

# CHEMISTRY (PYQs)

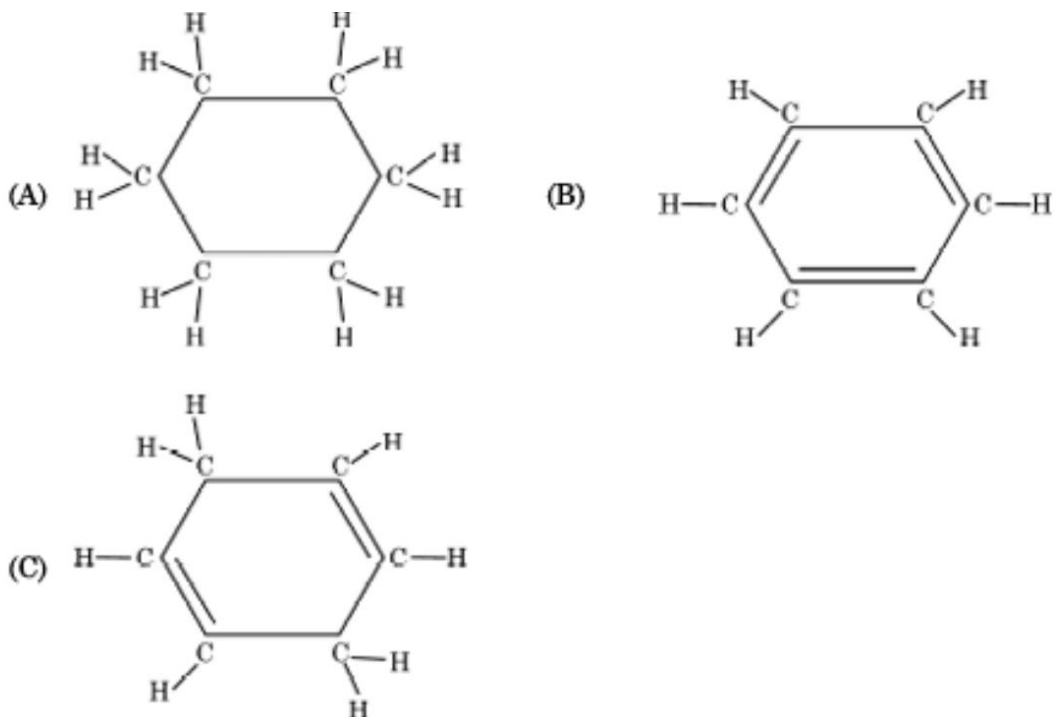
## CHAPTER 4 – CARBON AND ITS COMPOUNDS

### A. MULTIPLE CHOICE QUESTIONS (MCQs)

1. Carbon compounds: 1 (i) are good conductors of electricity. (ii) are bad conductors of electricity. (iii) have strong forces of attraction between their molecules. (iv) have weak forces of attraction between their molecules. The correct statements are:

- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (ii) and (iv)
- (d) (i) and (iii)

2. Consider the structures of the three cyclic carbon compounds A, B and C given below and select the correct option from the following:



- (a) A and C are isomers of hexane and B is benzene.
- (b) A is an isomer of hexane, B is benzene and C is an isomer of hexene.

(c) A is a saturated cyclic hydrocarbon and B and C are unsaturated cyclic hydrocarbons.

(d) A is cyclohexane and B and C are the isomers of benzene.

**3 Which of the following is an unsaturated hydrocarbon?**

(a)  $C_2H_6$

(b)  $C_3H_8$

(c)  $C_2H_4$

(d)  $CH_4$

**4. The functional group present in ethanol is:**

(a)  $-CHO$

(b)  $-COOH$

(c)  $-OH$

(d)  $-CO-$

**5. Which of the following will NOT decolourise bromine water?**

(a) Ethene

(b) Ethyne

(c) Ethane

(d) Propene

**6 Which of the following is an isomeric pair?**

(a) Butane and 2-methylpropane

(b) Methane and Ethane

(c) Ethane and Ethyne

(d) Propane and Butane

**7. A soap molecule has:**

(a) Hydrophobic head and hydrophilic tail

(b) Hydrophilic head and hydrophobic tail

(c) Hydrophobic head only

(d) Hydrophilic tail only

**8. General formula of alkyne is:**

(a)  $C_nH_{2n+2}$

(b)  $C_nH_{2n}$

(c)  $C_nH_{2n-2}$

(d)  $C_nH_{2n-4}$

**9. Which of the following does not form scum in hard water?**

(a) Sodium stearate

(b) Calcium stearate

- (c) Magnesium stearate
- (d) Potassium stearate

10. Which of the following gives brisk effervescence with sodium bicarbonate?

- (a) Alcohol
- (b) Aldehyde
- (c) Carboxylic acid
- (d) Ketone

11 The process of converting vegetable oils into solid fat (ghee) is:

- (a) Oxidation
- (b) Hydrogenation
- (c) Saponification
- (d) Substitution

12. Ethanoic acid reacts with ethanol in the presence of conc.  $\text{H}_2\text{SO}_4$  to form:

- (a) Ethane
- (b) Ethene
- (c) Ethyl ethanoate
- (d) Ethanal

## B. ASSERTION–REASON QUESTIONS

13. **Assertion (A):** Ethene decolourises bromine water.

**Reason (R):** Ethene undergoes addition reactions.

14. **Assertion (A):** Soaps do not work properly in hard water.

**Reason (R):** Hard water contains calcium and magnesium ions that form scum with soaps.

15. **Assertion (A):** Carbon forms a large number of compounds.

**Reason (R):** Carbon atoms can form long chains due to catenation.

16. **Assertion (A):** Detergents are more effective than soaps in hard water.

**Reason (R):** Detergents do not form insoluble salts with calcium and magnesium ions.

17. **Assertion (A):** Ethanol reacts with sodium to produce hydrogen gas.

**Reason (R):** Sodium displaces hydrogen from the  $-\text{OH}$  group in alcohols.

## C. SHORT ANSWER QUESTIONS

18. Why does carbon form covalent bonds?

19. What is hydrogenation? Give one example.

20. What is meant by catenation?

21. State the meaning of homologous series.
22. Why are alkenes called unsaturated hydrocarbons?
23. What is saponification?
24. Write the name and formula of the first member of alkynes.
25. What happens when ethanol is heated with excess concentrated sulphuric acid at 443 K?
26. Why is graphite a good conductor of electricity?
27. How can you convert ethanol to ethanoic acid?

## ANSWER KEY

### MCQs (1–20):

1. c
2. c
3. c
4. c
5. c
6. a
7. b
8. c
9. d
10. c
11. b
12. c

### Assertion–Reason (21–32):

13. Both A and R are true, and R is the correct explanation of A
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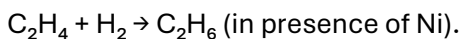
17. Both A and R are true, and R is the correct explanation of A

### Short Answers (33–42):

18. Because it has four valence electrons and cannot lose or gain four electrons; instead, it achieves stability by sharing electrons → forming covalent bonds.

19. The addition of hydrogen to an unsaturated hydrocarbon in the presence of Ni/Pd catalyst.

Example:



20. The ability of carbon atoms to form long chains or rings with other carbon atoms through covalent bonding.

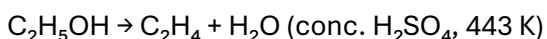
21. A group of organic compounds with the same functional group and same general formula, showing a gradation in physical properties.

22. Because they contain at least one carbon–carbon double bond and can add atoms like  $\text{H}_2$  or  $\text{Br}_2$ .

23. The reaction of esters with bases like NaOH to form soap and alcohol.

24. Ethyne,  $\text{C}_2\text{H}_2$ .

25. It gets dehydrated to form ethene:



26. Because each carbon atom forms only three covalent bonds; the fourth electron is free to move.

27. Oxidation using alkaline  $\text{KMnO}_4$  or acidified  $\text{K}_2\text{Cr}_2\text{O}_7$ .