Total number of printed pages – 4 B. Tech
PEEN 5402

## Eighth Semester Examination - 2008

## INDUSTRIAL INSTRUMENTATION

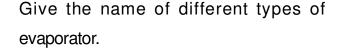
Full Marks - 70

Time: 3 Hours

Answer Question No. 1 which is compulsory and any five from the rest.

The figures in the right-hand margin indicate marks.

- 1. Answer the following questions: 2 ×10
  - (a) What are the controlled variables, manipulated variables and disturbances in a Distillation Column?
  - (b) What is the function of an Evaporator?



- (c) What do you mean by Economy of an Evaporator? What is its value for a Tripple Effect Evaporator?
- (d) What do you mean by Total Internal Reflux Control of binary distillation column? In which condition it happen?
- (e) What is Split-range control? Which condition it is used?
- (f) Draw the input and output flow versus time characteristics of a gas chromotograph.
- (g) What is resolution of a Mass Spectrometer?
- (h) Draw the Three Element Control diagram of a Boiler used in Thermal Power Plant.
- (i) Give basic principle of Scintillation counters for detection of nuclear radiation.

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- (j) Why feed forward and cascade control is used over feedback control system?
- With neat sketch describe the basic principle of operation of a binary distillation column and discuss the effect of reflux charge on its operation. Why pressure control is very important for distillation column?
- What is the basic control strategy for single composition control for upsets in feed composition and dual composition control for upsets in feed flow. Draw the diagram also.
- 4. (a) Derive the stedy state model of a double effect evaporator and based on model draw the control structure.6
  - (b) Draw the control diagram of a reactor temperature control system.
- What is the difference between Dispersive and Non-dispersive type IR spectrometer? Discuss the basic principle of any one of them. What is

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- monochromater? What are the elements are used as a monochromator?
- Draw the schematic diagram and discuss the principles and basic theory of Gas Chromatography.
- 7. (a) Describe in detail the pulverised fuel combustion control in a boiler of power plant.
  - (b) Discuss with diagram the main steam temperature control system of a power plant.5
- 8. Write notes on any *two*:  $5 \times 2$ 
  - (a) pH measurement
  - (b) Moisture measurement
  - (c) Mass spectrometer.

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