

(3 Hours)

[Total Marks : 80]

- N.B. : 1. Question **One** is **Compulsory**.
2. Solve any **Three** out of remaining.
3. **Draw** neat and **clear** Diagrams.
4. Assume suitable **data** if required

Q.1. Attempt the following

- A. Represent an AM signal both in time domain and frequency domain giving their mathematical equation for e_{AM} . 05
- B. List the ideal and practical characteristics with their values for an op-amp. 05
- C. What is DC load line? What is the importance of Q-point selection on a DC load line? 05
- D. What are the differences between PAM, PWM and PPM? 05

Q.2.

- A. Explain with neat diagram, the working of Hartley Oscillator using transistor. 10
- B. Describe the working of class A and Class C power Amplifier in detail with relevant diagrams. 10

Q.3.

- A. Explain the application of op-amp as differentiator. 10
- B. Explain the need of biasing and stabilization. In a Silicon transistor circuit with a fixed bias, $V_{CC}=9V$, $R_C=0.5K\Omega$, $R_B=60K\Omega$, $\beta=60$, $V_{BE}=0.7V$. Find the operating point on DC load line. 10

Q.4.

- A. What is the role of multiplexing in communication system? Explain TDM in detail. 10
- B. Explain how Op-Amp can be used as inverting summer. 10

Q.5.

- A. Derive the formula of total power in AM. An AM signal has a total power of 48 Watts with 45% modulation. Calculate the power in the carrier and the sidebands. 10
- B. Draw Input and output characteristics of CE Configuration. 05
- C. Explain Zero Crossing Detector using Op-amp 741. 05

Q.6.

- A. Define measures of information. A source puts out one of five possible symbols once every millisecond. The probabilities of these symbols are $1/2$, $1/4$, $1/8$, $1/16$ and $1/16$. Find information rate and Entropy. 10
- B. Draw waveforms of natural and flat top sampling signal for a given sine wave signal 05
- C. Draw block diagram of super-heterodyne receiver with waveforms for each block. 05
