Total No. of printed pages = 4

Ch-601/APC/6th Sem/2017/N

AUTOMATIC PROCESS CONTROL

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer all the questions from Part–A and any *three* from Part – B.

PART–A

1. Fill in the blanks : 1×11=11

(a) ____ control cannot be used alone due to high oscillation.

(b) In _____ control offset is almost zero.

(c) In derivative control, the ____ variable changes with the rate of change of _____.

(d) For low loads suitable controller is a _____ controller.

(e) A proportional controller will have an offset difference between _____ and _____ that depends on process load.

[Turn over

(f) Open loop poles are same as _____ poles.

(g) Proportional band is defined as the error required to move the valve from fully ____ to fully _____.

(h) _____ is used for cases where the major load variable can be measured but not controlled.

2. Give short and direct answers : 1×14=14

(a) Give one disadvantage of automatic process control.

(b) Define :

(i) Open loop system

(ii) Close loop system

(iii) Time constant.

(c) Give one example for each of the following :

(i) Feed back control

(ii) Feed forward control.

(d) What do you mean by proportional sensitivity ?

(e) What do you mean by Distributed Digital Control System ?

(f) State one function for each of the following :

(i) Pneumatic controller

(ii) Hydraulic controller

(iii) Electric controller.

(g) What is hydraulic transmission ?

(h) Give one application for each of the control engineering process :

(i) Control of pressure

(ii) Control of thermal process.

PART – B

3. (a) What is meant by automatic process control ? State the advantages of automatic process control. 5+5=10

(b) With the help of a home heating system, explain the following terms : 5

(i) Set Point

(ii) Manipulated Variable.

4. (a) What are the different modes of control ? Explain any one. 2+8=10

(b) State the advantages of Distributed Digital Control System. 5

5. (a) What do you mean by self operated controllers? Describe with a neat sketch the construction of any *one* of the following controllers : 2+8=10

(i) Thermostatic valve

(ii) Float level controller.

(b) Write a short note on final control element failure. 5

6. (a) State the functions of final control elements. Describe any one with a neat diagram. 2+8=10

(b) State some industrial applications of control engineering in the control of fluid flow. 5