

II B.Tech. I Semester Regular Examinations, November -2005
INSTRUMENTATION COMPONENTS
(Common to Electronics & Instrumentation Engineering and Electronics &
Control Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain automobile clutch mechanism?
(b) Differentiate belt and chain drives? [8+8]
2. (a) Discriminates between properties and interval and differential control as applied to control systems.
(b) Explain the working principles of derivative and integral action of pneumatic controller. [8+8]
3. (a) If an additional winding in which DC flows will there be any change in the operation of a transformer-Explain.
(b) Explain the operation of a series connected magnetic amplifier with necessary circuit diagram and waveform. [8+8]
4. (a) With diagram explain the operation of a permanent magnet stepper motor. [4+4]
(b) How are stepper motors superior to ordinary motors under specific requirements. [8]
5. (a) Draw the construction of a silicon controlled rectifier and explain its operation using forward and reverse characteristics.
(b) List the applications of SCR and explain briefly how phase control is possible using SCR. [8+8]
6. (a) With the help of functional diagram and circuit diagram explain the monostable operation of 555 timer.
(b) Derive the expression for time delay of a monostable multivibrator. [10+6]
7. (a) What is the essential difference between principle of operation of normal p-n diode and a LED.
(b) Describe the working principle of light emitting diode with neat diagram.
(c) Draw the schematic representation of an optocoupler and explain its working principle. [4+6+6]
8. (a) Discuss the spectral transmittance characteristics of an absorption filter.
(b) What are the parameters to be observed in the design of grating.

- (c) Give two types of mounting of grating and explain the importance of mount in the grating. [6+4+6]

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1. (a) Derive the expression for maximum power transmitted by a belt drive.
(b) Explain the phenomenon of creep in belts. [10+6]
2. (a) Explain how absolute pressure can be measured using different techniques.
(b) Mention few application of different type of bellown. [8+8]
3. (a) If an additional winding in which DC flows will there be any change in the operation of a transformer-Explain.
(b) Explain the operation of a series connected magnetic amplifier with necessary circuit diagram and waveform. [8+8]
4. (a) With diagram explain the operation of a permanent magnet stepper motor. [4+4]
(b) How are stepper motors superior to ordinary motors under specific requirements. [8]
5. (a) What are the factors that influence the value of inductance in an inductor?
(b) Two unconnected coils are mutually coupled. Given that $L_1=350\text{mH}$, $L_2=200\text{mH}$ and co-efficient of coupling is 0.6. what is the value of mutual inductance?
(c) The resistance of a 50mH coil is 30 ohms. What is Q-factor of the coil at 5kHz?
(d) The Q-factor of 100mH inductor is 80, when operated in 400kHz range. What is the dc resistance of the inductor? [4+4+4+4]
6. (a) With the help of functional diagram and circuit diagram explain the monostable operation of 555 timer.
(b) Derive the expression for time delay of a monostable multivibrator. [10+6]
7. (a) Explain the role of depletion region in the manufacture of photo detector.
(b) Discuss the relay ON/OFF control using light dependent resistor. [8+8]
8. (a) Draw the cross sectional diagram of a reflection grating. Explain.
(b) What are the different types of resonators used in Instrumentation system? Explain any one. [8+8]

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1. (a) Describe the system which makes use of belt drive.
(b) Compare with the performance of chain drive. [8+8]
2. (a) Give the schematic of general pneumatic control system and describe the function of various elements? [10]
(b) What are the advantages and limitations of pneumatic controller? [3+3]
3. (a) With neat diagrams explain the working of a synchro transmit receive system.
(b) Mention major applications of synchro system. [10+6]
4. (a) What is a multistock stepper moter? [4]
(b) Describe the working of a multistock stepper motor with neat diagram. [4+4]
(c) Mention two uses of stepper motor. [4]
5. (a) What is meant by thermistor and classify them with examples.
(b) What is meant by varistors and give their applications.
(c) List the losses of a capacitor and specify their affect. [5+6+5]
6. (a) Draw the block diagram of 555 Timer and explain the function of each block.
(b) List the applications and specifications of 555 IC
(c) Draw the cut diagram of a astable using 555 timer. [6+4+6]
7. (a) What are the materials used for manufacturing light emitting diode? Explain the manufacturing process.
(b) How are LEDs of different colour manufactured?
(c) Draw the V-I characteristics of a LED for different electrical inputs and explain how this principle can be utilized for recording of electrical variations as a film. [6+2+8]
8. (a) Draw the cross sectional diagram of a reflection grating. Explain.
(b) What are the different types of resonators used in Instrumentation system? Explain any one. [8+8]

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1. (a) Describe in detail the Geneva Mechanism.
(b) Explain the basic principle of the instrument used for Condition monitoring of any process. [8+8]
2. (a) What do you understand the term pneumatic amplification?
(b) Explain the operation of pneumatic amplifier with required sketches.
(c) Mention a few applications of pneumatic amplifier. [5+6+5]
3. (a) Express a relationship between various voltages of a synchro transmitter.
(b) How are synchros useful in error detection and correction in a servo control system. [8+8]
4. (a) With diagram explain the operation of a permanent magnet stepper motor. [4+4]
(b) How are stepper motors superior to ordinary motors under specific requirements. [8]
5. (a) What is meant by thermistor and classify them with examples.
(b) What is meant by varistors and give their applications.
(c) List the losses of a capacitor and specify their affect. [5+6+5]
6. (a) Draw the pin configuration of IC 741 and explain the purpose of each pin.
(b) Give the specifications, circuit symbol and applications of IC 741.
(c) Explain the biasing arrangement of IC 741. [6+8+2]
7. (a) Explain the role of depletion region in the manufacture of photo detector.
(b) Discuss the relay ON/OFF control using light dependent resistor. [8+8]
8. (a) List the materials used for manufacturing reflectors. Explain any one manufacturing process.
(b) Explain how resonators are effectively used in optical system? [10+6]
