CHEMISTRY

CARBON AND ITS COMPOUNDS

1. mark questions

1. Name of the organic compound, which can be produced by fermentation of sugar and is a constituent of beer.
2. Name the main products formed when :
   (i) Ethanol is oxidized by an alkaline solution of $KMnO_4$
   (ii) Ethanol is heated with conc. H_2SO_4
3. What is denatured alcohol
4. Name the product formed besides soap that is obtained during saponification process.
5. The molecular formula of the consecutive members of a homologous are C_6H_{14} and C_7H_{16}. Write the molecular formulae of members having 9 and 11 carbon atoms of this homologous series.
6. Write the names of functional groups present in (a) ethanol (b) ethanoic acid.
7. The structural formula of an ester is C2H5COOH3

   Write the molecular formula of the alcohol and acid from which it would have been formed.
8. The molecular formulae of two members of a homologous series are C_3H_4 and C_6H_{10}
9. Which of the following belonging to the same homologous series ? Why ? C_3H_8, C_3H_6, C_4H_8, C_4H_6.
10. What are addition reactions ? Give example
11. What is the difference between two consecutive members of a homologous series.
    (i) in terms of molar mass
    (ii) in terms of number and kind of atoms ?
12. Complete the equation :$C_2H_5COOH + NaOH \xrightarrow{heat}$
13. What type of bounds are present in hydrocarbons ? Why are they insoluble in water ?

14. Why do some people add common salt during the preparation of soap ?
15. Why have detergents replaced soap as a washing agent ?
16. Explain why ethene decolourises bromine water whereas ethane does not.
17. What is meant by saponification ?
18. What is vinegar ?
19. Give one advantage of daughter over soap. Why does soap form white precipitate with hard water ?
20. What are the two properties of carbon which lead to the huge number of carbon compounds we see around us ?

2 mark questions

21. Give reason for the following :
    (i) Burning of ethanol gives CO_2 while ethanol when oxidized with alkaline $KMnO_4$ produces ethanoic acid.
    (ii) Alcohol supplied for industrial purpose is mixed with copper sulphate.
22. Complete the following equations and write the names of products formed :
    (i) $C_3H_7COOH + NaOH \xrightarrow{heat}$
    (ii) $CH_3OH + O_2 \xrightarrow{heat}$
23. Explain given reason : Detergents made up molecules, in which branches is minimum, are preferred these days.
24. Name the product obtained and the chemical equations for oxidation of ethanol to different stages.
25. Explain the cleansing action of soaps with diagram.
26. An organic compounds 'A' is a constituent of antifreeze. The compound on heating with oxygen forms another compounds B which has a molecular formula $C_2H_4O_2$. Identify the compound 'A' and 'B'. Write the chemical equation of the reaction that takes place to form the compound 'B'.

27. Compound 'X' is a symmetrical gaseous hydrocarbon. Its molecular mass in 28. Write the chemical reaction of 'X' with H_2 gas in Nickel.

28. An organic compound 'X' which is sometimes used as an anti-freeze has the molecular formula C2H6O. 'X' on oxidation gives a compound 'Y' which gives effervescene with a backing soda solution. What can 'X' and 'Y' be ? Write their structural formulae.

29. What are synthetic detergents ? Give one example of synthetic. Write its two advantages over soap.

30. Why is mixture of water and alcohol used instead of water in radiators of vehicles in clod counties ? Give one reasons.

3 mark questions

31. (a) Write the chemical equation representing the conversion of ethane.

(b) Name of product obtained when butanol is oxidized by acidified K2Cr2O7.

32. What happens when ethanoic acid reacts with (i) Magnesium (ii) Sodium carbonate and (iii) Sodium hydroxide ? Write the necessary chemical equation in each case.

33. What are esters ? How are they formed ? Where do they occur in nature ? Give one example.

34. Give an example each of (i) a straight chain hydrocarbon, (ii) branched chain hydrocarbon and (iii) ring chain hydrocarbon.

35. What is an homologous series ? Explain with an example.

36. An organic compound 'A' has molecular formula C_3H_8O. This compound, on heating with alkaline potassium permanganate or acidified potassium dichromate, gives another organic compound 'B' which turns blue litmus red. Identify the compound 'A'. Write chemical equation of the reaction that takes place to form the compound 'B'. Name the compound 'B'.

37. A neutral organic compound A of molecular formula C_2H_6O, on oxidation with potassium dichromate and sulphuric acid, gives an acidic compound B. The compound A reacts with B on warming in the

presence of conc. H_2SO_4 to give a sweet smelling substance C. Identify A, B and C.

38. Three bottles without labels are known to contain ethanol, thanoic acid and soap solution separately. How will you test which bottle contains which substance ?

39. What will be the formula and electron dot structure of (a) cyclopentane (b) ethanoic acid (c) propanone.

40. Draw the structure of the following compounds
(a) Bromopentane (b) Butanone (c) Hexanal
Are structural isomers possible for bromopentane ?

<u>5 mark questions</u>

41. Chemical compound 'A' is produced by heating 'B' with conc. H_2SO_4, 'B' burns in air with blue flame to form CO_2 and H_2O. On reacting with $K_2Cr_2O_7$ 'B' produced a compound 'C' which turns blue litmus red. Identify the compounds A, B and C. Give their structures. Describe the process of preparation of the compound 'A' from sugar.

42. Describe one method for the preparation of ethanoic acid. Give it's two chemical two physical properties and three uses.

43. What is saponification ? Describe how soap is prepared in the laboratory. Explain the cleansing action of soap with diagram.

PERIODIC CLASSIFICATION OF ELEMENTS

<u>1. mark questions</u>

1. If an element with atomic number 'A' is an inert gas. In which group would you find and element with atomic number (A – 1) ?

2. An element has atomic number 13. In which period and group it should be placed ?

3. Element 'A' is an alkali metal. How many electrons would be present in its outermost shell ?

4. Element 'B' is a halogen. How many electrons are present in its outermost shell ?
5. Which of the two elements A (2, 8, 1) and B (2, 8, 8, 1) is more electropositive ? Why ?
6. A, B, C and D have boiling points – 188^0 C, 59^0 C, - 54^0 C and 183^0 C respectively. These belong to group 17. Name the element with highest atomic number.
7. Indicate the elements which belong to the same group from their atomic numbers as 9, 17, 24, 30, 35, 45.
8. What is the similarity in the electronic configuration of Mg, Ca and Sr ?
9. Name the members of alkaline earth family. Which out of them is radioactive in nature ?
10. Which of the following species are isoelectronic in nature ?
    (i) Ca^{2+} (ii) K (iii) Mg^{2+} (iv) S^{2-} (v) Cl
11. How many groups and periods are present in the long form of periodic table ?
12. How is metallic character of an element expressed ? How does it change in period ?
13. An element 'X' belongs to the second group of periodic table. What is the formula of its chloride ?
14. An element 'B' belongs to the second period and Group 13. Give the formula of its oxide.
15. What are the names of Group 1 and Group 17 elements ?

2 mark questions

16. If an element with atomic number 'A' is an inert gas. In which group would you find and element with atomic number (A + 2) ?
17. In the following set of elements, one element does not belong to the set. Select this element and state why it does not belong to that set;
    Oxygen, nitrogen, carbon, chlorine, fluorine.
18. Consider the following elements :
    Na, Ca, Al, K, Mg, Li

19. Calcium is an element with atomic number 20.

20. For the main group of periodic table given as follows:

1	2	13	14	15	17	17	18
H A C							

(a) Which element if the most metallic ?

(b) Which atom is the largest ?

21. Why does atomic size progressively become smaller (atomic radius decreases from Na to Cl) ?

22. The elements, chlorine, bromine and iodine have been put in the same group on the basis of their similar chemical properties:

(c) What are those similar properties ?

(d) What is the common name of this group of family ?

23. Consider the following elements : Na, Ca, Al, Mg, K, Li

(a) Which of these elements belong the same period of the periodic table ? Why ?

(b) Which of these elements belong to the same group of the periodic table ? Why ?

24. Given below are the melting points and the atomic radii of three element A, B and C of the periodic table each having 'n' electrons in the outermost shell of their atoms.

Elements	A	B	C
Melting points (^0C)	180.3	97.6	63.5
Atomic radii (A^0)	1.31	1.52	1.94

25. The atomic numbers of three elements A, B and C are given below:

Element	A	B	C
Atomic Number	3	9	11

3 mark questions

26. The electronic configuration of an element X is

K	L	M
2	8	6

(i) What is the group number of element X in the periodic table ?

(ii) What is the period number of element X in the periodic table ?

(iii) What is the number of valence electrons in an atom of X ?

27. The position of three elements X, Y and Z in the periodic table is given below :

Group 16	Group 17
_____	Z
_____	Y
_____	_____
X	_____

(a) State whether Z is a metal or a non-metal

(b) Will Z be large or smaller than X ?

(c) Which type of ion, cation or anion will be formed by element Z ?

28. Which of the following has bigger size ? Why ?

(i) Na or K (ii) C or N (iii) Cl or Br

29. Name two other elements which belong to the same family.

(i) Fluorine (ii) Calcium (iii) carbon

30. What are Dobereiner's triads ? Explain with one example.

5 mark questions

31. A part of periodic table is given below. The elements lithium, carbon, sulphur and argon have been placed in their correct position. The positions of other elements are represented by hypothetical letters.

1 Lithium	2 A	13 B	14 Carbon	15 C	16 D	17 E	18 F
I J K			G H		Sulphur	L M N	Argon

With reference to this table, answer the following :

(a) Which of these has largest radius ?

(b) Which of these has electron configuration (2, 8, 4) ?

(c) What is the electron arrangement of J ?

(d) Name the family of elements represented by E, L, M and N

(e) Which of these is an alkaline earth metal ?

32. Two elements X and Y belong to groups 1 and 2 respectively in the same period. Compare them with respect to

(a) the number of valence electrons

(b) valency

(c) metallic character

(d) size of the atoms

(e) formulae of their oxides and chlorides.

33. Write the electronic configurations of atoms of (a) potassium (K), (b) lithium (Li), (c) fluorine (F), (d) chlorine (Cl). Atomic number of K is 19, of Li is 3, of F is 9 and of Cl is 17. Use these electronic configurations to explain why potassium is more reactive than lithium, and fluorine more reactive than chlorine.

34. (a) What happens to basic character of oxides down the group and why ?

(b) What happens to acidic character of oxides along the period and why ?

(c) Which group elements can lose electrons most easily and why ?

35. Which element has

(a) two shells, both of which are completely filled with electrons.

(b) The electronic configuration 2, 8, 2 ?

(c) A total of three shells, with four electrons in the valence shell ?

(d) A total of two shells, with three electrons in the valence shell ?

(e) Twice as many electrons in the second shell as in its first shell ?

HOTS (High Order Thinking Skill) questions
"CARBON AND IT'S COMPOUNDS."

1. Draw the structure of glyceride.
2. What do you mean by a multiple bond ? Show the formation of a double bond in Ethane by electron dot stricture.
3. 'X' is a compound has very high melting point and is brittle while 'Y' has low melting point and is a gas. What are the types of compounds 'X' and 'Y' and differentiate them by the following two properties :
   a) conductivity
   b) solubility in water
4. Is combustion an oxidation reaction ? Explain with examples.
5. Bring out the following expressions:
   a) Propanol to sodiumpropoxide
   b) Ethanol to ethane
   c) Ethene to ethane
   d) Eethylethanoate to ethanol
   e) Ethanol to ethanoic acid
6. Account for the spherical shape of micelles.
7. What is the state of micelle in solution ?
8. Identify A, B & C

   $A + CH_3CH_2OH \rightarrow CH_3 - COOC_2H_5 + C$

   $CH_3COOH + A \rightarrow B + H_2O + CO_2$
9. Which form of energy is used for chlorination of methane ?
10. What is the difference in structure in between cyclohexane and benzene?
11. Micelles stay in solution as a colloid and will not come together to precipitate. Give reason.