



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS) (Grant – in – Aid)
Affiliated to Sardar Patel University



Roll No. & Sign:

Bachelor of Science (Semester – 6) Internal Theory Examination – 2026

US06MAICV02: Separation Techniques & Mass Transfer Operations

Date: 7th March, 2026

Time: 10:45 AM to 12:15 PM

Day: Saturday

Total Marks: 30 Marks

Q – 1 Answer the following Multiple-Choice Questions. (All are compulsory) [06]

1. Flow measuring instruments are classified based on:
(A) Colour (B) Temperature
(C) Principle of Operation (D) Size
2. Distillation is preferred over extraction when:
(A) Components form azeotropes (B) Relative volatility is high
(C) Feed is heat sensitive (D) Solvent selectivity is low
3. A triangular diagram is mainly used for:
(A) Gas absorption calculations (B) Two-component systems
(C) Three-component liquid-liquid equilibrium (D) Vapor-liquid equilibrium
4. Distillation is primarily based on:
(A) Difference in solubility (B) Difference in density
(C) Difference in volatility (D) Difference in viscosity
5. Evaporation is primarily used to:
(A) Separate immiscible liquids (B) Concentrate a solution by vaporizing solvent
(C) Remove dissolved gases (D) Reduce boiling point
6. The major advantage of multiple effect evaporation is:
(A) Lower capital cost (B) Lower steam economy
(C) Higher steam economy (D) Higher pressure drops



Q – 2 Explain ON–OFF control and discuss different types of lags. [06]
OR

Q – 2 Explain the principle of ion exchange resins and evaluate their role in industrial water purification. [06]

Q – 3 Describe Azeotropic distillation. [06]
OR

Q – 3 Explain Packed Column for continuous distillation with sketch. [06]

Q – 4 Distinguish between Distillation & Liquid-Liquid Extraction. [06]
OR

Q – 4 Explain Rotating Disc Contactor for Light Phase Dispersed unit with sketch. [06]

Q – 5 Explain principle and working of Calendria and Long Tube Vertical evaporators. [06]
OR

Q – 5 Write a note on Swenson–Walker crystallizer with a diagram. [06]

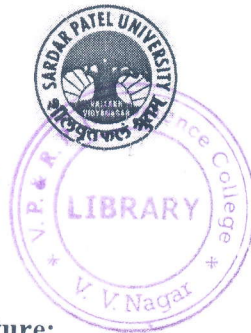
Supervisor Signature:

QUIZ TEST

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Obtain Marks:

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Total Marks: 15 Marks

Examiner Signature:

Note: The figure to the right indicates full marks of the questions.

Q-1 Fill in the blanks with the appropriate answer given in the bracket [8 Marks]

1. A control system maintains a process variable at a desired _____. (Set Point/End Point)
2. In _____ control, human intervention is required. (Manual / Automatic)
3. Liquid–liquid extraction is a _____ transfer operation. (Mass / Energy)
4. Distillation is based on difference in _____. (Boiling Point / Melting Point)
5. Vacuum distillation is used for _____ boiling substances. (High/Low)
6. The vertical vessel used in distillation is called _____ column. (Distillation/Crystallization)
7. Multiple effect evaporation is used to improve _____ economy. (Steam/Cold)
8. Supersaturation is necessary for _____ formation. (Crystal/Precipitation)

Q-2 State whether the following statement is true or false. [Write answer in the box] [7 Marks]

1. Orifice meter is a differential pressure meter.
2. Mother liquor is the solid crystal obtained after separation.
3. Vapour formed during distillation is richer in the less volatile component.
4. Continuous crystallizer operates at steady state.
5. Forced circulation evaporator uses natural circulation.
6. Multiple effect evaporation improves steam economy.
7. Distribution coefficient is ratio of solute concentration in extract to raffinate.