Code No: 07A51003   **R07**   **Set No. 2**

III B.Tech I Semester Examinations,November 2010
INDUSTRIAL INSTRUMENTATION
Electronics And Instrumentation Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. Write short notes on the following radiation detectors:

    (a) Thermopile.

    (b) Metal bolometer.

    (c) Thermistor.   [6+5+5]

2. Explain the following method of density measurement:

    (a) Air pressure balance method.

    (b) Vibrating probe method.   [8+8]

3. (a) Explain in detail eddy current or drag cup type tachometer.

    (b) Discuss in detail relative acceleration pickup.   [8+8]

4. (a) Explain the operation of a pneumatic load cell with a neat diagram.

    (b) Explain spring balance method of force measurement.   [10+6]

5. Which instruments are used for determining phase sequence of three phase supplies, Classify them and explain.   [16]

6. (a) Explain the characteristics of Electromagnetic flow meter.

    (b) Calculate the induced EMF in an electromagnetic flow meter due to the flow of a conductive fluid in a pipe with inner diameter of 2.75 cm. The flux density B= 60 Weber/m^2. and volume flow rate Q=2500 cm^3/min.   [6+10]

7. (a) What is surface texture? Explain components of surface texture.

    (b) Explain Ball type plug gauge to measure big bore diameter.   [8+8]

8. Differentiate the different primary sensors used for pressure measurement explain the operation of each with neat sketches.

          [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: 07A51003 | R07 | Set No. 4

III B.Tech I Semester Examinations,November 2010
INDUSTRIAL INSTRUMENTATION
Electronics And Instrumentation Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain any one digital method of torque measurement.

   (b) Discuss the advantages of digital methods used for torque measurement.
   [8+8]

2. Explain the following flow meters:

   (a) Ultrasonic flow meters.

   (b) Electromagnetic flow meters.   [8+8]

3. What are different types of electrical tachometers? Explain in detail.   [16]

4. What are sine bars? How sine bars are used for measurement of internal & external angles, discuss in detail.   [16]

5. Explain the following method of density measurements

   (a) Strain gauge load cell method.

   (b) Air pressure balance method.   [8+8]

6. What is vacuum gauge? What are the different types of vacuum gauges? Explain.
   [16]

7. (a) Explain the importance of humidity measurement in industry.

   (b) Name some processes which might require humidity control for efficient operation.   [8+8]

8. A radiation pyrometer sighted on the wall of a furnace reads 1350^0C. When it is sighted into the furnace on a hot metal of low emissivity, it reads 1400^0C. Is this possible? If so, what could be the cause? If not, why?   [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: 07A51003 | R07 | Set No. 1

III B.Tech I Semester Examinations,November 2010
INDUSTRIAL INSTRUMENTATION
Electronics And Instrumentation Engineering

Time: 3 hours
Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. Describe the working principle, construction and method of using an optical pyrometer with the help of a neat sketch. [16]

2. (a) List the disadvantages of mechanical tachometers.

   (b) Explain the operation of a revolution counter with neat sketch. [6+10]

3. (a) Explain the concepts of contact & non-contact type of length measurements.

   (b) Explain in detail about standards and calibration of lengths. [8+8]

4. (a) Define 'density' and 'specific gravity'. Mention the units.

   (b) Explain the importance of 'density' and 'specific gravity' measurements in process industries with examples. [6+10]

5. (a) Explain the operation of any one capacitive pressure transducer used for pressure measurement.

   (b) Write about the following
      i. Bellows
      ii. Diaphragm
      iii. Capsule. [10+6]

6. (a) Write the basic principle of operation of Electromagnetic flow meter.

   (b) Explain the constructional features of electromagnetic flow meter. Mention its advantages and disadvantages. [6+10]

7. (a) Explain the operation of sesimic type of vibration transducer.

   (b) An accelerometer has a seismic mass of 0.05kg and a spring constant of 3×10^3 N/m. Maximum mass displacement is ± 0.02m. Calculate the measurable acceleration and natural frequency. [8+8]

8. (a) Explain the principle of 'STROBOSCOPE'

   (b) Explain 'stroboscopic methods' for measurement of frequency of flash light. [6+10]

⋆ ⋆ ⋆ ⋆ ⋆

3

III B.Tech I Semester Examinations,November 2010
INDUSTRIAL INSTRUMENTATION
Electronics And Instrumentation Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆⋆⋆⋆⋆

1. (a) Describe the principle and operation of a stroboscope.

   (b) While measuring the speed of a steam turbine with stroboscope, single line images are observed for stroboscope settings of 3000, 4000 and 5230rpm. Calculate the turbine speed.   [10+6]

2. Explain the measurement of lengths by using the vernier calipers with relevant diagrams. Explain the least count of the instrument.   [16]

3. Write short notes on the following:

   (a) Capacitor type microphone.

   (b) Piezo-electric crystal type microphone.

   (c) Electro dynamic type microphone.

   (d) Carbon microphone.   [4+4+4+4]

4. (a) Which type of flow meter is used to measure gas flow rates in closed pipes? Explain with neat diagram.

   (b) Explain the characteristics of vortex shedding type flow meter.   [8+8]

5. (a) Explain the working principle of radiation densitometer.

   (b) Briefly discuss the advantages and disadvantages of radiation type density measurement.   [8+8]

6. (a) What is a pyrometer? Explain principle involved in pyrometer construction.

   (b) Explain different types of pyrometers.   [6+10]

7. (a) Explain the method of force measurement by using Electrical load cell.

   (b) A strain gauge is bonded to a steel beam 0.25m long and has a cross-sectional area of $0.4 \times 10^3 m^2$. Young's modulus of steel is $207GN/m^2$. The strain gauge has an unstrained resistance of 240Ω and a gauge factor of 2.2. When the load is applied, the gauge resistance changes by 0.013Ω. Calculate the amount of force applied to the beam.   [8+8]

8. Explain the following:

   (a) Ionization type vacuum pressure measurement.

   (b) Pirani vacuum gauge.   [8+8]

⋆⋆⋆⋆