

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Write only required answer. Avoid writing irrelevant and unnecessary too long answers.

- Q.1** (a) Explain avalanche break down of P-N junction. 03
 (b) Draw input and output voltage and current waveforms of Centre tap full wave rectifier with capacitor filter. 04
 (c) Derive the equation of efficiency of Class-C amplifier. 07
- Q.2** (a) “The linear voltage regulator IC LM7805 works like a variable resistor.” Justify the statement. 03
 (b) Draw schematic diagram of shunt regulator using Zener diode. Explain working of the circuit. 04
 (c) Compare CE, CB, CC Configuration of BJT. 07
- OR**
- (c) Draw and explain the hybrid-pi model for a transistor connected in CE Configuration. 07
- Q.3** (a) Draw internal block diagram of op-amp. 03
 (b) Explain function of each block of above Q3(a) 04
 (c) Define following terms with reference to OPAMP: 1) Input offset voltage 2) Input bias current 3) PSRR 4) CMRR. Explain Common mode rejection ratio. 07
- OR**
- Q.3** (a) State protections required for input terminals of OPAMP. 03
 (b) State types of Analog to Digital Converters. 04
 (c) Explain gyrator circuit with neat diagram and mathematical equation. 07
- Q.4** (a) Draw internal block diagram of SE 555 IC. 03
 (b) Draw monostable multi vibrator using SE 555 IC. Decide component values for mono- shot with 0.1S pulse width. 04
 (c) Draw block diagram of V/F converter and explain the same. 07
- OR**
- Q.4** (a) What is a filter circuit? State types of filter circuit considering frequency response. 03
 (b) Explain phase shift oscillator. 04
 (c) Explain second order Butterworth Filter with neat diagram. 07
- Q.5** (a) What is DTL? Draw schematic diagram of AND gate using DTL. 03
 (b) State 5 names of logic families. 04
 (c) Draw schematic diagram of inverting amplifier using switched capacitor circuit. Explain its working. 07
- OR**
- Q.5** (a) State characteristics of ideal opamp. 03
 (b) An opamp circuit has closed loop gain of 10. It is working on +/- 12V DC power source. The input signal applied is $x(t) = 5\sin(100\pi t)$. Draw input output waveform of the circuit. Explain output waveform. 04
 (c) Draw schematic diagram of Non-Inverting amplifier using OPAMP. Derive gain equation of the same. Comment on input impedance of this amplifier. 07
