CLASS: IMSc   SEMESTER : IX
BRANCH: FOOD TECHNOLOGY   SESSION : MO/18

SUBJECT: SAF3003 AUTOMATION IN FOOD PROCESSING INDUSTRY
TIME: 3.00 HOURS   FULL MARKS: 60

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.


Q.1(a)   Define absolute pressure, vacuum pressure and gauge pressure.   [6]
Q.1(b)   Explain different types of pressure measuring device.   [6]

Q.2(a)   Explain the principle of thermocouple.   [4]
Q.2(b)   Explain the principle of different types of temperature measuring device.   [8]

Q.3(a)   Find the Laplace Transform of unit step function.   [2]
Q.3(b)   Find the Laplace Transform of $\sin 2t$.   [4]
Q.3(c)   Find the Laplace Transform of $e^{-at}.\sin(kt)$.   [6]

Q.4(a)   Find the transfer function of liquid level system with constant flow outlet q_0. [6]
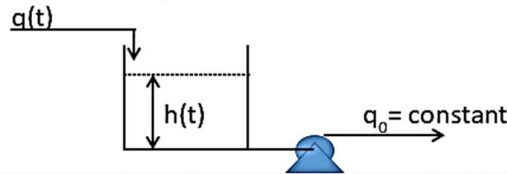
Q.4(b)   Find the transfer function of liquid level system with attaching resistance R in the outlet.   [6]
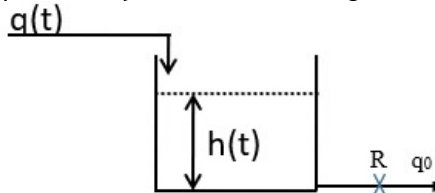
Q.5   Three tanks are connected in series, determine the transfer function $H(s)/Q(s)$ for the liquid-level   [12]
      system. Resistances R1 and R2 are connected to the tank 1 and 2 respectively which is linear. The flow
      rate from tank 3 is maintained constant at $q_0= b$ by means of a pump; i.e., the flow rate from tank 3
      is independent of head h. The tanks are noninteracting.

Q.6   Find out the transfer function for interacting system as shown figure below.   [12]
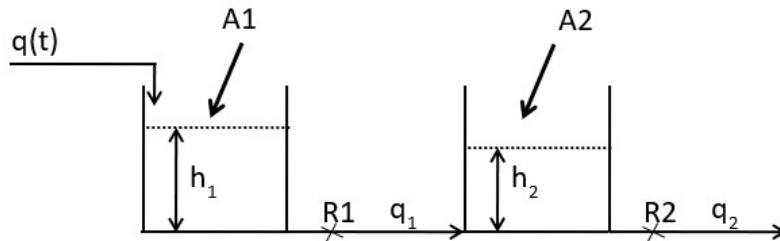
Q.7(a)   With neat sketch and mathematical expressions define period of oscillation and decay ratio.   [4]
Q.7(b)   A block of mass W is resting on a frictionless table which is connected to the stationary with linear   [8]
         spring and a dashpot. The block is free to oscillate under the action of forward force F(t) applied. Find
         the transfer function.