

1 litre of polluted water is extracted using **50 mL** of hexane. The following table shows the results obtained with the separation of hexane extract constituents on a **DB-5** column (**30 m** long), using helium as a carrier gas.

Compound	Retention time (min)	Peak width at half-height (min)	Peak area
Benzene	4.33	0.16	23667
Naphthalene	4.86	0.21	91843
Anthracene	5.91	0.24	30975
Pyrene	7.25	0.30	56384
Chrysene	8.85	0.33	18402

1. If the velocity of the mobile phase is **13.30 cm/s**, calculate the dead time **t_M in min**.
2. If the temperature is programmed as: initial temperature: **70 °C** (for **3 min**), then increases at **15°/min** rate till **150 °C** (for 10 min).
What will be the temperature of oven after **8 min** from the injection time?
3. Under the same conditions, a compound **M** gives a retention factor **$K = 1.37$** . What is the compound **M**?
4. A reference sample containing **32.00 mg/mL** naphthalene was injected in the same conditions and gave a peak at **4.81 min** with area of **160477**. What is the concentration of naphthalene in the polluted water sample (ppm)?