

**THE KAVERY ENGINEERING COLLEGE***(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026***Fifth Semester***Chemical Engineering****CH3005 - Petrochemical Technology***Regulations - 2021**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10\*2=20)**

| <i>Q.No</i> | <i>Questions</i>                                                                                    | <i>BTL</i> | <i>CO</i> | <i>Marks</i> |
|-------------|-----------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 1.          | What are the common feedstocks used in petroleum industries?                                        | L1         | 1         | 2            |
| 2.          | Give two advantages of refinery-petrochemical complex integration.                                  | L1         | 1         | 2            |
| 3.          | Write any two differences between reforming and cracking of feedstocks in petrochemical production. | L2         | 2         | 2            |
| 4.          | What is syngas and what are its main components?                                                    | L1         | 2         | 2            |
| 5.          | Write a brief note on acrylonitrile, including its main industrial applications.                    | L2         | 3         | 2            |
| 6.          | Illustrate any two advantages of methyl tertiary butyl ether (MTBE).                                | L2         | 3         | 2            |
| 7.          | Write few uses of Acrylonitrile Butadiene Styrene.                                                  | L1         | 4         | 2            |
| 8.          | Mention any two industrial applications of polycarbonates.                                          | L2         | 4         | 2            |
| 9.          | Name two additives commonly used in lubricants and their purpose.                                   | L1         | 5         | 2            |
| 10.         | Explain two NPK fertiliser formulations and their significance.                                     | L2         | 5         | 2            |

**PART - B (ANSWER ALL QUESTIONS) (Marks 5\*16 = 80)**

| <i>Q.No</i> | <i>Questions</i>                                                                                                                                                                 | <i>BLT</i> | <i>CO</i> | <i>Marks</i> |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 11.         | a Explain in detail about the structure of petrochemical complexes with a flow diagram.                                                                                          | L3         | 1         | 16           |
|             | Or                                                                                                                                                                               |            |           |              |
|             | b What is a petrochemical? Elucidate the classification of petrochemicals and write about their applications as well.                                                            | L3         | 1         | 16           |
| 12.         | a Describe the catalytic reforming of naphtha for the production of high-octane aromatics. Discuss the mechanism, catalysts used and byproducts formed.                          | L3         | 2         | 16           |
|             | Or                                                                                                                                                                               |            |           |              |
|             | b Explain the sources, separation methods and uses of C4 hydrocarbons (butadiene, isobutylene and 1-butene). Give examples of their applications in polymer and fuel industries. | L3         | 2         | 16           |

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| 13. | a | Elucidate the process flow scheme for ethylene glycol production from ethylene oxide hydration. Also write about the variables controlling mono, di, and triethylene glycol yield.                                                                                                                                      | L4                                                                                                                                                                                               | 3  | 16 |    |
|     |   | Or                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                  |    |    |    |
|     | b | Describe the industrial production of Bisphenol-A from phenol and acetone. Provide the process flow scheme, catalyst system, reaction conditions and yield pattern. Discuss the technological advantages of this process and its significance as an intermediate in the manufacture of polycarbonates and epoxy resins. | L4                                                                                                                                                                                               | 3  | 16 |    |
| 14. | a | i                                                                                                                                                                                                                                                                                                                       | Classify polymers into fibres, rubbers, and plastics with suitable examples. Explain how structure determines their mechanical and thermal properties.                                           | L3 | 4  | 8  |
|     |   | ii                                                                                                                                                                                                                                                                                                                      | Compare and contrast LDPE and HDPE in terms of polymerisation techniques, molecular structure, density, crystallinity and industrial applications.                                               | L3 | 4  | 8  |
|     |   | Or                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                  |    |    |    |
|     | b | Describe the emulsion and solution polymerisation routes for styrene-butadiene rubber (SBR). Compare its properties to natural rubber and explain its role in tyre manufacturing.                                                                                                                                       | L3                                                                                                                                                                                               | 4  | 16 |    |
| 15. | a | i                                                                                                                                                                                                                                                                                                                       | Explain agrochemicals with respect to their definition, classification, methods of production, and applications.                                                                                 | L3 | 5  | 8  |
|     |   | ii                                                                                                                                                                                                                                                                                                                      | Discuss electronic chemicals in terms of their classification, purity requirements, examples, and industrial importance.                                                                         | L3 | 5  | 8  |
|     |   | Or                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                  |    |    |    |
|     | b | i                                                                                                                                                                                                                                                                                                                       | Discuss the role of petrochemicals as raw materials for pharmaceuticals. Explain with examples how intermediates such as benzene, toluene and ethylene derivatives contribute to drug synthesis. | L3 | 5  | 10 |
|     |   | ii                                                                                                                                                                                                                                                                                                                      | What are key raw materials and their functions for detergent manufacturing?                                                                                                                      | L3 | 5  | 6  |