Code No: R05221003 **R05** **Set No. 2**

II B.Tech II Semester Examinations,April/May 2012
SENSORS AND SIGNAL CONDITIONING
Electronics And Instrumentation Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What is piezo resistive Effect
   (b) What are the advantages and disadvantages of semiconductor strain gauges. [8+8]

2. (a) What is an amplifier. Draw the circuit symbol of op-amp and derive an equation for its output voltage.
   (b) List the ideal characteristics of op-amp. [10+6]

3. (a) The dead-zone of a certain pyrometer is 0.125 percent of the span. The calibration is 800^0C 1800 ^{0}C. What temperature change must occur before it is detected?
   (b) Explain the phenomenon of hysteresis in measurement systems
      i. Static Error
      ii. Relative error
      iii. Static correlation. [8+8]

4. (a) The hot junction of a chromel alumel thermocouple is connected to a potentiometer terminals at 24^0C. The potentiometer whose terminals core are 24^0C reads 25.76mv. What is the temperature of the thermocouple junction? The calibration chart of the thermocouple is

Temperature^{O}C	20	24	28	—	480	488	493
Voltage,mv	0.8	0.95	1.12	—	26.25	26.72	26.04

   (b) Explain the factors affecting the static accuracy of filled in thermometers.[8+8]

5. (a) How are synchros useful in error detection and correction in a servo control system?
   (b) What do you understand by a dynamic error of a synchro system? [8+8]

6. (a) Explain the working principle of meggar with neat diagram.
   (b) In the Wheatstone bridge of Fig. 5 the values of resistances of various arms are P = 1000Ω, Q = 100Ω, R = 2,005Ω and S = 200Ω. The battery has an emf of 5V and negligible internal resistance. The galvanometer has a current sensitivity of 10mm/μ A and an internal resistance of 100Ω. Calculate the deflection of galvanometer and the sensitivity of the bridge in terms of deflection per unit change in resistance. [8+8]

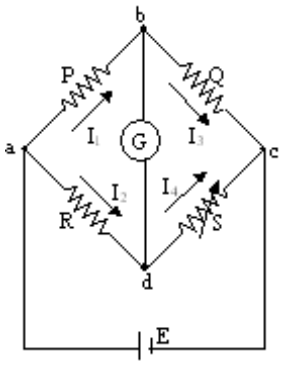

Figure 5

7. (a) How junction semiconductor diodes are used as temperature sensors? What are the factors on which the output of the sensor depends?

   (b) How are quartz crystal resonators used as temperature sensors? How is resonant frequency related to temperature? [8+8]

8. (a) Explain the working of Hay's Bridge with the help of necessary equations. Also state any one of its applications.

   (b) Explain the working of carrier amplifier. Also state the applications of it. [8+8]

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Code No: R05221003 **R05** **Set No. 4**

II B.Tech II Semester Examinations,April/May 2012
SENSORS AND SIGNAL CONDITIONING
Electronics And Instrumentation Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the working principle of meggar with neat diagram.
   (b) In the Wheatstone bridge of Fig. 5 the values of resistances of various arms are P = 1000Ω, Q = 100Ω, R = 2,005Ω and S = 200Ω. The battery has an emf of 5V and negligible internal resistance. The galvanometer has a current sensitivity of 10mm/μ A and an internal resistance of 100Ω. Calculate the deflection of galvanometer and the sensitivity of the bridge in terms of deflection per unit change in resistance. [8+8]

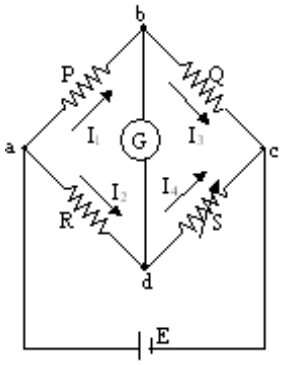

Figure 5

2. (a) How junction semiconductor diodes are used as temperature sensors? What are the factors on which the output of the sensor depends?
   (b) How are quartz crystal resonators used as temperature sensors? How is resonant frequency related to temperature? [8+8]

3. (a) What is an amplifier. Draw the circuit symbol of op-amp and derive an equation for its output voltage.
   (b) List the ideal characteristics of op-amp. [10+6]

4. (a) How are synchros useful in error detection and correction in a servo control system.
   (b) What do you understand by a dynamic error of a synchro system. [8+8]

5. (a) Explain the working of Hay's Bridge with the help of necessary equations. Also state any one of its applications.
   (b) Explain the working of carrier amplifier. Also state the applications of it. [8+8]

6. (a) The dead-zone of a certain pyrometer is 0.125 percent of the span. The calibration is 800^0C 1800 ^{0}C. What temperature change must occur before it is detected?

   (b) Explain the phenomenon of hysteresis in measurement systems
   i. Static Error
   ii. Relative error
   iii. Static correlation. [8+8]

7. (a) What is piezo resistive Effect
   (b) What are the advantages and disadvantages of semiconductor strain gauges. [8+8]

8. (a) The hot junction of a chromel alumel thermocouple is connected to a potentiometer terminals at 24^0C. The potentiometer whose terminals core at 24^0C reads 25.76mv. What is the temperature of the thermocouple junction? The calibration chart of the thermocouple is

Temperature^OC	20	24	28	—	480	488	493
Voltage,mv	0.8	0.95	1.12	—	26.25	26.72	26.04

   (b) Explain the factors affecting the static accuracy of filled in thermometers.[8+8]

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Code No: R05221003 **R05** **Set No. 1**

II B.Tech II Semester Examinations,April/May 2012
SENSORS AND SIGNAL CONDITIONING
Electronics And Instrumentation Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the working principle of meggar with neat diagram?
   (b) In the Wheatstone bridge of Fig. 5 the values of resistances of various arms are P = 1000Ω, Q = 100Ω, R = 2,005Ω and S = 200Ω. The battery has an emf of 5V and negligible internal resistance. The galvanometer has a current sensitivity of 10mm/μ A and an internal resistance of 100Ω. Calculate the deflection of galvanometer and the sensitivity of the bridge in terms of deflection per unit change in resistance. [8+8]

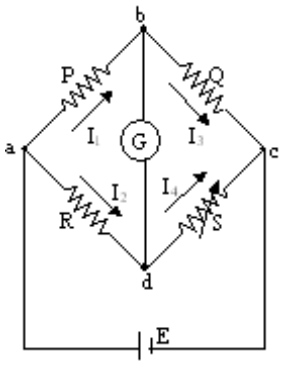

Figure 5

2. (a) How are synchros useful in error detection and correction in a servo control system.
   (b) What do you understand by a dynamic error of a synchro system. [8+8]

3. (a) Explain the working of Hay's Bridge with the help of necessary equations. Also state any one of its applications.
   (b) Explain the working of carrier amplifier. Also state the applications of it. [8+8]

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(b) How are quartz crystal resonators used as temperature sensors? How is resonant frequency related to temperature. [8+8]

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Voltage,mv	0.8	0.95	1.12	—	26.25	26.72	26.04

(b) Explain the factors affecting the static accuracy of filled in thermometers.[8+8]

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Code No: R05221003 **R05** **Set No. 3**

II B.Tech II Semester Examinations,April/May 2012
SENSORS AND SIGNAL CONDITIONING
Electronics And Instrumentation Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the working of Hay's Bridge with the help of necessary equations. Also state any one of its applications.
   (b) Explain the working of carrier amplifier. Also state the applications of it. [8+8]

2. (a) The hot junction of a chromel alumel thermocouple is connected to a potentiometer terminals at 24^0C. The potentiometer whose terminals core at 24^0C reads 25.76mv. What is the temperature of the thermocouple junction? The calibration chart of the thermocouple is

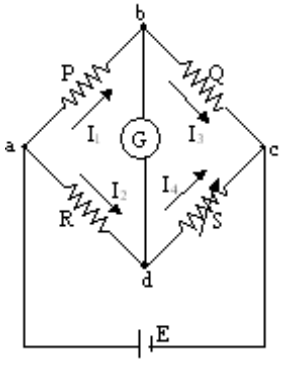
Temperature^OC	20	24	28	—	480	488	493
Voltage,mv	0.8	0.95	1.12	—	26.25	26.72	26.04

   (b) Explain the factors affecting the static accuracy of filled in thermometers. [8+8]

3. (a) How are synchros useful in error detection and correction in a servo control system.
   (b) What do you understand by a dynamic error of a synchro system. [8+8]

4. (a) What is piezo resistive Effect
   (b) What are the advantages and disadvantages of semiconductor strain gauges. [8+8]

5. (a) Explain the working principle of meggar with neat diagram?
   (b) In the Wheatstone bridge of Fig. 5 the values of resistances of various arms are P = 1000Ω, Q = 100Ω, R = 2,005Ω and S = 200Ω. The battery has an emf of 5V and negligible internal resistance. The galvanometer has a current sensitivity of 10mm/μ A and an internal resistance of 100Ω. Calculate the deflection of galvanometer and the sensitivity of the bridge in terms of deflection per unit change in resistance. [8+8]



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      iii. Static correlation. [8+8]

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