B.E. Electronics & Communication/Telecommunication Engineering (Model Curriculum)
Semester-IV

SE203 - Analog and Digital Communication

P. Pages : 2 **GUG/W/23/13913**

Time : Three Hours * 7 5 0 0 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Define amplitude modulation and modulation index. Derive the expression for amplitude modulated wave. **8**

b) The LC oscillator generates 250 kHz carrier frequency. If the oscillator output is modulated by audio frequency of 5 MHz, what are the lower and upper sideband frequency and the bandwidth required to transmit this amplitude modulated wave. **8**

OR

2. a) A 12 kw carrier is amplitude modulated at 80% depth of modulation by a sinusoidal modulating signal. Calculate the sideband power, total power and the transmission efficiency of the AM wave. **8**

b) Define AM draw and explain the diode AM modulator, with neat waveform. **8**

3. a) Draw and explain the block diagram or the Armstrong frequency modulation system. **8**

b) What is pre-emphasis why it is used. Sketch a typical pre-emphasis circuit and explain, why de-emphasis must be used also. **8**

OR

4. a) Draw and explain the operation of ratio detector to demodulate FM signal. **8**

b) Consider an FM broadcasting system and determine the bandwidth of FM signal. What will be the bandwidth when frequency deviation is doubled. **8**

5. a) Draw the block diagram of FM radio receiver and explain briefly each blocks. **8**

b) Calculate the image rejection of a receiver having an RF amplifier and an intermediate frequency (IF) of 450 kHz, if Q of the relevant coils is 65 at incoming frequency of **8**
i) 1200 kHz ii) 20 MHz

OR

6. a) What is super heterodyne receiver. Draw and explain the block diagram of super heterodyne AM radio receiver. **8**

b) What AGC why it is required in super heterodyne radio receiver. Explain the working of delayed AGC with neat circuit diagram. **8**

7. a) State and prove sampling theorem for the bandlimited signals. **8**

b) Explain with suitable block diagram the working of the Delta modulator transmitter and receiver. What are the problems associated with DM. **8**

OR

8. a) A voice signal bandlimited to 3.4 kHz is to be transmitted using PCM system. The signaling rate of the PCM is not to exceed 36000 bits/sec. Find **8**
i) Approximate value of F_S.
ii) The number of quantization levels Q.
iii) Number of digits (bits) per word N.

b) Define analog pulse modulation. Explain generation and detection of PAM signal. **8**

9. a) With block diagram and space diagram explain QPSK transmitter receiver. **8**

b) What is QAM. Explain the operation of QAM transmitter and receiver. **8**

OR

10. a) With a suitable block diagram explain generation and reception of FSK signal in digital CW modulation system. Elaborate your answer with necessary waveform and expressions. What is bandwidth requirement of FSK system. **8**

b) Explain working of M-ary PSK transmitter and receiver. **8**

****