



Attempt questions first; check the separate key afterward. Show all working. Draw accurate figures where required.

A. Very short answers - 1 mark each

1. What is the valency of carbon?
2. Explain why carbon mainly forms covalent bonds.
3. Name carbon's property of forming bonds with itself.
4. Explain how catenation and tetravalency create many compounds.
5. Write the molecular formula of ethane.
6. Draw electron-dot structures of methane and ethene.
7. Which is unsaturated: ethane or ethene?
8. Explain saturated and unsaturated hydrocarbons with structures.

B. Short answers / practice - 2 marks each

9. Name the functional group in ethanol.
10. Name the functional group in ethanoic acid.
11. Name $\text{CH}_3\text{CH}_2\text{CH}_3$.
12. Name CH_3COOH .
13. What mass difference separates successive members of a homologous series?
14. State three characteristics of a homologous series.
15. Write the formula of the third alkane.
16. Write structural formulae of the two isomers of C_4H_{10} .
17. What is formed when ethanol is oxidised completely to the corresponding acid?
18. State a suitable oxidising reagent.
19. Name the gas formed when ethanol reacts with sodium.
20. Write the balanced reaction.

C. Application / reasoning - 3 marks each

21. Name the reaction between an alcohol and a carboxylic acid to form an ester.

22. Write the ethanol-ethanoic acid reaction and its condition.

23. What does soap form with calcium ions in hard water?

24. Explain why detergents work better in hard water.

25. Does hydrogenation convert an unsaturated oil toward a saturated fat?

26. Explain hydrogenation and state a catalyst.

27. Name $\text{CH}_3\text{CH}_2\text{OH}$ and state its functional group.

28. Write the balanced combustion equation for methane.

29. Explain why covalent compounds generally conduct electricity poorly.

30. Write the formulae of the first three alkenes beginning with ethene.

31. Compare the reaction of ethanoic acid and ethanol with sodium carbonate.

D. Extended practice - 5 marks per pair

32. Name the reaction in $\text{CH}_4 + \text{Cl}_2 \rightarrow \text{CH}_3\text{Cl} + \text{HCl}$ in sunlight.

33. Compare substitution and addition reactions with examples.

34. Which end of a soap molecule is attracted to water?

35. Explain micelle formation and cleansing action using a labelled diagram.

ANSWER KEY - Numerical / closed questions

- 1) 4. 3) Catenation. 5) C_2H_6 . 7) Ethene. 9) Hydroxyl, $-\text{OH}$. 10) Carboxyl, $-\text{COOH}$. 11) Propane. 12) Ethanoic acid. 13) 14 u in molecular mass. 15) C_3H_8 . 17) Ethanoic acid. 18) Alkaline KMnO_4 or acidified $\text{K}_2\text{Cr}_2\text{O}_7$. 19) Hydrogen. 20) $2\text{C}_2\text{H}_5\text{OH} + 2\text{Na} \rightarrow 2\text{C}_2\text{H}_5\text{ONa} + \text{H}_2$. 21) Esterification. 22) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \rightleftharpoons \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$; acid catalyst. 23) Insoluble scum. 25) Yes. 26) Nickel catalyst. 27) Ethanol; hydroxyl. 28) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$. 30) $\text{C}_2\text{H}_4, \text{C}_3\text{H}_6, \text{C}_4\text{H}_8$. 31) Ethanoic acid releases CO_2 ; ethanol shows no comparable reaction. 32) Substitution. 34) Ionic/polar head.