

- Q-3** **Answer the following in detail: (Any 2)** **(10)**
- A) What is the significance of Reynold' number? Is it dimensionless? Justify your answer.
 - B) Describe principle and working of rotameter with labeled diagram,.
 - C) Explain overall material balance and individual material balance theory with suitable example.

Section-II

- Q-4 (A)** **Do as directed:** **(07)**
- I) Define: Convection.
 - II) Give the two names of metal used for prevention of chromium depletion.
 - III) Enumerate problems associated with glass.
 - IV) Write the equation governing solid-fluid mass transfer.
 - V) Define individual film coefficient.
 - VI) Give one example of each method of heat transfer.

- Q-4 (B)** **Answer the following in brief: (Any 4)** **(08)**
- I) Describe the steel alloys used in pharmacy practice.
 - II) Write the advantages of steam used as heating medium.
 - III) State the conditions for using arithmetic mean area and log arithmetic mean area for calculating the rate of heat transfer. Also write the equations for both.
 - IV) Comment: counter-current flow is better than co-current flow for an efficient heat transfer.
 - V) What is the effect of elevated temperature on mass transfer?
 - VI) Enlist various boundary layers that offer a resistance to convection.

- Q-5** **Answer the following:** **(10)**
- A) Discuss in detail the role of stainless steel in the pharmaceutical industry.

OR

- A) Explain over all heat transfer coefficient U. Taking simple example of steam condenser, derive the equation for U.
- B) How will you use mean area and mean temperature for calculating rate of heat transfer? Derive the mathematical equation to explain the concept of mean area and mean temperature.

OR

- B) Classify materials used for pharmaceutical plant construction. Explain corrosion.

- Q-6** **Answer the following in detail: (Any 2)** **(10)**
- I. Write a note on Stainless steel as a material for pharmaceutical plant construction..
 - II. Write the factor affecting selection of material of pharmaceutical plant construction.
 - III. Explain with diagram resistances "In series" and "In parallel" and derive the equations for both.