 %. What mass of it would be required to prepare 1.0 mol dm^{-3} solution in 1 dm^3 flask?
- [NaOH = 40.0 gmol^{-1}]
- 100 g
 - 40.0g
 - 50.0g
 - 60.0g

16. If the densities of hydrogen and oxygen are 0.5 g dm^{-3} and 8.0 g dm^{-3} respectively, what would be the ratio of their rates of diffusion under the same conditions of temperature and pressure?
- 1:1
 - 16:1
 - 8:1
 - 4:1
17. Which of the following compounds is a bleaching agent?
- Na_2CO_3
 - AgCl
 - KClO_3
 - CaOCl_2
18. The rate of a reaction depends on the frequency of effective collision between
- product particles.
 - reacting particles and the vessel.
 - reactant and product particles.
 - reactant particles.
19. The substance that causes the reduction of Fe_2O_3 in the blast furnace is
- CaO .
 - CaCO_3 .
 - SiO_2 .
 - CO .
20. In galvanic cells, the metal with a **higher** reduction potential serves as the
- anode.
 - salt bridge.
 - electrolyte.
 - cathode.
21. The energy required to break one mole of an ionic crystal into its isolated gaseous ions is
- atomization energy.
 - sublimation energy.
 - lattice energy.
 - enthalpy of formation.
22. What is the correct sequence for the processes occurring in the mass spectrometer?
- Vapourization, ionization, acceleration, deflection
 - Ionization, vapourization, deflection, acceleration
 - Ionization, vapourization, acceleration, deflection
 - Vapourization, acceleration, ionization, deflection
23. The oxidation number of iron in the compound $\text{Na}_3\text{Fe}(\text{CN})_6$ is
- +2.
 - +5.
 - +4.
 - +3.
24. The mass of 1.51×10^{23} molecules of carbon (IV) oxide is
 $[N_A = 6.0 \times 10^{23}, \text{CO}_2 = 44.0 \text{ g mol}^{-1}]$
- 22.0 g.
 - 0.55 g.
 - 5.5 g.
 - 11.0 g.

Which of the following hydroxides is amphoteric ?

- A. $\text{Al}(\text{OH})_3$
- B. $\text{Ca}(\text{OH})_2$
- C. $\text{Fe}(\text{OH})_3$
- D. $\text{Mg}(\text{OH})_2$

Which of the following observations will be made during the electrolysis of copper(II) tetraoxosulphate (VI) solution using copper anode and carbon cathode ?

- I. The anode dissolves
- II. The colour of the solution remains the same
- III. Hydrogen ions are discharged at the cathode

- A. I only
- B. II and III only
- C. III only
- D. II only

In the presence of phenolphthalein, alkali shows

- A. green colour.
- B. orange colour.
- C. violet colour.
- D. pink colour.

Which of the following statements about a buffer solution is correct?

- A. It is usually a small amount of an acid.
- B. Addition of small amount of alkali increases the pH of the solution.
- C. Addition of small amount of acid reduces the pH of the solution.
- D. It resists a change in pH on addition of either small amount of an acid or an alkali.

Which of the following substances is added to the iron ore and coke in the blast furnace during the extraction of iron ?

- A. Calcium oxide
- B. Sulphur
- C. Hydrogen
- D. Limestone

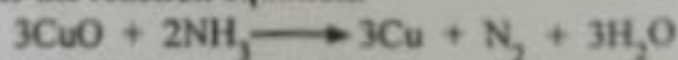
Dilution of ethanoic acid solution increases its electrical conductivity due to

- A. increase in solubility.
- B. decrease in solubility.
- C. decrease in dissociation.
- D. increase in dissociation.

Which of the following substances could be reduced by hydrogen gas?

- A. Calcium oxide
- B. Silver oxide
- C. Magnesium oxide
- D. Potassium oxide

Consider the reaction equation:



What is the oxidizing agent in the reaction?

- A. N_2
- B. NH_3
- C. Cu
- D. CuO

33. Which of the following molecules would displace chlorine from an aqueous solution of its salt?

- A. I_2
- B. Al_2
- C. I_3
- D. Hl_2

34. Consider two elements X and Y with the following electron configuration



The formula of the compound formed between the elements is

- A. XY
- B. X_2Y
- C. XY_3
- D. XY_2

35. The IUPAC name of the compound $(CH_3)_3CCH_2CH_3$ is

- A. 1,1,1-trimethylpropane.
- B. 2,2-dimethylhexane.
- C. 3,3-dimethylbutane.
- D. 2,2-dimethylbutane.

36. Which of the following substances is **not** an isotope of hydrogen?

- A. Deuterium
- B. Tritium
- C. Protium
- D. Hydroxonium

37. The use of slaked lime to adjust soil acidity is based on

- A. decomposition.
- B. neutralization.
- C. nitrification.
- D. precipitation.

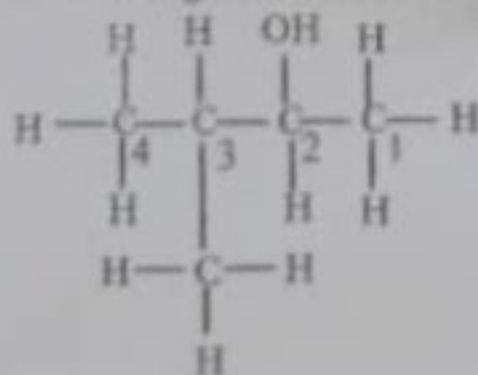
38. Which of the following statements about chemical change is **correct**? It

- A. can be reversed by physical means.
- B. is not accompanied by heat change.
- C. results in the formation of new elements.
- D. occurs only when substances react.

39. The number of peaks in a mass spectrum, represents the number of

- A. atoms.
- B. allotropes.
- C. isotopes.
- D. ions.

40. Which of the following atoms numbered 1 to 4 is a secondary carbon atom?



- A. 4
- B. 1
- C. 2
- D. 3

41. Complete hydrogenation of benzene produces
- cyclohexene.
 - ethyne.
 - cyclohexane.
 - margarine.
42. The advantage of detergent over soap is that detergents
- are readily available.
 - lather readily with water.
 - are non-biodegradable.
 - are in powdered form.
43. The pH of $0.01 \text{ mol dm}^{-3} \text{ HNO}_3$ is
- 0.1.
 - 2.0.
 - 1.0.
 - 0.2.
44. Which of the following compounds would **not** give a precipitate with AgNO_3 ?
- $\text{CH}_3\text{C}\equiv\text{CCH}_3$
 - $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH}$
 - $\text{CH}_3\text{C}\equiv\text{CH}$
 - $\text{HC}\equiv\text{CH}$
45. What is the pOH of a solution whose pH is 4.5?
- 5.5
 - 11.5
 - 9.5
 - 7.5
46. All pure samples of the same chemical compound contain the same elements combined in the same proportion by mass. This is a statement of the law of
- conservation of mass.
 - multiple proportions.
 - definite proportion.
 - reciprocal proportion.
47. Ethanol is produced by
- hydrolysis of sucrose.
 - distillation of wood.
 - fermentation of starch.
 - catalytic oxidation of methane.
48. In the extraction of iron from its ore, the coke used
- acts as a catalyst.
 - reduces the amount of heat produced.
 - produces carbon (II) oxide.
 - oxidizes the Fe to Fe_2O_3 .