Total number of printed pages–4

53 (IE 605) PINC

2019

PROCESS INSTRUMENTATION AND CONTROL

Paper : IE 605

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. *(a)* Draw a neat diagram of a Temperature measurement system and identify the functional elements of the measurement system from sensing to display indication. 10

   (b) Discuss on the performance parameters used for selection of a Transducer. 10

Contd.

2. *(a)* Explain the different forms of controller action. 10

(i) Proportional

(ii) Proportional Integral and Derivative.

(b) Explain with a neat diagram and flow characteristics the following control valves. 10

(i) Equal percentage valve

(ii) Linear opening valve.

3. Discuss the automation used in manufacturing of beverages in the alcoholic/ non-alcoholic sector, along with the process description. 20

4. *(a)* Elaborate the importance of closed loop control system in the food processing industry. 10

(b) Write down the detailed descriptions of the following tags in the P & I diagram. 10

(i) TIC

(ii) PI

(iii) LY

(iv) FX

(v) SX

(vi) LSH

(vii) DAHH

(viii) FRRC

(ix) PDT

(x) AIC

5. *(a)* Comment on the stability of sixth power characteristics equation of a control system using Routh-Hurwitz stability criterion.

$$s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16$$

10

(b) Sketch the Root Locus of a unity feedback control system with open loop transfer function

$$G(s) = \frac{K}{(s)(s+1)(s+3)}.$$ 10

6. Reduce the system shown in figure by using rules of Block Reduction technique and compare the single transfer function using signal flow graph. 10+10