[4758] - 561

T.E. (Electronics)
INSTRUMENTATION SYSTEMS
(2012 Course) (End-Sem.) (304209) (Semester - II)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Neat diagrams must be drawn wherever necessary.*
2) *Figures to the right indicate full marks.*
3) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
4) *Assume suitable data, if necessary.*

Q1) a)   Explain transit time type of ultrasonic flow meter.   **[5]**

   b)   State the difference between active and passive transducers. Enlist three examples each of active and passive transducers.   **[5]**

<div align="center">OR</div>

Q2) a)   Explain the different fundamental standards and units for common physical parameters.   **[5]**

   b)   Explain capacitive and inductive principles used in proximity sensing.**[5]**

Q3) a)   Explain the working principle of optical Pyrometer.   **[5]**

   b)   Explain construction and working of electromagnetic flow sensor.   **[5]**

<div align="center">OR</div>

Q4) a)   State working principle of thermocouple. Explain how cold junction compensation is achieved for thermocouple.   **[5]**

   b)   Explain capacitive sensor for level measurement when,   **[5]**
   i)   Liquid is conducting
   ii)   Liquid is not conducting

Q5) a)   Explain with suitable block diagram LM75 semiconductor temperature sensor.   **[8]**

   b)   Write short note on: **[8]**
   i)   Micro-machined hot wire anemometer.
   ii)   Magnetic field sensors.

<div align="center">OR</div>

Q6) a) Explain the steps involved in surface micromachining of MEMS accelerometer. Draw a neat sketch of MEMS accelerometer. **[8]**

b) Write short note on: **[8]**

i) Micro-machined absolute pressure sensor.

ii) Smart sensors.

Q7) a) Explain how simultaneous analog and digital communication is achieved with HART protocol? **[8]**

b) Write short note on: **[10]**

i) I²C bus.

ii) Foundation field bus.

OR

Q8) a) Explain with neat diagram I/P and P/I convertor. **[8]**

b) Write short notes on: **[10]**

i) RS 232 standard

ii) IEEE 488 bus

Q9) a) What is actuator? Explain with diagram working of: **[8]**

i) Spring diaphragm actuator

ii) Piston actuator

b) Explain principle of operation of stepper motor. State important selection criteria of stepper motor? **[8]**

OR

*Q10)*a) Explain with neat diagram working of poppet valve. Draw the symbol for a 2/2 valve and a 3/2 valve. **[8]**

b) Explain role of relay and solenoid valve with any one application. **[8]**