

QP Code : 4829

(3 Hours)

[Total Marks : 80

- N.B. : 1. Question No. ONE is compulsory
2. Solve any THREE out of remaining questions
3. Assume suitable data if required

- Q1. Solve the following 20 Marks
A. Draw and explain FET based Hartley and Colpitt Oscillator.
B. Comment on the following ADC/DAC specifications
I. Resolution
II. Linearity
III. Accuracy
IV. Settling Time
V. Stability.
C. How is adaptive delta modulation superior to delta modulation?
D. Discuss the factors that influence modulation index of an FM wave
- Q2. A. Sketch a block representation for an n-channel JFET, showing bias voltages, depletion regions, and current directions. Label the device terminals and explain its operation. Explain the effect of increasing levels of negative gate-source voltage.
Also sketch a typical drain characteristics for $V_{GS}=0$ for an n-channel JFET. Explain the shape of the characteristic, identify the regions, and indicate the important current and voltage levels. 10 Marks
B. Design an op-amp differentiator that will differentiate an input signal with $f_{max}=100$ Hz. Draw the output waveform for a sine wave of 1 V peak at 100 Hz applied to the differentiator. Also repeat it for square wave input. 10 Marks
- Q3. A. Explain the different methods of biasing JFET along with their characteristics in detail. 10 Marks
B. Explain any one technique used of conversion of analog signal to digital with ADC 05 Marks
C. Draw and explain opamp inverting comparator. Draw input and output waveforms for $V_{ref} > 0$ and also for $V_{ref} < 0$. 05 Marks
- Q4. A. Draw Foster Seeley Discriminator with circuit diagram and explain its working with phasor diagrams? 10 Marks
B. What is DSBSC wave? Explain its generation using balanced modulator. 10 Marks
- Q5. A. Draw the PAM, PWM and PPM waveforms in time domain assuming a sinusoidal modulating signal. Explain them in brief. 10 Marks
B. In an AM radio receiver the loaded Q of the antenna circuit at the input to the mixer is 100. If the intermediate frequency is 455 KHz, calculate the image frequency and its rejection at 1 MHz. 05 Marks
C. With neat circuit diagram explain the use of PLL in frequency translator. 05 Marks
- Q6. A. What do you understand by signal multiplexing? Explain TDM and FDM with suitable examples. 10 Marks
B. Draw the spectrum of an amplitude modulated wave and explain its components 05 Marks
C. Compare class A and class C power amplifiers 05 Marks

