

**PROCESS CONTROL & INSTRUMENTATION**  
**3K4-IER-19**

Time : 3 hrs.

M.M : 100

**Note :—**

1. Part 'A' may be attempted in first 6 pages of Answer Sheet.  
भाग 'क' के सभी उत्तर, उत्तर-पुस्तिका के प्रथम छः पृष्ठों में ही करने हैं।
2. Part 'B' in rest of the Sheets of Answer Sheet.  
भाग 'ख' के उत्तर, उत्तर-पुस्तिका के अगले शेष पृष्ठों में लिखिये।
3. Answers may be given in English or Hindi.  
प्रश्नों के उत्तर अंग्रेजी अथवा हिन्दी में दीजिये।

**PART - 'A'****1. Attempt any ten questions :-**

(10x2=20)

- (a) Define Transfer function.
- (b) What is the sensitivity of valves?
- (c) What is SMART Transmitter?
- (d) Different between open loop and closed loop system.
- (e) What is intrinsic safety?
- (f) Define speed floating control action?
- (g) Define process line diagram.
- (h) Define Annunciators.
- (i) Explain the principle of signal conditioning.
- (j) List the hardware components of feedback control loop.
- (k) What is Ramp signal?
- (l) Define cascade loop system.
- (m) What is meant by value sizing?
- (n) List any objectives of process control.

**2. Attempt any five questions :**

(5x4=20)

- (a) Explain the different process characteristics in detail?
- (b) Write notes on current to pneumatic converter.
- (c) Write down the different instrument terms symbols used in piping and instrumentation diagram.

- (d) Write equation and circuitry used in pneumatic controllers.
- (e) Explain in detail boosters?
- (f) Explain working of P+I controller.
- (g) Explain cascade control with a block diagram with example.
- (h) Write down the flow equation of equal percentage valve and sketch its inherent valve characteristics.

### PART- B

Attempt any three questions.

(3x20=60)

- 3. (a) A process has two time-constants of 10 sec and 25 sec and a steady state gain of 13. Find the gain of the proportional controller required to give a damping ratio of 0.5 in the closed loop response.  
(b) What is controller tuning and why is it important?
- 4. (a) Explain 2-wire and 4-wire transmitter and their application also.  
(b) Briefly explain the control schemes in the distillation column?  
<https://diplomate.greybits.in/>
- 5. (a) Explain the types and sequence of operation of annunciators.  
(b) Write short notes on
  - (i) V to I converter
  - (ii) Electrical to pneumatic
  - (iii) Process Reaction Curve.
- 6. (a) Explain Ratio control system.  
(b) Explain PLC with the help of block diagram and ladder diagram.
- 7. (a) Explain regulator and servo control.  
(b) Explain architecture of a computer.