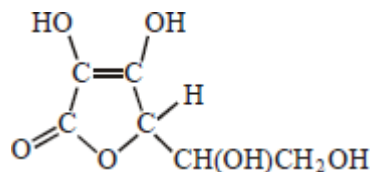


Q1. Which one of the following is **not** a correct statement about vitamin C, shown below?



- A It is a cyclic ester.
- B It can form a carboxylic acid on oxidation.
- C It decolourises a solution of bromine in water.
- D It is a planar molecule.

(Total 1 mark)

Q2. In which one of the following mixtures does a redox reaction occur?

- A ethanal and Tollens' reagent
- B ethanoyl chloride and ethanol
- C ethanal and hydrogen cyanide
- D ethanoic acid and sodium hydroxide

(Total 1 mark)

Q3. Propanoic acid reacts with methanol in the presence of a small amount of concentrated sulphuric acid. The empirical formula of the ester formed is

- A CH₂O
- B C₂H₆O₂
- C C₂H₄O₂
- D C₂H₄O

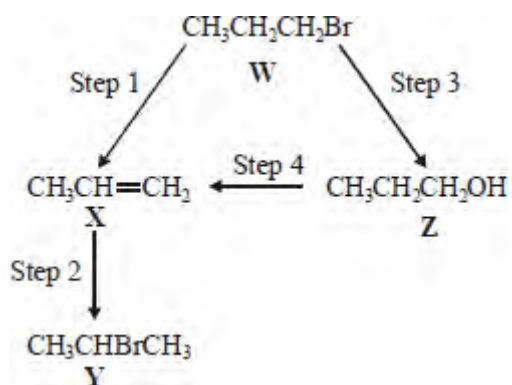
(Total 1 mark)

Q4. Which one of the following is **not** a correct general formula for the non-cyclic compounds listed?

- A alcohols $C_nH_{2n+2}O$
- B aldehydes $C_nH_{2n+1}O$
- C esters $C_nH_{2n}O_2$
- C primary amines $C_nH_{2n+3}N$

(Total 1 mark)

Q5. For this question refer to the reaction scheme below.

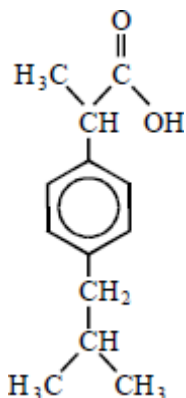


Which one of the following statements is **not** correct?

- A Reaction of **W** with sodium cyanide followed by hydrolysis of the resulting product gives propanoic acid.
- B Mild oxidation of **Z** produces a compound that reacts with Tollens' reagent, forming a silver mirror.
- C **Z** reacts with ethanoic acid to produce the ester propyl ethanoate.
- C **W** undergoes addition polymerisation to form poly(propene).

(Total 1 mark)

Q6. Ibuprofen is a drug used as an alternative to aspirin for the relief of pain, fever and inflammation. The structure of ibuprofen is shown below.



Which one of the following statements is **not** correct?

- A** It has optical isomers.
- B** It liberates carbon dioxide with sodium carbonate solution.
- D** It undergoes esterification with ethanol.
- D** It undergoes oxidation with acidified potassium dichromate(VI).

(Total 1 mark)

Q7. Butan-1-ol was converted into butyl propanoate by reaction with an excess of propanoic acid. In the reaction, 6.0 g of the alcohol gave 7.4 g of the ester. The percentage yield of ester was

- A** 57
- B** 70
- C** 75
- D** 81

(Total 1 mark)

Q8. Which one of the following would **not** react with aqueous silver nitrate to produce a precipitate that is soluble in concentrated aqueous ammonia?

- A CaBr_2
- B $[\text{COCl}_4]^{2-}$
- C $(\text{CH}_3)_4\text{N}^+\text{I}^-$
- D CH_3COCl

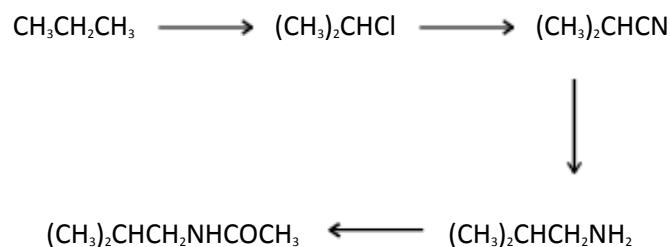
(Total 1 mark)

Q9. Which compound is formed by the reaction of ethane-1,2-diol with an acid?

- A $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$
- B $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_2\text{CH}_2-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$
- C $\text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$
- D $\text{CH}_3\text{CH}_2-\text{O}-\text{CH}_2\text{CH}_2\text{OH}$

(Total 1 mark)

Q10. Which one of the following types of reaction mechanism is **not** involved in the above sequence?

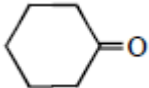
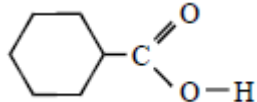
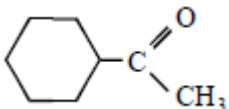
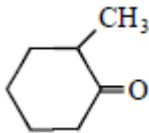


- A free-radical substitution
- B nucleophilic substitution
- C elimination
- D nucleophilic addition-elimination

(Total 1 mark)

Q11. The compound lithium tetrahydridoaluminate(III), LiAlH_4 , is a useful reducing agent. It behaves in a similar fashion to NaBH_4 . Carbonyl compounds and carboxylic acids are reduced to alcohols. However, LiAlH_4 also reduces water in a violent reaction so that it must be used in an organic solvent.

Which one of the following can be reduced by LiAlH_4 to a primary alcohol?

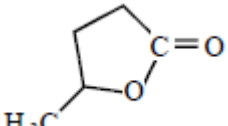
- A 
- B 
- C 
- D 

(Total 1 mark)

Q12. An excess of methanol was mixed with 12 g of ethanoic acid and an acid catalyst. At equilibrium the mixture contained 8 g of methyl ethanoate. The percentage yield of ester present was

- A 11
- B 20
- C 54
- D 67

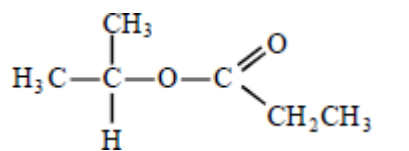
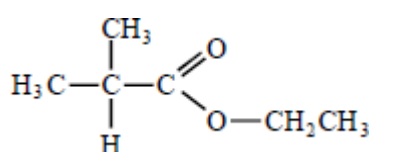
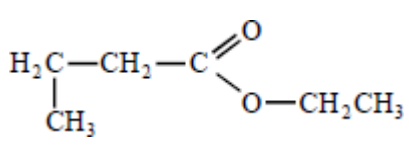
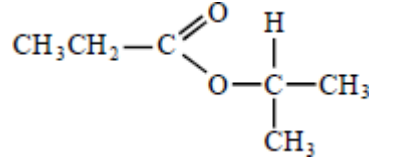
(Total 1 mark)

Q13. Acid hydrolysis of  produces

- A $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{COOH}$
- B $\text{CH}_2(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$
- C $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{OCHO}$
- D $\text{CH}_2(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_2\text{OCHO}$

(Total 1 mark)

Q14. The structural formula of ethyl 2-methylpropanoate is

- A** 
- B** 
- C** 
- D** 

(Total 1 mark)

Q15. Hydrolysis of the ester, $\text{CH}_3\text{COOCH}_2\text{CH}_2\text{CH}_3$, produces ethanoic acid. In an experiment, 2.04 g of the ester was used and 0.90 g of ethanoic acid was produced. The percentage yield of ethanoic acid was:

- A** 44
- B** 59
- C** 75
- D** 90

(Total 1 mark)

Q16. How many structural isomers, which are esters, have the molecular formula $C_4H_8O_2$?

- A** 2
- B** 3
- C** 4
- D** 5

(Total 1 mark)

Q17. CH_2O is the empirical formula of

- A** methanol
- B** methyl methanoate
- C** ethane-1,2-diol
- D** butanal

(Total 1 mark)

Q18.

Summarised directions for recording responses to multiple completion questions			
A (i), (ii) and (iii) only	B (i) and (iii) only	C (ii) and (iv) only	D (iv) alone

Isomers of the ester $\text{HCOOCH}_2\text{CH}_2\text{CH}_3$, include

- (i) ethyl ethanoate
- (ii) methyl propanoate
- (iii) butanoic acid
- (iv) butyl methanoate

(Total 1 mark)