Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

SEVENTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER EXAMINATIONS, NOV - 2017

SUBJECT: CHEMICAL PROCESS SYSTEMS [ICE 4005]

Duration: 3 Hour Max. Marks:50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A	Explain the basic principles of Mass and Energy balance.	2
1B	How Sankay diagram is useful for energy analysis. Draw the necessary sketch.	3
1C	Explain three different modeling techniques of the stirred tank heating process. State the assumptions.	5
2A	Draw the flowsheet symbols of vertical thermosiphen re-boiler and air cooler with finned tubes.	2
2B	Write the properties of the basic, speciality and knowledge chemicals.	3
2C	Explain the nine various properties of the liquid fuels with specifications.	5
3A	What are the sources of waste heat recovery? Highlight the ways to recover the heat from the sources.	2
3B	Explain the stoichiometric calculation of air requirement.	3
3C	What are the various types of heat exchanger. For the shell and tube type derive for the thermal efficiency.	5
4A	Write the applications of non-contact type heat exchangers.	2
4B	Explain about the relation between the temperature and pressure in the distillation column with respective expressions and diagram.	3
4C	Derive for the thermal efficiency of the distillation process. Also describe the thermodynamic aspects of distillation.	5
5A	Define agitated distillation column and its needs.	2

5B	With a neat sketch explain the concept of evaporators in energy consumption.	3
5C	How pinch technology will contribute to energy saving in chemical process industries.	5

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