**RECORD YOUR RESPONSE IN THE SPACE PROVIDED UNDER EACH SUBQUESTION**

**BQ1: Gas Stripping: 20 Marks**

A groundwater stream containing a soluble hydrocarbon (A) at 100 ppm (mol basis) is to be stripped before its use for potable purposes. It enters a 5-tray stripping column operating at 1 atm pressure and 21.1 °C at 250 kmol/h. The hydrocarbon stripping is carried out using pure air at 1700 kmol/h. The equilibrium follows Henry’s law relationship and Henry's constant is 0.223 bar.

a) Calculate the mole fraction of A in the treated groundwater (ppm). The environmental regulations require that the pollutant must be no more than 1 ppm. Does this tower meet the standards? **5 Marks**

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| Response: |

b) Analytically or graphically calculate the number of equilibrium stages required to remove 99% of the hydrocarbon pollutant. **5 Marks**

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| Response: |

c) An alternative approach is to treat the contaminated groundwater in a packed bed tower. To achieve the same outlet concentration of A found in Part a, estimate the height of the packing materials within the packed bed. Note that the bed has an inner diameter of 0.65 m and the packing material has found to have KGa = 0.045 kmol/s.m3.atm. **9 Marks**

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| Response: |

d) For the packed bed tower designed in Part c, determine its height equivalent to theoretical trays. **1 Marks**

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| Response: |

**END OF QUESTION BQ1 (Go to next page)**