



**GIET UNIVERSITY, GUNUPUR - 765022**  
**B. Tech (Sixth Semester Regular) Examinations, May - 2024**  
**21BEEPC36003 - Communication Engineering**  
**(EEE)**

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks)

**PART – A****(2 x 5 = 10 Marks)**Q.1. Answer **ALL** questions

- |   |      |              |
|---|------|--------------|
|   | CO # | Blooms Level |
| a. Draw the spectrum of a dc signal voltage 6 volt.                                     | CO1  | K2           |
| b. Illustrate the relationship between FM and PM.                                       | CO3  | K2           |
| c. Define sampling theorem. What is aliasing?   | CO4  | K1           |
| d. Write down two application of DSB-C.   | CO2  | K1           |
| e. If $m(t) = 2\cos 5t$ & $c(t) = 5 \cos 50t$ then draw the spectrum for DSB-SC signal. | CO2  | K2           |

**PART – B****(15 x 4 = 60 Marks)**Answer **ALL** questions

- |   | Marks             | CO # | Blooms Level |
|---|-------------------|------|--------------|
| 2. a. Derive the mathematical expression for trigonometric Fourier series with all the coefficients.  | 10                | CO1  | K2           |
| b. Determine inverse Fourier transform of $\delta(\omega - \omega_0)$ .   | 5                 | CO1  | K3           |
| (OR)  |                   |      |              |
| c. Explain the generation of SSB-SC modulation with proper diagram.   | 10                | CO3  | K2           |
| d. Explain need of modulation in communication system.  | 5                 | CO2  | K2           |
| 3.a. Derive the expression of DSB-C in frequency domain and draw the Spectrum.  | 7+3               | CO2  | K6           |
| b. Explain different types of elementary functions used in communication system.  | 5                 | CO1  | K2           |
| (OR)  |                   |      |              |
| c. Write down the short notes on:   |                   | CO4  | K2           |
| (i) External Noise  | 2.5+              |      |              |
| (ii) Additive white Gaussian noise(AWGN)  | 2.5               |      |              |
| d. Derive the mathematical equation for instantaneous frequency in angle modulation.  | 10                | CO3  | K6           |
| 4.a. Prove that $f[\cos 6t] = \pi [\delta(\omega-6) - \delta(\omega+6)]$  | 5                 | CO1  | K3           |
| b. Derive the spectra of white noise that has been passed through (i) ideal low pass filter (ii) Band pass filter.  | 10                | CO4  | K6           |
| (OR)  |                   |      |              |
| c. Derive the required total power present in DSB-SC modulated signal.  | 8                 | CO2  | K6           |
| d. Compare different types of amplitude modulation techniques.  | 7                 | CO2  | K5           |
| 5.a. Calculate the carrier, modulating frequency, modulation index, and maximum frequency deviation for the FM signal $v(t) = 10 \cos (6000t + 5 \sin 2200t)$ | 2+2+<br>2+2=<br>8 | CO3  | K3           |
| b. Explain the direct method of generation of FM wave,  | 7                 | CO3  | K2           |
| (OR)  |                   |      |              |
| c. Explain about Ring Modulator with expressions and with a suitable diagram for positive carrier half.   | 8                 | CO2  | K2           |
| d. Explain generation of PTM using suitable diagram.  | 7                 | CO4  | K2           |

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