R13

Code No: 115AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, November - 2015
ANALOG COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A **(25 Marks)**

1.a) What is Amplitude modulation? Define modulation index of an AM signal. [2]
b) Draw the Amplitude Modulation waveforms with modulation index (m)=1, m<1, m>1. [3]
c) Compare AM with DSB-SC and SSB-SC. [2]
d) For 100% modulation what is the relationship between the voltage amplitudes of the side band. [3]
e) Define the term modulation index for AM and FM. [2]
f) Derive the formula for instantaneous value of FM voltage. [3]
g) What is the need of pre-emphasis and de-emphasis in FM transmission? [2]
h) Calculate the thermal noise power appearing across a 20kΩ resistor at 25^0C temperature with an effect noise bandwidth of 10KHZ. [3]
i) Explain single polarity and double polarity PAM. [2]
j) Explain simple and delayed AGC. [3]

PART - B **(50 Marks)**

2. What is the principle of amplitude modulation? Derive expression for the AM wave and draw its spectrum. [10]

OR

3. For an Am DSBFC wave with peak unmodulated carrier voltage V_c=10Vp, a load resistance R_L= 10 Ω and a modulation co efficient m = 1. Determine
a) Power of carrier, upper and lower side band
b) Total power of modulate wave
c) Total sideband power
d) Draw the power spectrum. [2+2+3+3]

4. With a neat diagram explain how a SSB wave is generated using Phase Discriminator method with only USB and rejecting the LSB. [10]

OR

5. Derive an expression for SSB Modulated wave for which upper sideband is retained. [10]

6. Explain the principle of Angle Modulation. Derive and explain phase deviation, Modulation index, frequency deviation and percent modulation. [10]

OR

7. Derive the expression for the frequency modulated signal. Explain what is meant by narrowband FM and wideband FM using the expression. [10]

8. Draw and explain the pre-emphasis and de-emphasis circuits with a neat diagram. What is their function? [10]

OR

9. Derive the effective noise temperature of a cascade amplifier. Explain how the various noises are generated in the method of representing them. [10]

10.a) Draw and explain block diagram of double conversion FM receiver.
b) What do you mean by pulse modulation and define types of pulse modulation? [6+4]

OR

11. What is AGC? Draw and explain a simple AGC circuit and what are the different types of AGC explain them. [10]

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