

# 10.1 Fundamentals of Organic Chemistry

## Question Paper

Course	DPIB Chemistry
Section	10. Organic Chemistry
Topic	10.1 Fundamentals of Organic Chemistry
Difficulty	Hard

**Time allowed:** 20  
**Score:** /10  
**Percentage:** /100

**Question 1**

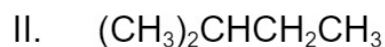
How many isomers, including structural and stereoisomers, with the formula  $C_5H_{10}$  have structures that involve  $\pi$  bonding?

**A** 3**B** 4**C** 5**D** 6

[1 mark]

**Question 2**

Study the formulae shown below and determine which molecules are isomers of each other

**A** I and II only**B** I and III only**C** II and III only**D** I, II and III

[1 mark]

### Question 3

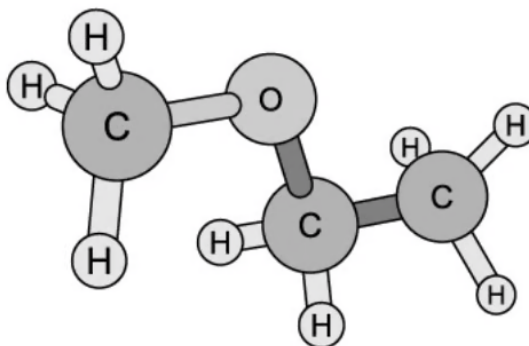
What is the correct condensed structural formula for 2,2-dibromo-4-methylhexane?

- A  $\text{CH}_3\text{CBr}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{CH}_3$
- B  $\text{CH}_3\text{CHBrCBr}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{CH}_3$
- C  $\text{CH}_3\text{CBr}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- D  $\text{CH}_3\text{CHBrCH}(\text{CH}_3)\text{CHBrCH}_2\text{CH}_3$

[1 mark]

### Question 4

What is the correct IUPAC name for the molecule shown?



- A ethoxyethane
- B methoxyethane
- C propanone
- D propanal

[1 mark]

**Question 5**

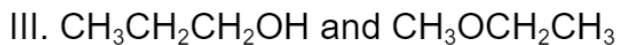
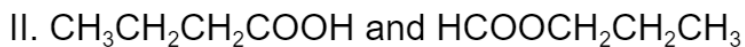
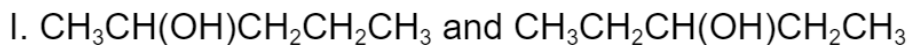
Which of the molecules shown below is **not** an isomer of pentan-2-ol?

- A pentan-1-ol
- B 2-methylbutan-2-ol
- C 2-methylpentan-2-ol
- D pentan-3-ol

[1 mark]

**Question 6**

Which of the following pairs are functional group isomers?

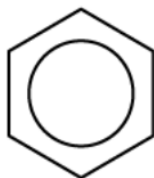


- A I and II only
- B I and III only
- C II and III only
- D I, II and III

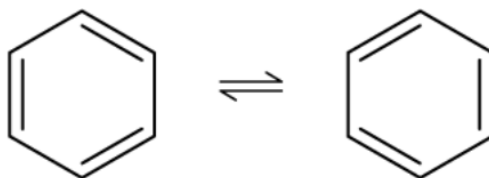
[1 mark]

### Question 7

The structure of benzene is often shown as



This is a representation of a resonance hybrid structure that lies between these two possible structures



Evidence for this resonance structure is:

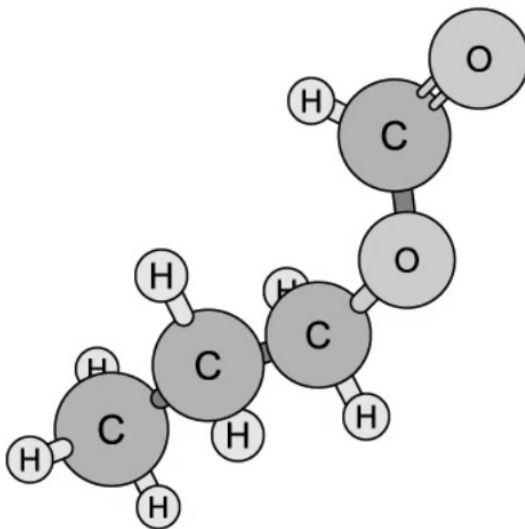
- I. The carbon-carbon bond lengths lie between the value for a single and a double bond
- II. The bond angles are all equal in benzene
- III. The enthalpy of hydrogenation of benzene is less exothermic than expected

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

[1 mark]

Question 8

What is the correct name of the following molecule using IUPAC rules?

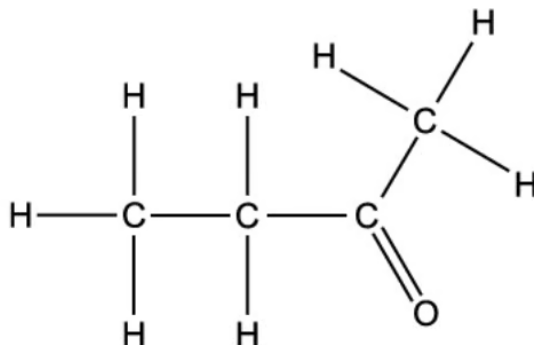


- A propyl methanoate
- B methyl propanoate
- C methoxypropane
- D butoxymethanal

[1 mark]

**Question 9**

What types of isomerism can the following molecule show?



- I. Branch-chain
- II. Positional
- III. Functional group

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

[1 mark]

**Question 10**

Which row of the table is correct about the trend and explanation in the boiling points of the alcohols  $\text{CH}_3\text{OH}$ ,  $\text{C}_2\text{H}_5\text{OH}$  and  $\text{C}_3\text{H}_7\text{OH}$  ?

	Trend in boiling points	Explanation
<b>A</b>	$\text{CH}_3\text{OH} > \text{C}_2\text{H}_5\text{OH} > \text{C}_3\text{H}_7\text{OH}$	The London dispersion forces decrease with each additional $\text{CH}_2$
<b>B</b>	$\text{CH}_3\text{OH} > \text{C}_2\text{H}_5\text{OH} > \text{C}_3\text{H}_7\text{OH}$	The strength of the hydrogen bonds decreases with each additional $\text{CH}_2$
<b>C</b>	$\text{C}_3\text{H}_7\text{OH} > \text{C}_2\text{H}_5\text{OH} > \text{CH}_3\text{OH}$	The London dispersion forces increase with each additional $\text{CH}_2$
<b>D</b>	$\text{C}_3\text{H}_7\text{OH} > \text{C}_2\text{H}_5\text{OH} > \text{CH}_3\text{OH}$	The strength of the hydrogen bonds increases with each additional $\text{CH}_2$

[1 mark]