

(3 Hours)

[Total Marks:80]

- N.B.** (1) Question no.1 is compulsory.
 (2) Attempt any three questions from Question No. 2 to 6
 (3) Make any suitable assumption wherever required.
- Q.1** Answer any four.
- (a) Give the working principle of Photodiode with its application 5M
 - (b) Explain the various bias compensation techniques in a BJT. 5M
 - (c) Determine the operating point parameters I_{CQ} and V_{CEQ} for the Fixed Bias circuit. Assume $\beta = 100$ and $V_{BE} = 0.7V$, $R_C = 3k\Omega$, $R_B = 470K\Omega$, $V_{CC} = 12V$. . 5M
 - (d) Explain the Effect of negative feedback on voltage gain, input impedance, output impedance, and bandwidth. 5M
 - (e) State and Explain Barkhausen's criteria for sustained oscillations. 5M
- Q.2** (a) Analyze Voltage Shunt Negative feedback Amplifier with respect to Input Resistance, Output Resistance and Voltage gain. 10M
- (b) Derive expression for voltage gain, input impedance and output impedance of a CS amplifier. 10M
- Q.3** (a) Draw FWR with C filter and describe the circuit operation with waveform. Compare the performance of C, L, LC filters 10M
- (b) Explain the Colpitts Oscillator in detail with circuit diagram and equations. 10M
- Q.4** (a) Explain Crystal oscillator with the help of suitable diagram and waveforms. 10M
- (b) Give the DC and AC analysis of Dual Input Unbalanced output differential Amplifier 10M
- Q.5** (a) Explain the Construction and Working of E-MOSFET with the help of its characteristics. 10M
- (b) Explain various types of coupling and their effect on the performance of BJT. 10M
- Q.6** Write short note on following. (Any TWO) 20M
- (a) Zener Diode as voltage Regulator.
 - (b) Hartley Oscillator.
 - (c) re-model used in Transistor
