School of Engineering
B.TECH Electronics and Communication Engineering
Mid Term Examination - May 2024

Duration : 90 Minutes
Max Marks : 50

Sem IV - G2UA402T - Analog and Digital Communication

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1) What is the modulation index for an FM signal in which the modulating frequency is 2 kHz and the maximum deviation is 10 kHz? — K2 (2)

2) Draw the frequency spectrum of a AM wave. — K1 (3)

3) A certain transmitter radiates 9 kW with the carrier unmodulated, and 10.125 kW when the carrier is sinusoidally modulated. Calculate the modulation index. If another sine wave is simultaneously transmitted with modulation index 0.4, determine the total radiated power. — K2 (4)

4) Derive the expression for the instantaneous voltage of AM wave? — K2 (6)

5) Derive the expression for the instantaneous voltage of DSBSC wave. — K3 (6)

6) Illustrate elements of an analog communication system with the help of a block diagram. Explain each block in detail. — K3 (9)

7) Explain the need for modulation in detail. — K4 (8)

8) A 400 W carrier is amplitude modulated to a depth of 100%. Calculate the total power in case of SSB technique. How much power saving (in W) is achieved for SSB compared to AM and DSBSC signal for the same modulation. If the depth of modulation is changed to 75%, then how much power (in W) is required for transmitting the SSB wave? Compare the powers required for SSB in both the cases and comment on the reason for change in the power levels. — K4 (12)

OR

Explain the advantages offered by digital pulse modulation techniques. — K4 (12)