KUMARAGURU college of technology
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Register Number: …….

B.E DEGREE EXAMINATIONS: APRIL/ MAY 2016

(Regulation 2013)

Sixth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U13EIT604**:** Process Dynamics and Control

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. In a Heat exchanger, one fluid shuffles back and forth across the flow path of the other fluid and this phenomenon is called as _____.
   a) Co-current b) Counter current
   c) Cross flow d) Laminar
2. Boilers that are producing steam lower than 80bar are called as _____.
3. In the following, choose the boiler where the hot gas passes through the tubes that are surrounded by water
   a) Water tube boiler b) Fire tube boiler
   c) Externally fired boiler d) Internally fired boiler
4. In a boiler system the _____ is an indication of the balance between the heat inflow and heat outflow.
5. From the following choose a reactor which requires a high conversion of reaction
   a) Stirred tank reactor b) Tubular reactor
   c) Packed fed reactor d) Plug flow reactor
6. In steam generation process when the temperature is further increased above the saturated steam it is called as _____.
7. Which of the following is the largest lag in distillation column?
   a) Lags in liquid flow b) Concentration lag in liquid hold up
   c) Concentration lag in Vapor hold up d) Lags in vapor flow
8. The lag in vapor flow is usually an order of magnitude smaller than the lag in liquid flow because of small capacity for _____ on the plates.
9. The process which involves in the conversion of white sugar by using a bleaching agent is called_____.
   a) Clarification b) Separation
   c) Evaporation d) Dying

10. Fertilizers are chemical substances which provide plants with the _____ needed for its growth and development.

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. What is the need for the derivative control action in a Heat exchanger?
12. When the raw water that is passing through the tube side, explain how the heat transfer rate is affected?
13. What is meant by inverse response of a boiler?
14. What is meant by swell effect in a boiler?
15. Analyze the effects of Time constant in a Plug Flow reactor.
16. Discuss about the stability in chemical reactors.
17. What is the need for reflux flow control in a distillation column?
18. List the different types of distillation column.
19. Draw the process flow diagram for a sugar mill.
20. List the various unit operations involved in sugar manufacturing plant.

PART C (5 x 14 = 70 Marks)

(Answer not more than 400 words)

Q.No. 21 is Compulsory

21. Discuss in detail about the various unit operations that are involved in chemical pulp process industries.

22. (a) (i) Elaborate in detail about how the lag is introduced in a heat transfer system and mention the remedies to be taken. (8)

(ii) Obtain the transfer function of shell and tube heat exchanger. (6)

(OR)

(b) (i) Discuss in detail about how the exit fluid temperature can be controlled by using various control schemes in a heat exchanger. (10)

(ii) List the different types of heat exchanger with respect to various flow configurations. (4)

23. (a) Develop different types of control configuration schemes to control the boiler feed water at the desired level of 150m in a high pressure boiler drum.

(OR)

(b) Discuss in detail about the various control mechanisms involved to run the turbo alternator with safe and efficient condition during the superheated steam extraction of turbines.

24. (a) Elaborate in detail about the different types of processes involved in process industries during their chemical reactions and also choose a suitable reactor for each process.

(OR)

(b) Discuss in detail about the various techniques involved in the detection of outlet product of a CSTR and summarize the different control schemes that are used to maintain process variable at the desired level of concentration.

25. (a) Detail an overview about the different types of lag introduced in a distillation column during its separation process.

(OR)

(b) Summarize the various possibilities of control scheme for distillation column pressure control.

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