Anglo-Chinese School
(Barker Road)
A Methodist Institution
Founded in 1886

CHEMISTRY
DEPARTMENT OF SCIENCE

Name: ..... ( ) Class: SEC 4 .....

FUELS AND CRUDE OIL – ASSIGNMENT

Multiple-Choice Questions [20 Marks]

TOTAL SCORE	/ 30

Write in your selected answer for the multiple-choice questions in the boxes provided.

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

1. Which of the following property is necessary for methane to be used as a fuel?

A It burns exothermically.
B It can be easily transported.
C It has a low boiling point.
D It is gaseous at room temperature.

2. Which of the following is the least important factor in choosing a suitable fuel?

A availability of the fuel
B energy evolved per mole of fuel
C physical state of the fuel
D products of combustion

3. Which of the following statements about hydrogen fuel is true?

A It does not produce any harmful products.
B It is a cheaper alternative to petrol.
C It is burnt with oxygen in a hydrogen fuel cell.
D It is obtained from fractional distillation of air.

4. Which of the following statements describing petrol and diesel are true?

A Petrol has a higher boiling point than diesel.
B Petrol is less expensive than diesel.
C Petrol is more flammable than diesel.
D Petrol produces more pollutants than diesel.

5. Ethanol, an alternative fuel for cars, is advantageous because

A it does not contribute to global warming.
B it does not produce any carbon dioxide on combustion.
C it helps increase the availability of food through crop growing.
D it increases the availability of land from oil rigs for other use.

6. Ethanol fuel is produced by photosynthesis, followed by fermentation. Which of the following is **not** an accurate difference between the two processes?

A Photosynthesis is endothermic while fermentation is exothermic.
B Photosynthesis forms an aqueous product while fermentation forms a liquid product.
C Photosynthesis requires chlorophyll while fermentation requires yeast.
D Photosynthesis requires light to occur while fermentation requires absence of light.

7. Which of the following statements describing gaseous fuels is false?

A Gaseous fuels are generally more flammable and hence easier to combust.
B Gaseous fuels are more difficult to store as they require compression or liquification.
C Gaseous fuels generally produce less harmful products when combusted.
D Gaseous fuels have a lower energy-to-mass ratio than solid fuels.

8. Which of the following statements describing fossil fuels are true?

(i) All fossil fuels contain carbon in its structure.
(ii) All fossil fuels are renewable sources of energy.
(iii) All fossil fuels are liquid at room temperature and pressure.
(iv) All fossil fuels are formed from the remains of ancient plants and animals.

A (i) and (ii) only
B (i) and (iv) only
C (ii) and (iii) only
D (iii) and (iv) only

9. Which of the following matches **correctly** the type of fuel and its origins?

	Coal	*Petroleum*
A	animals	wood
B	fossil fuels	plants
C	plants	animals
D	wood	fossil fuels

10. The separation of compounds in crude oil by fractional distillations occurs because the compounds have different

A boiling points.
B densities.
C melting points.
D viscosities.

11. Which of the following is the main constituent for natural gas?

A carbon dioxide
B kerosene
C liquefied petroleum gas
D methane

12. Natural gas is more flammable than other fuels because

A it burns more endothermically.
B it burns more exothermically.
C it forms colourless products.
D it has a low density.

13. Which of the following best explains why crude oil must undergo fractional distillation?

A It has a variety of boiling points.
B It is a mixture.
C It is an unstable substance.
D It must be separated into its useful fractions.

14. Which of the following is **not** a difference between petrol and petroleum?

A Petrol has a smaller range of boiling points than petroleum.
B Petrol is a compound while petroleum is a mixture.
C Petrol is directly used as a fuel while petroleum has to be separated for use.
D Petrol is less viscous and more flammable than petroleum.

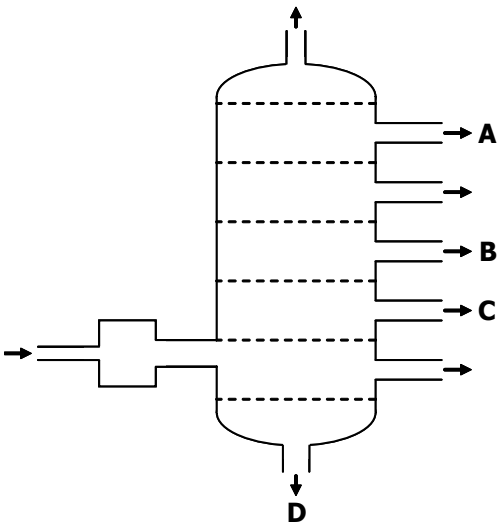
15. The table below shows the boiling points of four fractions, **A**, **B**, **C** and **D**, obtained when crude oil is distilled.

Fraction	**P**	**Q**	**R**	**S**
Boiling point range / ^{o}C	35 – 75	80 – 145	150 – 250	> 250

How is fraction **P** different from fraction **S**?

A Fraction **P** contains larger molecules.
B Fraction **P** is in less demand.
C Fraction **P** is more flammable.
D Fraction **P** is more viscous.

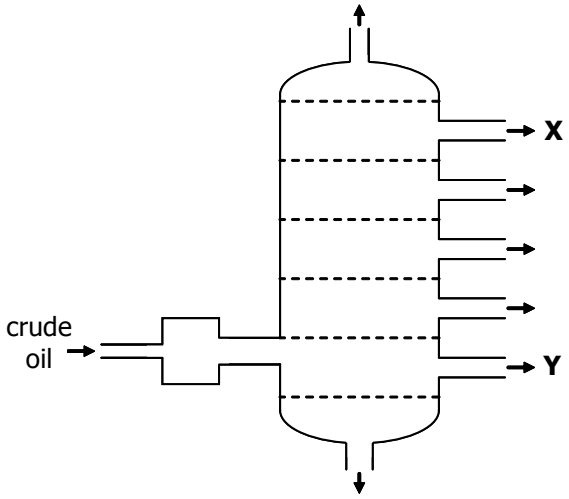
16. The diagram represents the process of fractional distillation of petroleum. Which is the outlet where diesel is obtained?



17. Useful fractions are obtained by the fractional distillation of petroleum oil. Which fraction is correctly matched to its use?

	Fraction	*Use*
A	bitumen	for making roads
B	gasoline	aircraft fuel
C	paraffin	for waxing and greasing
D	lubricating oil	fuel for ships

18. The diagram below represents the process of fractional distillation of crude oil.



Which of the following statements about fractions **X** and **Y** is correct?

A **X** burns easier than **Y**.
B **X** has a higher boiling point than **Y**.
C **X** is used for making road surfaces.
D **Y** is the lighter fraction compared to **X**.

19. Which of the following statements about cracking is true?

A Cracking increases the availability of crude oil in the world.
B Cracking is important in the manufacture of waxes and polishes.
C The products of cracking can be controlled by the type of catalyst.
D Traces of carbon dioxide and carbon monoxide may be produced.

20. A large hydrocarbon, $C_{20}H_{42}$, is cracked to produce two molecules of C_6H_{12} and four molecules of C_2H_4. How many molecules of hydrogen are produced?

A one **B** two **C** three **D** four

Structured Questions [10 Marks]

21. (a) Define 'catalytic cracking'. [1]

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(b) Explain the significance of cracking to the petroleum industry. [2]

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22. Ethanol is a feasible alternative fuel for petrol. Construct chemical equations, including state symbols, for

(a) the fermentation of sugar to form ethanol, [1]

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(b) the combustion of ethanol in a car engine. [1]

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23. Petroleum gas is one of the fractions that can be obtained from crude oil.

(a) What is meant by the term 'petroleum fraction'? [1]

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(b) (i) Name the method used to refine crude oil. [1]

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(ii) Explain how the method works. [1]

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(c) Petroleum gas is often stored as a liquid. Other than cost, state an advantage and a disadvantage of this method of storage. [2]

Advantage: .....

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Disadvantage: .....

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END