

Total No. of Questions :10]

SEAT No. :

**P2886**

**[4958]-1077**

[Total No. of Pages :2

**T.E. (Instrumentation and Control Engineering)**  
**Instrument & System Design**  
**(2012 Pattern) (Semester - II) (End - Semester)**

*Time : 2½ Hours.*

*[Max. Marks :70]*

*Instructions to candidates:*

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat circuit diagrams should be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

- Q1)** a) Explain Ergonomics and Aesthetics. **[3]**  
b) Draw the internal constructional diagram of IC XTR 110. Write its features and applications. **[7]**

OR

- Q2)** a) What is noise? Classify it and explain thermal noise. **[5]**  
b) Explain the working of cold junction compensation circuit in IC AD 594. **[5]**

- Q3)** a) Write a note on prototyping and testing. **[5]**  
b) What is triboelectric effect? Explain ESD & its minimization mechanisms. **[5]**

OR

- Q4)** a) Define IP standard. Explain IP 54 & 34 standards. **[5]**  
b) Draw the internal circuit of IC HCNR 201 and explain its operation for positive input positive output. **[5]**

**P.T.O.**

- Q5)** a) Introduce and explain in detail the IC MM74C922. [9]  
b) Describe the features of ICM 7217 and explain the functions of following pins. [9]  
i) Zero.  
ii) Count input.  
iii) Scan.  
iv) Up / Down

OR

- Q6)** a) Design frequency multiplier ( $f_{out} = 10 * f_{in}$ ) using suitable IC. Also draw the circuit diagram. [9]  
b) A stepper motor is to be interfaced to micro controller. Suggest suitable IC. Draw interfacing diagram. Give its features, specifications and applications. [9]

- Q7)** a) What is soldering? Give its types. Explain wave soldering method. What are its advantages? [8]  
b) Differentiate between single side board and double side board. [8]

OR

- Q8)** a) Explain different types of printed circuit boards. [8]  
b) Give the design rules for analog circuit PCBs. [8]

- Q9)** a) Explain the terms maintainability and availability. [4]  
b) Different between reliability and quality. [6]  
c) Write a note on failure and failure modes. [6]

OR

- Q10)** a) Explain reliability, Exponential, Weibull and Gamma Distribution. [8]  
b) Write short notes on- [8]  
i) Documentation.  
ii) Quality Assurance.