DATE: NAME: CLASS:

ANSWER KEY	Chapter 14 Test Answer Key	BLM 14.5.1A

Answers to Multiple-Choice Questions

1. c
2. c
3. d
4. d
5. b
6. c
7. d
8. c
9. c
10. b
11. d
12. b
13. a
14. b
15. d
16. b
17. c
18. c
19. a
20. a

Answers to Numerical Response Questions

21.	1,2,2,2 (in this order)
22.	9,1,2,5 (in this order)
23.	1,4,7,8
24.	2,3
25.	1,4
26.	2,3,4,1 (in this order)
27.	4,2,1,3 (in this order)
28.	1,3,4
29.	4,2,3,1
30.	2,1,4,3

Answers to Written Response Questions

31. A functional group is a group of atoms bonded together in a specific arrangement that determines the chemical and physical behaviour of the compound containing the group. Because compounds with similar functional groups have similar physical and chemical properties, knowing the functional groups in a compound allows for predictions regarding the properties of a new compound.

32. Molecule I is a carboxylic acid named butanoic acid. Molecule II is an ester named ethyl ethanoate. To distinguish between the two, only substance I will react with litmus paper to turn blue litmus red, and with baking soda to produce carbon dioxide gas. Molecule I also has a higher boiling point than Molecule II. Additionally, esters have characteristic fruity smells, while butanoic acid has the decidedly unpleasant odour of rancid butter.

33. a) **Fractional Distillation**: Fractional distillation involves successive heating, evaporation, cooling, and condensation. At the refinery, petroleum is heated to high temperatures inside a large fractionating tower. As the temperature rises, all of the hydrocarbons except the very large compounds vaporize. As the vapours rise, they cool and condense at different levels in the tower according to their boiling points. Smaller compounds have lower boiling points and thus rise higher and cool more before they condense. Perforated plates, often fitted with bubble caps, are placed to collect the cooled condensing fractions, and pipes channel them away for further treatment.

b) **Cracking and Reforming:** In the cracking process, hydrocarbons are heated under pressure in the absence of air, often with steam, hydrogen, or a catalyst. The result is the breaking of carbon–carbon bonds to form smaller fragments, such as short-chain alkanes, alkenes, and aromatic hydrocarbons. In reforming, heat, pressure, and catalysts convert straight-chain alkenes into branched-chain alkanes, cyclic alkanes, and aromatics.