

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION SP/2025)**

**CLASS: B.TECH
BRANCH: CHEMICAL ENGG.**

**SEMESTER : VI
SESSION : SP/2025**

SUBJECT: CL355 PETROCHEMICALS TECHNOLOGY

TIME: 03 HOURS

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

		CO	BL
Q.1(a) Compare & contrast FOUR refinery configurations with flow sheets & details	[5]	1	4
Q.1(b) Discuss the classification of petrochemicals and provide examples from each category (excluding generation-based classification).	[5]	1	2
Q.2(a) Discuss the concept of the sulfolane-based process used for recovering high-purity aromatics from hydrocarbon mixtures (flowsheet not required).	[3]	2	2
Q.2(b) Briefly describe the UOP Continuous Catalytic Regeneration (CCR) Platforming process for producing aromatics from naphtha with a neat flowsheet. Also, discuss the different types of reactions involved in the platforming process.	[7]	2	2,3
Q.3(a) Explain the following: (i) outline the flowsheet for production of phthalic anhydride from o-xylene (ii) Name FOUR major steps involved in DMT manufacture & write the functions of the last step (iii) outline the chemical reaction for maleic anhydride production process	[5]	3	2
Q.3(b) Illustrate block diagram flowsheet of hydrodealkylation of toluene & explain the role of 'Beckmann rearrangement' in Caprolactam process & outline the TWO steps involved in DDT manufacture	[5]	3	2
Q.4(a) In a syngas to CH ₃ OH process in a slurry reactor, rate of reaction is -0.105 kmol/min.m ³ for a catalyst charge of 3.95 kg/m ³ , $r_b = 0.08$ min & H ₂ solubility = 0.014 kmol/m ³ . (i) Estimate 'r _{cr} ' (ii) Calculate new catalyst charge required for reaching 50% conversion, keeping all the other previous parameters same, if volume of reactor = 2m ³ and F _{A0} = 0.7 kmol/min	[4]	4	5
Q.4(b) Explain the following: (i) Define methane slip & effect of high pressure on it & mention how it is balanced (ii) Illustrate CH ₃ OH-to-HCHO process based on partial oxidation only through a flowsheet (iii) List names of FOUR methods for production of CHCl ₃ by direct methane chlorination (iv) Outline block diagram flowsheet for VCM production & mention why oxychlorination is unpreferred?	[6]	4	2
Q.5(a) Why is oxalic acid added to the acrylonitrile purification column?	2	5	2
Q.5(b) Discuss the importance of the oxo process in the industrial conversion of olefins.	3	5	2
Q.5(c) Describe the production of ethylene oxide from ethylene with a neat flowsheet.	5	5	2,3

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