

S.E. Sem. III [CMPN]
**Electronic Circuits and
Communication Fundamentals**



Time : 3 Hrs.]

Prelim Question Paper

[Marks : 80

- N.B.:** (1) Question No. 1 is compulsory.
(2) Solve **any three** questions out of the remaining questions.
(3) **Assume** suitable **data** if required.

1. Solve the following : [20]
- (a) Explain construction of FET
 - (b) Comment on the following ADC/DAC specifications :
 - (i) Resolution (ii) Linearity (iii) Accuracy
 - (iv) Settling Time (v) Stability
 - (c) Explain slope over load error in delta modulation.
 - (d) Discuss the factors that influence modulation index of an FM wave.
2. (a) Determine the V_{GSQ} , I_{DQ} , V_{DSQ} and A_V for a voltage divider circuit [10]
with $V_{DD} = 18V$, $R_D = 2.2 K$, $R_1 = 2.1 M$, $R_2 = 330 K$ and $R_S = 1.2 K$,
 $I_{DSS} = 10 mA$, $V_P = -8V$ and $V_{DS} = 40 \mu s$.
- (b) Explain how an op-amp can be used as - (i) Integrator [10]
(ii) Differentiator
3. (a) Sketch a typical drain characteristics for $V_{GS} = 0$ for an n-channel [10]
JEFET. Explain the shape of the characteristics, identify regions and
indicate the important current and voltage levels.
- (b) Explain any one technique used of conversion of analog signal to digital [5]
with ADC.
- (c) Draw and explain op-amp inverting comparator. Draw input and output [5]
waveforms for $V_{ref} > 0$ and also for $V_{ref} < 0$.
4. (a) Draw and explain superheterodyne receive for amplitude modulation. [10]
What are the various characteristics of the receiver?
- (b) Explain Armstrong method to generate FM wave. [10]
5. (a) Draw the PAM, PWM and PPM waveform in time domain assuming a [10]
sinusoidal modulating signal. Explain them in brief.
- (b) An AM signal appears across a 50Ω load has the following equation [10]
 $V(t) = 12 (1 + \sin 12.566 \times 10^3 t) \sin 18.85 \times 10^6 t$ Volts.
- (i) Sketch the envelope of this signal in time domain.
 - (ii) Calculate the modulation index, side band frequencies, total power
and bandwidth.

6. (a) What do you understand by signal multiplexing? Explain TDM and FDM with suitable examples. [10]
- (b) Draw the spectrum-of an amplitude modulated wave for more than one modulating signal and explain its components. [5]
- (c) Explain Flywheel effect. [5]

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