

QP Code : 5115

(3 Hours)

[Total Marks : 80

- N.B. : 1. Question ONE is compulsory
 2. Solve any THREE out of remaining questions
 3. Draw neat and clean diagrams
 4. Assume suitable data if required.

- Q. 1. A. Give reasons for the following 5
 I. FET is called as a square law device
 II. Barkhausens criteria should be satisfied to get oscillations
 B. With neat diagram explain any one application of Zero-Crossing Detector 5
 C. With neat circuit diagram explain the use of PLL as a phase shifter 5
 D. Explain with suitable example what do you understand by signal multiplexing? 5
- Q. 2. A. Draw and explain JFET characteristics. Also show that for a JFET 10

$$g_m = \frac{2}{|V_P|} \sqrt{I_{DSS} \cdot I_{DS}}$$

 B. With respect to op-amp explain the ideal characteristics and concept of virtual aground. Explain how op-amp can be used as an averaging amplifier in inverting configuration. Also draw neat circuit diagrams to
 I. convert sine wave to square wave using op-amp.
 II. detect the crossing of zero's in the generated square wave. 10
- Q. 3. A. Explain how operational amplifier can be used for addition of two AC signals with one DC signal. 5
 B. Explain fly wheel effect in Class C amplifier. 5
 C. What is sampling theorem and state its significance in communication. What is the standard frequency for speech signal? 5
 D. Determine the magnitude of g_m for a JFET with $I_{DSS} = 8 \text{ mA}$ and $V_P = -4 \text{ V}$ at the following dc bias points:
 (a) $V_{GS} = -0.5 \text{ V}$.
 (b) $V_{GS} = -1.5 \text{ V}$.
 (c) $V_{GS} = -2.5 \text{ V}$. 5

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- Q. 4 A. Explain generation of SSB using phase shift method. 10
B. Discuss the operating principle of PLL and explain its use as frequency translator. 10
- Q. 5 A. With neat diagram explain the circuit for FM detection. 10
B. Explain amplitude modulation for more than one modulating signal in the following cases:
(i) Mathematical equation
(ii) AM waveform
(iii) AM amplitude and power spectrum
(iv) Modulation Coefficient
(v) Transmission Power 10
- Q. 6 A. Explain application of PLL as frequency synthesizer 5
B. With block diagram explain TDM-PCM system? 5
C. Write short note on generation of FM by Armstrong method. 5
D. Compare different biasing techniques for JFET 5
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