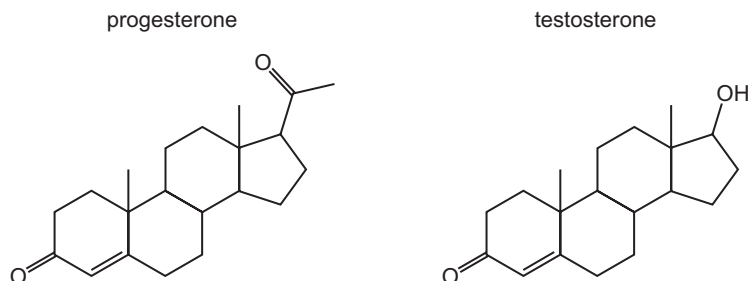


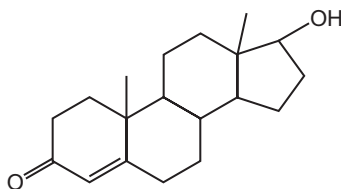
26 The skeletal formulas of two compounds are shown.



Which statements about progesterone and testosterone are correct?

- A** They both contain a ketone group, and they both have geometrical isomers due to the C=C bond.
- B** They have the same molecular formula, and they both have geometrical isomers.
- C** They have the same number of chiral carbons, and they have the same molecular formula.
- D** They have the same number of chiral carbons, and they both contain a ketone group.

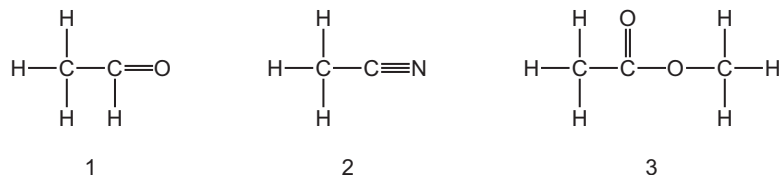
28 The diagram shows the skeletal formula of the hormone testosterone.



What is the molecular formula of testosterone?

- A** C₁₉H₂₈O₂ **B** C₁₇H₂₂O₂ **C** C₁₇H₂₄O₂ **D** C₁₉H₂₆O₂

37 The structures of three organic compounds are shown.



Which compounds produce ethanoic acid when heated with HCl(aq)?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

3 The alkanes are a homologous series of organic molecules. Alkanes are generally unreactive and are commonly used as fuels.

(a) Define homologous series.

.....
 [2]

(b) Give two reasons to explain the general unreactivity of alkanes.

1
 2 [2]

(c) Alkanes with low relative molecular mass, M_r , are more useful than those found in heavier crude oil fractions.

Name the process that is used to obtain alkanes with low M_r from heavier crude oil fractions.

..... [1]

(d) Hexane, C₆H₁₄, has four structural isomers.

Fig. 3.1 shows hexane and two of its structural isomers.

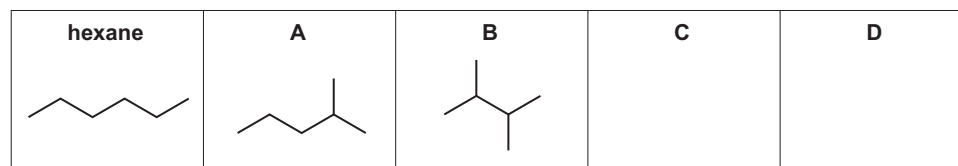


Fig. 3.1

(i) Complete Fig. 3.1 by drawing structures for **C** and **D**, the other two structural isomers of hexane. [2]

(ii) **A**, **B** and hexane have different boiling points.

Arrange **A**, **B** and hexane in order of increasing boiling point.

Explain your answer.

lowest < < highest

 [3]

- (e) Hexane can be converted into compounds **E** and **F** at high temperature and pressure. Fig. 3.2 shows the reaction scheme involving hexane, **E** and **F**.

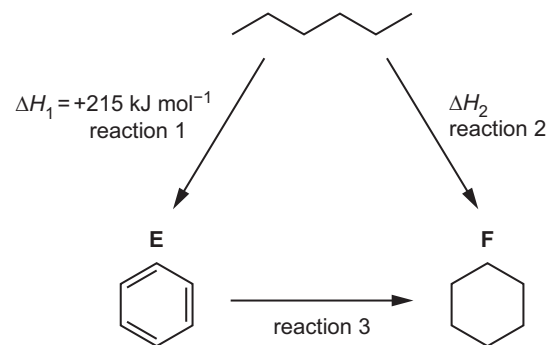


Fig. 3.2

- (i) Identify a suitable reagent for reaction 3.

..... [1]

- (ii) Use the data in Fig. 3.2 and in Table 3.1 to calculate the enthalpy change of reaction 2, ΔH_2 .

Table 3.1

compound	enthalpy change of formation, $\Delta H_f^\circ / \text{kJ mol}^{-1}$
	-156
	+48

$\Delta H_2 = \dots\dots\dots \text{ kJ mol}^{-1}$ [2]

- (iii) Write an equation for the complete combustion of hexane.

..... [1]