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**B. TECH**  
**(SEM V) THEORY EXAMINATION 2021-22**  
**PRINCIPLES OF COMMUNICATION**

**Time: 3 Hours****Total Marks: 70****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

- 1. Attempt all questions in brief.** **2 x 7 = 14**
- a. Give expression of modulation index in terms of max and min voltage?
  - b. What is Parameter variation method of FM?
  - c. Explain the demodulation of pulse width modulation and pulse position modulation?
  - d. What are the limitations of delta modulation?
  - e. What is Shot noise, Thermal noise, Resistor noise?
  - f. Explain linear diode detector?
  - g. Draw the block diagram of FM receiver?

**SECTION B**

- 2. Attempt any three of the following:** **7 x 3 = 21**
- a. What is VSB modulation? What is the application of VSB modulation?
  - b. What are the differences between FM and PM. Draw envelope of FM and PM for modulating signal,  $f(t) = A_m \cos \omega_m t$ .
  - c. Give comparison between PAM, PWM, PPM
  - d. Explain Adaptive Delta Modulation.
  - e. Derive Figure of merit of AM.

**SECTION C**

- 3. Attempt any one part of the following:** **7 x 1 = 7**
- (a) Describe Baseband and Passband signals.
  - (b) A carrier wave of frequency 20 KHz is amplitude modulated by a modulating signal  $f(t) = \cos 2\pi 10^3 t + \cos 4\pi 10^3 t$ . Find the expression for corresponding SSB-SC signal.
- 4. Attempt any one part of the following:** **7 x 1 = 7**
- (a) A sinusoidal voltage with an amplitude of 100 V and a frequency of 100MHz is frequency modulated by a sinusoidal signal of 20 KHz to generate a deviation of 80 KHz. Find the amplitude of the carrier frequency and all the sidebands up to fourth sideband present in the modulated signal. Draw the spectrum.
  - (b) Explain Multi tone wideband FM. State whether Frequency modulation is linear or non-linear. Prove your statement.
- 5. Attempt any one part of the following:** **7 x 1 = 7**
- (a) Explain PWM modulation and demodulation.
  - (b) Explain T1 digital carrier system.
- 6. Attempt any one part of the following:** **7 x 1 = 7**
- (a) Explain Voice coders.
  - (b) Describe frequency domain representation of noise
- 7. Attempt any one part of the following:** **7 x 1 = 7**
- (a) Explain Pre-emphasis and De-emphasis.
  - (b) Describe the operation of PLL.