

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3160507

Date: 01/06/2026

Subject Name: Advanced Separation Processes

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a) Enlist three limitations of membrane based separation processes. **03**
 - (b) Compare and contrast selection of carbon dioxide as a most suitable solvent for supercritical fluid extraction process. **04**
 - (c) Explain in detail about pervaporation process. **07**
- Q.2**
- (a) Which are the major factors affecting membrane fouling in microfiltration? **03**
 - (b) List major applications of reactive distillation. **04**
 - (c) Construct a neat flow sheet Residuum Oil Supercritical Extraction (ROSE) process and explain it in detail. **07**
- OR**
- Q.2**
- (c) Considering distillation step only, what are the major advantages reactive distillations offered over conventional distillation. **07**
- Q.3**
- (a) List out three major applications of gas separation. **03**
 - (b) Which parameters affecting performance of nanofiltration membrane? **04**
 - (c) Illustrate how separation by supercritical fluid extraction methods is advantageous over conventional separation methods. **07**
- OR**
- Q.3**
- (a) List out three names of membrane modules used in membrane separation processes. **03**
 - (b) Write four examples of concentration driven membrane processes. **04**
 - (c) In enzyme purification by ultrafiltration how concentration polarization is reduced? **07**
- Q.4**
- (a) What is principle of thin layer chromatography? **03**
 - (b) Draw a labeled diagram of Short Path Distillation Unit (SPDU). **04**
 - (c) Inference principle and working of separation by column chromatography. **07**
- OR**
- Q.4**
- (a) State principle of gel chromatography. **03**
 - (b) Outline important aspects of membrane bioreactor. **04**
 - (c) Analyzed electrophoresis separation with suitable labeled diagram of it. **07**
- Q.5**
- (a) Summarize operating parameters in electrodialysis. **03**
 - (b) Enlist major applications of reverse osmosis. **04**

- (c) Compare advanced separation processes with conventional separation processes by providing a specific case study. **07**

OR

- Q.5** (a) Select suitable advanced separation processes for the following: **03**
(i) Recovery of protein from cheese whey (ii) Identification of artificial colors in food and beverages (iii) Concentration of latex emulsion
- (b) Explain chemical potential in interface mass transfer and its importance in advanced separation processes. **04**
- (c) Explain membrane gas separator using complete mixing model. **07**
