RR

II B.Tech I Semester(RR) Supplementary Examinations, May/June 2010
TRANSDUCERS AND INSTRUMENTATION COMPONENTS
(Instrumentation & Control Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Define accuracy and precisim of a measuring instruments with suitable examples. [6M]

   (b) An Instrument reads the values for four different readings 4.0, 4.1, 3.9, 4.2. What is the absolute error and mean error. [4M]

   (c) An Instrument measures 4.1V, 4.1V, 4.1V and 4.1V in four readings. Is the instrument precise explain. If the true value is 4V what is the error? [2M]

   (d) Is the precise Instrument is better than the errganeous instrument - Explain.

   [4M]

2. (a) Compare and contrast a thermocouple with a thermistor as a temperature transducer. [6M]

   (b) Why is platinum normally used in the construction of precision standard thermometers for calibration work? State its measuring temperature range and the reason for selecting such a range. Describe with a neat diagram and construction detail of a platinum resistance thermometer.[10M]

3. (a) A capacitive transducer uses two quartz diaphragms of area $750mm^2$. Separated by a distance 3.5mm.A pressure of $900kN/mm^2$ when applied to the top diaphragm produces a deflection of 0.6mm. The capacitance is 370pf when no pressure is applied to the diaphragms. Find the value of capacitance after the application of a pressure of $900kN/mm^2$. [8M]

   (b) A capacitive transducer is made up of two concentric cylindrical electrodes. The outer diameter of the inner cylindrical electrode is 3mm and the dielectric medium is air. The inner diameter of the outer electrode is 3.1mm. Calculate the dielectric stress when a voltage of 100v is applied across the electrodes. Is it within safe limits? The length of electrodes is 20mm. Calculate the change in capacitance if the inner electrode is moved through a distance of 2mm, The breakdown strength of air is 3kv/mm. [8M]

4. (a) What is a RTD? Where it is used? [4M]

   (b) Explain a 4 lead measurement scheme of temperature measurement using resistance thermometer. [12M]

5. (a) Discuss the merits and demerits of Chain and Friction drives. [8M]

   (b) Mention application of chain and friction drives indicating the preference of one over the other in specific system. [8M]

6. (a) What do you understand by blow down and chatter of safety relief value. Explain. [8M]

   (b) What is the need for value tightness and leakage proof in safety relief value.

   [8M]

7. (a) In what way a pulse transformer is different from normal transformer. [4M]

   (b) A square waveform is given as input to a pulse transfer, sketch the O/P waveform. [6M]

   (c) Mention a few uses of pulse transformer. [6M]

8. (a) Sketch the block diagram of a servo system using two phase motor and derive its transter function.

   (b) What will be the response of the system for step input.

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