

A Level Biology A
H420/02 Biological Diversity

Question Set 13

1

Crude oil contains hydrocarbons. Three hydrocarbons commonly present in crude oil are shown in Fig. 22.

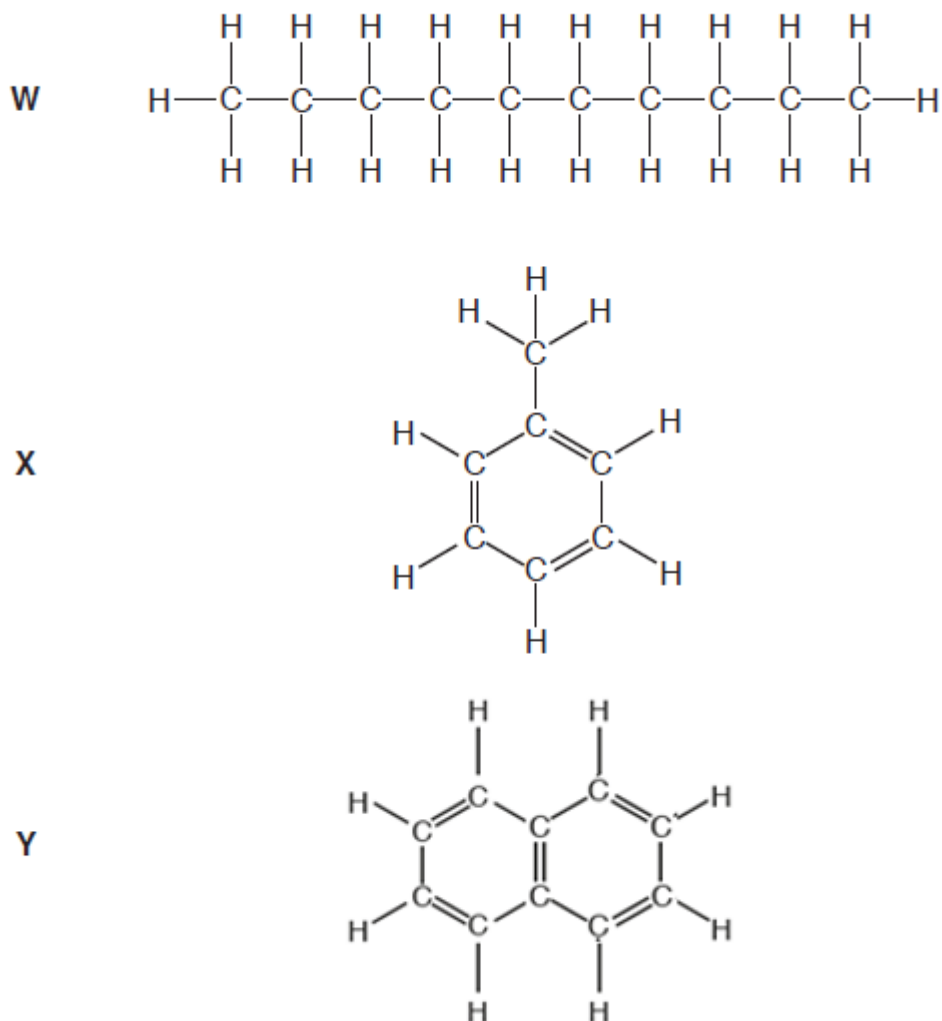


Fig. 22

- (a) Compound **W** shows some structural similarities with fatty acids.

State one structural difference between compound **W** and a saturated fatty acid.

Saturated fatty acids have COOH group

[1]

- (b) Crude oil is often spilled from ships into the sea causing great damage to wildlife. The chemicals in crude oil are harmful to many species and do not break down quickly in the environment.

Some bacteria can break down the hydrocarbons in crude oil. These bacteria have been used by conservationists at sites where oil has been spilled.

(i) The rate of hydrocarbon breakdown by bacteria can be increased by spraying the oil with detergent. Detergents break up oil into droplets, thereby increasing their surface area.

- Student A concluded that the detergent speeded up the rate of hydrocarbon breakdown **only** because it increased the surface area of hydrocarbon upon which the bacteria could grow.
- Student B concluded that the detergents **also** increased the growth of the bacterial population by an alternative mechanism.

Use the information in Fig. 22 and your knowledge of bacterial growth requirements to provide support for student B's conclusion.

[3]

Bacteria could gain nutrient from detergent or detergent can facilitate uptake of hydrocarbon. And absence of other element in oil is a limiting factor for bacterial growth.

(b) (ii) Suggest one piece of evidence that would further support student B's conclusion.

[1]

Grow bacteria on small droplets with and without detergent then compare their growth.

(c) Bacteria that are able to digest and metabolise the hydrocarbons in crude oil are more common in areas, such as around the coast of Alaska and the Gulf of Mexico, where oil spillages are common.

[1]

Suggest an explanation for this observation.

oil acts as selective agent so the bacteria that can digest oil outcompete other bacteria species.

(d) Listed below are three approaches, A, B and C, that can be taken to maintain biodiversity:

A	<i>ex situ</i> conservation
B	<i>in situ</i> conservation
C	preservation

For each of the statements below, indicate whether it could be consistent with *in situ* conservation, *ex situ* conservation or preservation by inserting the correct letter or letters in the table.

	Approach
organisms are not removed from their natural habitat	B and C
human intervention is happening	A and B

[2]

Total Marks for Question Set 13: 8

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