

Total No. of Questions :10]

SEAT No. :

**P2904**

**[4958]-1099**

[Total No. of Pages :3

**T.E. (Chemical)**

**PROCESS INSTRUMENTATION AND CONTROL**

**(2012 Pattern) (Semester - II) (309352)**

*Time : 2½ Hours]*

*[Max. Marks :70*

*Instructions to the candidates:*

- 1) *Answer Q. No. 1 or 2, Q. No. 3 or 4, Q. No. 5 or 6, Q. No. 7 or 8, Q. No. 9 or 10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of logarithmic tables, slide ruler, Mollier Charts, electronic pocket calculator and steam tables is allowed.*
- 5) *Assume suitable data if necessary.*

**Q1)** a) Explain functional elements of instruments in detail. [5]

b) Explain need and scope of process instrumentation. [5]

OR

**Q2)** a) Give the classification of instruments. [5]

b) Explain the difference between accuracy and precision in an instrument. [5]

**Q3)** a) Give classification of pressure measuring instruments. [5]

b) Explain with diagram, construction and working diaphragms. [5]

OR

**Q4)** a) Define temperature and give classification of temperature measuring instruments. [5]

b) Explain with diagram, construction and working filled - system thermometers. [5]

**P.T.O.**

- Q5)** a) Explain classification of flow measuring instruments. [8]  
b) Explain with diagram, construction and flow equation orifice meter plate. [8]

OR

- Q6)** a) Explain classification of level measuring instruments. [8]  
b) Explain with diagram, construction and working sight or gauge glass method. [8]

- Q7)** Describe with diagram the following techniques of composition analysis [16]  
a) IR absorption spectroscopy  
b) Ultraviolet absorption spectroscopy

OR

- Q8)** Write note on [16]  
a) HPLC  
b) liquid chromatography  
c) refractometry  
d) Ph meter

- Q9)** a) Describe the heat exchanger automatic control system with block diagram. [9]  
b) Derive the dynamic response equation of first order system for step changes. [9]

OR

**Q10)a)** An air to open valve on the inflow controls level in a tank. When the process is at the set point the valve opening is 50%. **[9]**

An increase in outflow results in the valve opening increasing to a new steady state value of 70%. What is the resulting offset if the controller PB is:

i) 50%

ii) 25%

b) Explain with equation, different control actions. **[9]**

**x x x**