

II B.Tech. I Semester Supplementary Examinations, May -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) What is the coupling mechanism with operation of a clutch in an automotive?
(b) In what way are different from chain and belt drives?
(c) Enumerate the applications of friction drives.
2. A flat circular diaphragm of mild steel has diameter of 15mm young's modulus is 200GN/m^2 and Poisson's ratios is 0.28 find the thickness of the diaphragm if the maximum stress is not exceed 300MN/m^2 . When the applied pressure is 300kN^2 find the deflection at the center of diaphragm.
3. (a) What do you understand by a dynamic error of a synchro system.
(b) Explain how a synchro transmitt-receiver pair is useful as a control component in error correction.
4. (a) Discriminate between ordinary electric motors and Servo motors.
(b) Briefly explain the working of D.C and A.C servomotors with neat sketches
5. (a) Explain the difference between transition capacitance and diffusion capacitance of a pn junction diode.
(b) Sketch the characteristics of ideal and practical diodes and explain them.
(c) Define the dynamic resistance of pn diode and explain how and why it varies with current and temperature. Give the typical value of dynamic resistance both for Si and Ge diodes.
6. (a) Give the construction, equivalent circuit and characteristics of DIAC and explain its operation.
(b) Sketch SCR phase control circuits for
 - i. 90 degrees phase control
 - ii. 180 degrees phase control.In each case show the load waveform and explain the operation of the circuit.
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.

8. (a) Draw and explain spectral transmittance characteristics of a multilayer interference filter.
- (b) Briefly explain the behaviour of dichroic filter.

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1. (a) Explain the construction and working principles of Gear mechanism.
(b) Explain the basic concepts of Scale and pointer type of Indicating Mechanism.
2. (a) Give the schematic of general pneumatic control system and describe the function of various elements?
(b) What are the advantages and limitations of pneumatic controller?
3. (a) In what way a pulse transformer is different from normal transformer.
(b) A square waveform is given as input to a pulse transfer, sketch the O/P waveform.
(c) Mention a few uses of pulse transformer.
4. (a) Discriminate between ordinary electric motors and Servo motors.
(b) Briefly explain the working of D.C and A.C servomotors with neat sketches
5. (a) List the different types of windings that are employed in inductors.
(b) List the factors affecting the capacitance of capacitors.
(c) Explain the terms electrical noise, power derating and Boells effect of resistors.
(d) Explain the colour code for resistors.
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.
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.
8. (a) Discuss the arrangement of multilayer filter used in optical system.
(b) Describe how prisms are used in monochromators?

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1. (a) What is the coupling mechanism with operation of a clutch in an automotive?
(b) In what way are different from chain and belt drives?
(c) Enumerate the applications of friction drives.
2. (a) What are the basic requirements of control mechanism?
(b) With a block schematic the functioning of a control mechanism.
3. (a) How can a potentiometer be used as a data acquisition component?
(b) Categorize the different types of potentiometer useful for specific applications.
(c) Explain the salient characteristics of potentiometer.
4. (a) Discriminate between ordinary electric motors and Servo motors.
(b) Briefly explain the working of D.C and A.C servomotors with neat sketches
5. (a) List the different types of windings that are employed in inductors.
(b) List the factors affecting the capacitance of capacitors.
(c) Explain the terms electrical noise, power derating and Boells effect of resistors.
(d) Explain the colour code for resistors.
6. (a) Draw the pin configuration of LM 317 and explain each pin
(b) List the application and specification of LM 317 IC
(c) List the applications of 723 IC and explain one application with example.
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.
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.

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1. (a) Derive the expression for power transmitted by chain drive.
(b) Categorise the different chain drives and describe in detail the using of one type chain drive.
2. (a) What are the types characteristics of plugs used in pneumatic control valve.
(b) Explain the term valve rangeability.
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.
4. (a) Discriminate between ordinary electric motors and Servo motors.
(b) Briefly explain the working of D.C and A.C servomotors with neat sketches
5. (a) State the factors affecting the resistance of a resistor.
(b) What is the need for logarithmic taper in carbon potentiometers used for audio circuits.
(c) What is a dielectric and explain its characteristics.
(d) Differentiate RF and AF chokes.
6. Show with the help of circuit diagram an 741 op-amp used as
 - (a) Scale changer
 - (b) Inverting adder
 - (c) Non-inverting adder
 - (d) Phase shifter
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.
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.

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