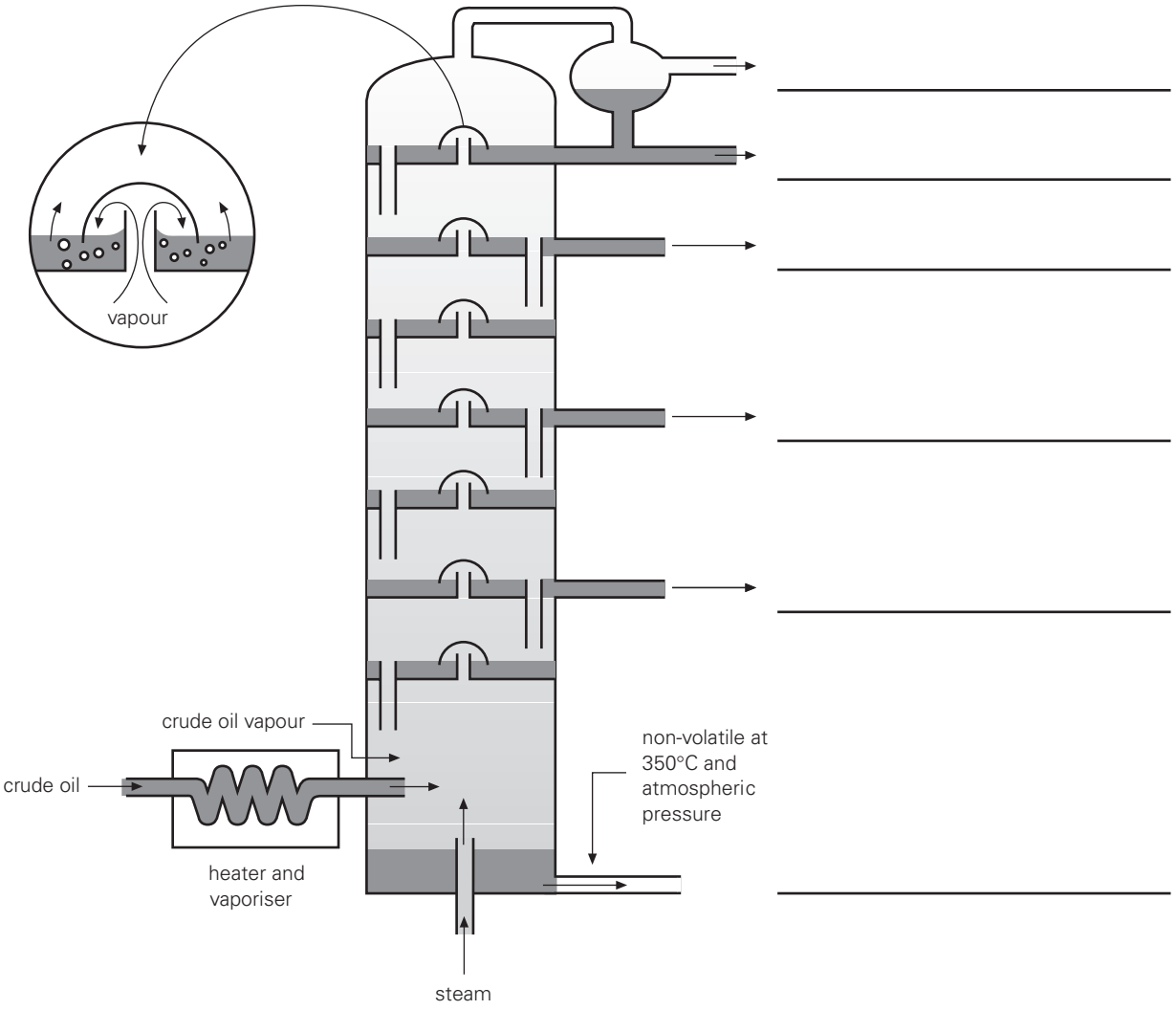
WORKSHEET 6

FRACTIONAL DISTILLATION OF CRUDE OIL

Syllabus reference 8.5.3

1 Crude oil is a fossil fuel. At an oil refinery it is separated into fractions by fractional distillation. The working of a fractionating column is shown below.



a Explain how a fractionating column separates crude oil into fractions.

b What is the main property that fractional distillation is based on?

c In which part of the column are the more volatile components found?

d Place the following fractions in the appropriate place on the fractionating column diagram: kerosene, petroleum ether, heating oil/diesel, petrol (gasoline), lubricating oil, residue (asphalt and tar), gases, greases and waxes.

2 Use your textbook to complete the following table.

FRACTION	COMPOSITION (CARBONS PER MOLECULE)	USE

3 Which fraction from the primary distillation of crude oil would most likely contain the following hydrocarbons?

a $C_{35}H_{72}$ _____

b C_4H_{10} _____

c $C_{20}H_{42}$ _____

d C_8H_{18} _____

4 In the alcoholic beverages industry, spirits such as whisky, gin and rum are made by distilling fermentation liquors. This increases the alcohol content from about 15% to 40–50%. Overproof (OP) spirits contain an even higher alcohol content. Suggest how this is done.

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5 Many countries in the Persian Gulf have very little rainfall so they can experience severe shortages of fresh water. They have constructed desalination plants to produce fresh water from seawater. Explain how distillation could be used to produce fresh water.

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