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SE-8258

B. E. - III (Sem - V) (Chemical) Examination

May / June – 2011

Instrumentation & Process Control

(New Course)

Time : Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 3 (Sem - 5) (Chem.)**

Name of the Subject :

☛ **Instrumentation & Process Control (New)**

☛Subject Code No. : **8 2 5 8** ☛Section No. (1, 2,.....) : **1, 2**

Seat No. :

Student's Signature

(2) Answer to the two sections must be written in separate answer book.

(3) Figure the the **right** hand side indicate marks.

(4) Answer suitable data if necessary.

(5) Graph paper will be provided if required.

SECTION - I

1 (a) Explain in brief. **10**

(i) Mention transfer function of sin at and cos at.

(ii) Define period of oscillation and overshoot.

(iii) Define phase angle and Amplitude Ration for I^{st} order system.

(iv) Mention transfer function for II^{nd} order system when damping coefficient is greater than one for Impulse response.

(v) Define proportional controller.

(b) Derive transfer function for I^{st} order system using mercury inglass thermometer. **6**

2 Answer any **two** of the following. **18**

(a) Determine the transfer function H(s)/Q(s) for the liquid level system show in fig(1). Resistanance R_1 and R_2 are linear. The flow rate from tank 3 is maintained at constant Q_0 by means at pump.

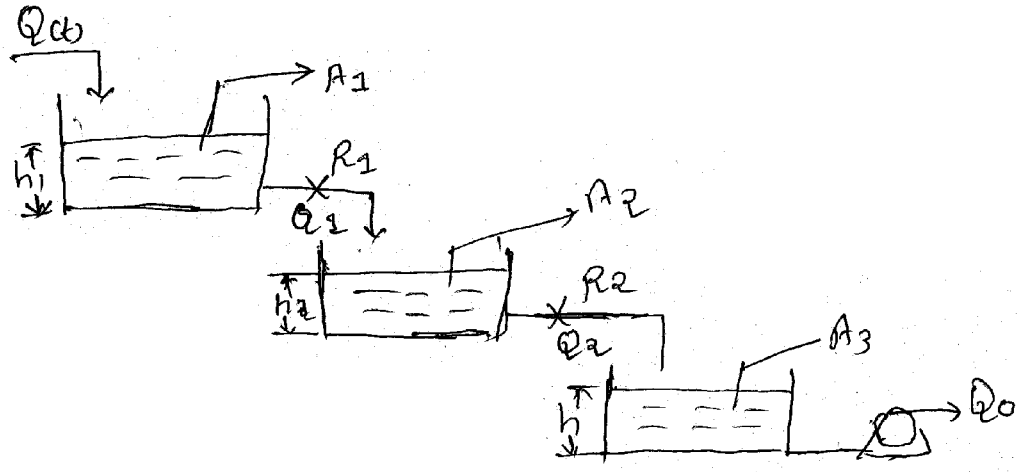

Fig-1

(b) Determine the transfer function y(s)/x(s) for block diagram given below.

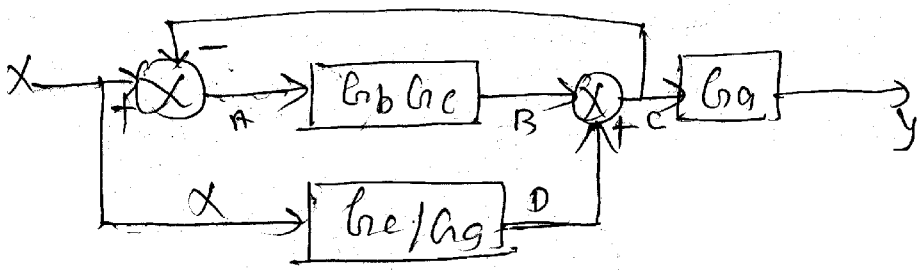

Fig. 2

(c) Derive transfer function equation of a mixing process.

3 Answer any **four** of the following. **16**

(a) Cascade control.

(b) Bode diagram of a IInd order system.

(c) Gain Margin and phase margin.

(d) Bode stability criteria,

(e) Transportation lag.

SECTION - II

4 (a) Answer the following. **2×5=10**

(i) Explain dead time lag.

(ii) Discuss the relationship between different temperature scale.

(iii) What is the application of pressure spring ?

(iv) What is vacuum thermocouple ?

(v) Write down two problems of total emissivity of the target surface.

(b) Explain photoelectric pyrometer in detail. **1×8=8**

5 Answer any **two**. **2×8=16**

(a) Discuss liquid column manometers.

(b) Describe the bubbler system for liquid level measurement.

(c) Discuss the flow of compressible fluids in pipes.

6 Answer any **two**. **2×8=16**

(a) Discuss open channel meters for the flow measurement.

(b) Write short note on :

(i) Diaphragm pressure element.

(ii) Differential pressure element.

(c) Write a short note on area meters with a neat diagram.
