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PASSAGE V

Petroleum, or crude oil, is refined by separating it into different by-products. This process is called *fractional distillation*, whereby the crude oil is heated and each different product is distilled, or drawn off, at different stages. Each product is distilled at certain temperature ranges and collected in separate receivers. Petroleum refining is carried out in a boiler and a fractionating tower. The crude oil is super-heated in the boiler to about 600°C, which vaporizes the crude oil. The vapors then rise in the tower to certain levels where they cool and condense, according to their chemical structure. When the vapor reaches a height in the tower where the temperature in the column is equal to the boiling point of the substance, the vapor turns into liquid (condenses), collects in troughs, and flows into various tanks for storage, as shown in Figure 1. Table 1 below summarizes the characteristics of the by-products obtained from the fractional distillation of petroleum.

Petroleum by-product	Condensation temperature (°C)
Petroleum gas	20–40
Gasoline	40–70
Kerosene	100–120
Gas oil	120–200
Lubricating oil stocks	200–300
Residue	600

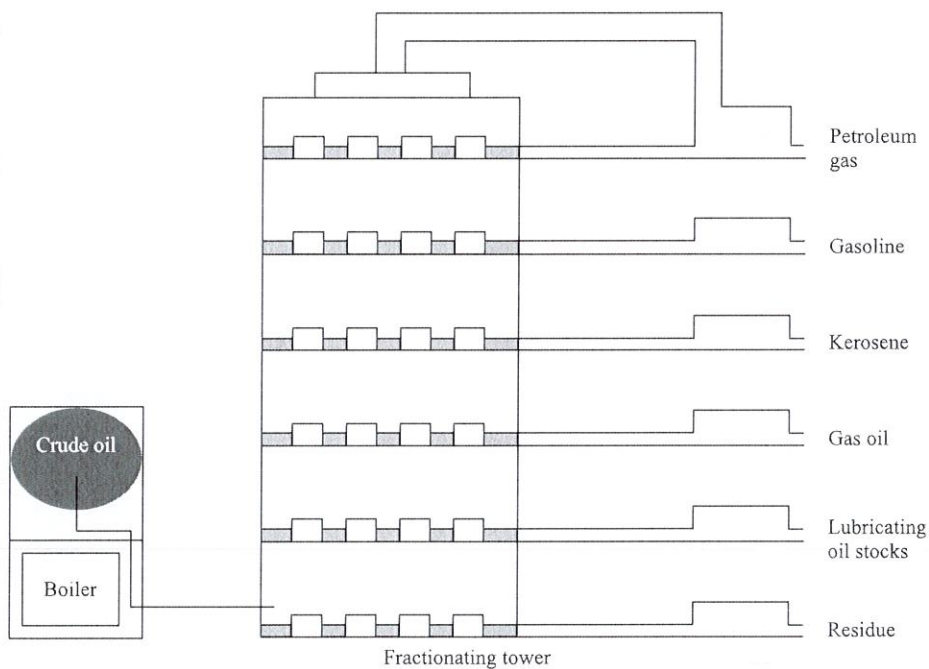


Figure 1

23. According to the passage, the temperature at which gasoline condenses is most likely:
- A. less than 0°C.
 - B. less than 40°C.
 - C. greater than 20°C.
 - D. greater than 70°C.
24. According to the passage, which by-product formed in the fractionating tower condenses first?
- F. Petroleum gas
 - G. Kerosene
 - H. Gas oil
 - J. Residue

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25. According to Figure 1, fractional distillation uses which of the following as a raw material?
- A. Gasoline
 - B. Residue
 - C. Crude oil
 - D. Gas oil
26. Given that naphtha, another by-product of petroleum distillation, has a condensation point of approximately 90°C, between which two petroleum by-products would this substance be found in a fractionating tower?
- F. Gasoline and kerosene
 - G. Lubricating oil stocks and gas oil
 - H. Kerosene and gas oil
 - J. Residue and lubricating oil stocks
27. According to the passage, at what temperature is most of the crude oil vaporized?
- A. 600°C
 - B. 300°C
 - C. 100°C
 - D. 20°C
28. According to the passage, as the vapor rises in the fractionating tower:
- F. the condensation temperature increases only.
 - G. the condensation temperature decreases only.
 - H. the condensation temperature increases quickly, then slowly decreases.
 - J. the condensation temperature remains stable at 600°C.

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