Code: 9A23604 **R09**

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

INSTRUMENTATION & BIOPROCESS CONTROL

(Biotechnology)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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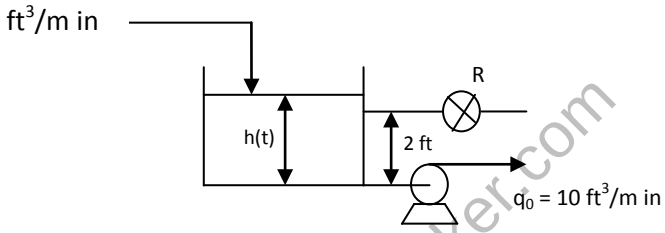
1 Discuss the dynamics of simple temperature system and derive the transfer function H(s)/Q(s).

2 Explain 1/4th decay ratio, IAE, ISE & ITAE.

3 Derive the transfer function H(s)/Q(s) for the liquid level system shown in below figure.
(a) When the tank level operates about the steady state value of h_s = 1 ft.
(b) When the tank level operates about the steady state value of h_s = 3 ft.
The pump removes water at a constant rate of 10 ft^3/min. The rate is independent of head. The cross sectional area of the tank is 1.0 ft^2 and the resistance R is 0.5 ft/ft^3.



4 Explain Zeigler-Nichol's tuning method of PID controller in detail.

5 (a) Explain about distillation column.
(b) Explain the principle of split range control with a suitable example.

6 Explain about control valve sizing. What is the significance of control valve sizing?

7 Explain about the development of molecular arrays as memory stores.

8 A unit step change in error is introduced into a PID controller. If K_c = 10, T_1 = 1 and T_D = 0.5, find P(t).

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