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

**AQ2: Distillation: 10 Marks**

A mixture of 60 mol% A (more volatile component) and 40 mol% B is fed continuously into a distillation column at 450 kmol/h. The column operates at 101.32 kPa abs. The distillate is expected to contain 90 mol% A and the bottom product contains 10 mol% A. The feed is pre-heated such that it enters the column partially vaporised. In addition, the vapour fraction of the feed is equal to the distillate to feed ratio on mole basis.

Based on this description, answer the questions given below. Graphical methods are not required to obtain the answers.

a) Calculate the distillate and bottoms molar flow rates in kmol/h. **2 Marks**

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| Response: |

b) Calculate the q value for the given conditions. **2 Marks**

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| Response: |

c) On a graph, where is the mole fraction of the MVC in liquid and is the mole fraction of the MVC in vapour, the intersection of q line and the rectifying operating line at minimum reflux ratio (pinch point) gives coordinate = 0.68. Calculate the minimum reflux ratio, . (Note: graphical solution is not required) **5 Marks**

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| Response: |

d) For an actual reflux ratio of 1.5 times the minimum reflux ratio, write the equation for enriching operating line in the form of **1 Mark**

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| Response: |

**END OF QUESTION AQ2 (Go to next page)**