


BASIC CONCEPTS HW MS

1.	C ₁₃ H ₂₈			[1]
2.	(i)	120–130 (1)	1	
	(ii)	boiling point increases with increase in <i>M_r</i> /molecular formula/number of carbon atoms/chain length (1) more intermolecular forces/electrons/surface area/ surface interactions/van der Waal forces (1)□	2	[3]
3.	(a)	octane, 400 +/- 5 hexadecane. 545 +/- 5 if °C penalise once.	1 1	
	(b)	fractional distillation	1	
	(c)	(i) 	✓ ✓	
			2	
	(ii)	2-methylpentane	1	
	(iii)	C, B and A	1	
	(iv)	the more branching/the shorter the chain... the lower the boiling point/ less energy needed to separate the molecules long chain have greater surface area/surface interactions/more VdW forces or converse argument about short/branched chains.	1 1	
	(d)	(i) <i>M_r</i> of (CH ₃) ₃ COH = 74 % oxygen = (16/74) × 100 = 21.6 % (ii) (CH ₃) ₃ COH + 6O ₂ → 4CO ₂ + 5H ₂ O 1 mark for CO ₂ and H ₂ O only	1 1 2	[16]
4.	(a)	C ₆ H ₁₄	1	
	(b)	(i) boiling point increases with increase in <i>M_R</i> /molecular formula/N° of carbon atoms/chain length (ii) more intermolecular forces/electrons/surface area/ surface interactions/van der Waal forces (iii) 120 – 130 °C	1 1 1	
5.	(i)	C ₆ H ₁₀	1	
	(ii)	C ₃ H ₅ / ecf to (i)	1	[4]

(iii) M_r of cyclohexene = 82 1

$\% C = (72/82) \times 100 = 88\%$ 1

87.8% gets 1 mark

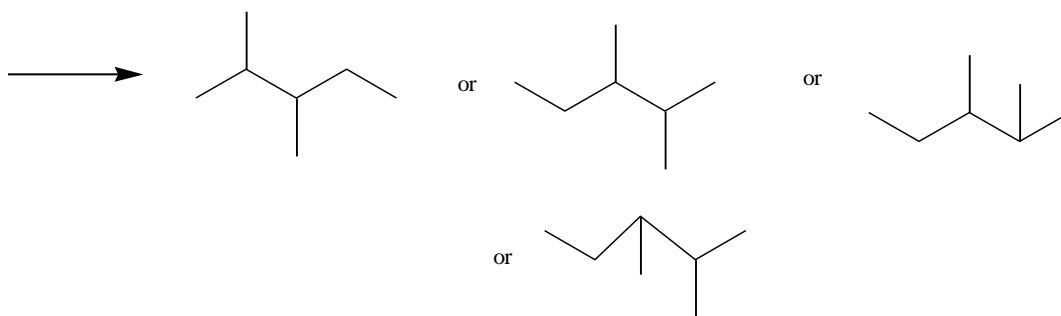
ecf to (i) and (ii) for both marks

Alternative calculation based on empirical formula:

Mass of empirical unit = 41, $\% C = (36/41) \times 100 = 88\%$

[4]

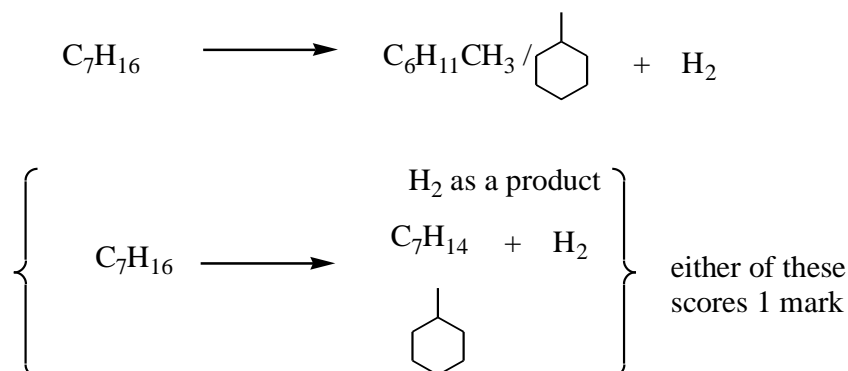
6. (a) (i) 1



(ii) 85–98 °C 1

2

(b)

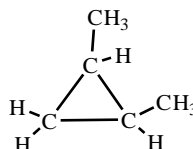
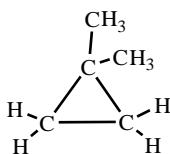
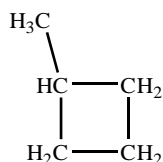


(c) more efficient fuel/better fuel/ higher octane number/reduces knocking/more volatile/lower boiling points/burn better/burn more easily/quicker ✓

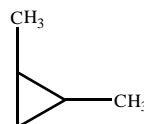
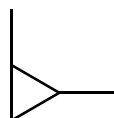
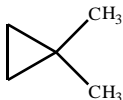
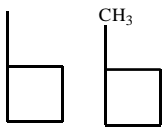
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[5]

7. (i) any two from methylcyclobutane, 1,1-dimethylcyclopropane and 1,2-dimethylcyclopropane



allow



✓✓

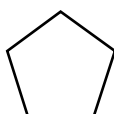
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- (ii) cyclopentane ✓

1

- (iii) ✓

1



[4]

8. (a) Same molecular formula, different structure /displayed formula/ arrangement of atoms/bonds ✓✓

2

(Same formula, different structure/displayed formula/arrangement of atoms ✓

- (b) (i) 3-methylbut-1-ene and 2-methylbut-2-ene
(any unambiguous structure/formula is acceptable) ✓✓

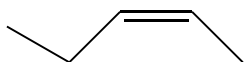
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- (ii) 2-methylbut-1-ene/2-methyl-1-butene ✓

1

- (iii) ✓

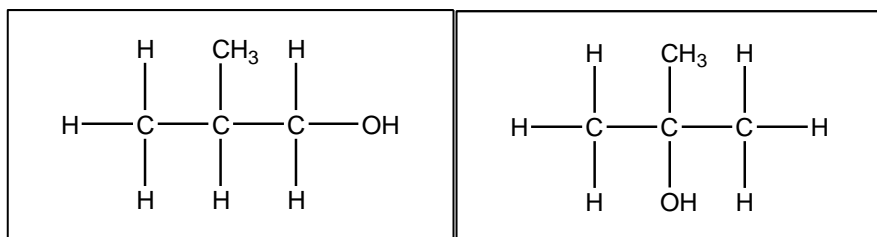
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[6]

9. (i)

2



(ii) either (2-)methylpropan-1-ol or (2-)methylpropan-2-ol

1

[3]