

7. (a) What are the advantages and features of the instrumentation amplifier? Derive the expression for the output voltage of instrumentation amplifier. (8)
- (b) What is the function of the precision rectifier circuit? What is the significance of UTP and LTP in Schmitt trigger circuit? (7)

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B.Tech.(CE/IT/CSE/EL/EEE) - III SEMESTER

ANALOG ELECTRONIC CIRCUITS

(ESC-301/ELPC-302)

Time : 3 Hours]

[Max. Marks : 75 *

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Draw a negative waveform clipper circuit. (1.5)
- (b) What is a zener diode? (1.5)
- (c) Differentiate between full-wave rectifier and half-wave rectifier in terms of average current and voltages. (1.5)
- (d) What is the Q point? What is the importance of Q point? (1.5)

- (e) In BJT, the collector junction is reversed biased still a large current flow through it, explain how? (1.5)
- (f) Why the emitter follower circuit is called so? (1.5)
- (g) Explain the transconductance of a FET. (1.5)
- (h) What is input offset current and slew rate? (1.5)
- (i) What is the PID controller? (1.5)
- (j) Draw the circuit of the peak detector using OP-AMP. (1.5)

PART - B

- 2. (a) The four diodes used in a bridge rectifier current have forward resistance of 10Ω and load resistance of 480Ω . The alternating supply voltage is 240 V (RMS), calculate (i) DC load current (ii) DC power loss in all diode (iii) rectification efficiency (iv) ripple factor (v) Peak inverse voltage. (10)
- (b) Explain V-I characteristics of the diode and differentiate between static and dynamic resistance of a diode. (5)
- 3. (a) How MOSFET is different from BJT? With the help of a neat diagram, explain the construction, working and characteristics of n-channel enhancement type MOSFET. (10)

- (b) Draw the equivalent small-signal model and high-frequency equivalent model for CE configuration of a transistor amplifier. (5)
- 4. (a) Enumerate the various requirements for biasing a circuit. (3)
- (b) Deduce collector current, draw and explain input and output characteristics in the Common emitter configuration of a transistor. (6)
- (c) Draw and explain the input and output characteristics of the common source amplifier. (6)
- 5. (a) List the characteristics of an ideal OP-AMP. (3)
- (b) Differentiate between differential and common mode operation of an OP-AMP. Define CMRR and its significance. (6)
- (c) Design an adder circuit to get the output expression as $V_o = -[0.1V_1 + V_2 + 10V_3]$ (6)
- 6. (a) Draw and explain the integrator circuit using OP-AMP. Derive the expression for output voltage. (8)
- (b) Design a phase shift oscillator with a frequency of 100 Hz using OP-AMP. (7)