

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –**  
**RAIGAD -402 103**  
**Semester Examination – May - 2019**

**Branch: Electronics and Telecommunication Engineering**

**Sem.:- IV**

**Subject with Subject Code:- Analog Communication Engineering    Marks: 60**  
**[BTEXC402]**

**Date:- 16/05/2019**

**Time:- 3 Hr.**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

**(Marks)**

- Q.1. A) State and explain Sampling Theorem. What is Nyquist (06)**  
**Criteria? A continuous time signal  $x(t) = 7 \sin 2500\pi t + 5 \sin 7500\pi t$  is to be sampled. Calculate the minimum sampling frequency.**
- B) With the help of neat diagram explain a typical radio (06)**  
**transmitter.**

- Q.2. A) Explain double sideband suppressed carrier technique of AM. (12)**  
**Also explain generation of the same using Balanced Modulator.**

**OR**

- B) 1. Derive an expression for power relation in an AM wave. (06)**  
**Assuming that a 750 W carrier is modulated to the depth of 50 percent. Calculate the total power in modulated wave.**
- 2. Explain VSB technique of AM, What are its advantages over (06)**  
**other AM Techniques**

- Q.3. Answer any two of the following**

- A) Explain generation of Frequency modulation with the help of (06)**  
**basic reactance modulator.**
- B) In an FM system, when the audio frequency (AF) is 750 Hz, and (06)**  
**AF voltage is 2.6 V, the deviation is 5.2 kHz. If the AF voltage is**  
**now increased to 8V what is new deviation? If the AF voltage is**

further raised to 10V while AF is dropped to 200 Hz, what is the deviation? Find Modulation index in each case.

C) Explain concept of Pre-emphasis and De-emphasis. (06)

Q.4. A) What is superheterodyne principle? Explain operation of superheterodyne receiver with the help of block diagram. Also enlist advantages of superheterodyning. (08)

B) Define: Sensitivity, Selectivity, Fidelity, Image frequency (04)

Q.5. A) Draw and explain the circuit diagram of practical diode detector. How AGC obtained from the detector (06)

B) Draw and explain the circuit diagram of ratio detector. How amplitude limiting can be achieved using ratio detector? What are advantages and disadvantages of ratio detector? (06)

Q.6. Answer any two of the following

A) Define Noise. What are different sources of noise? Explain in detail. (06)

B) Two Resistors  $15\text{K}\Omega$  and  $60\text{K}\Omega$  are at room temperature, for the bandwidth of  $100\text{kHz}$ , calculate thermal noise for following conditions. (a) for each resistor (b) for series connection (c) for parallel connections. (06)

C) Define: Noise Figure, Noise Factor (06)

The signal power and noise power measured at the input of an amplifier are  $200\text{ }\mu\text{W}$  and  $2\text{ }\mu\text{W}$  respectively. If the signal power at the output is  $1.5\text{W}$  and noise power is  $40\text{mW}$ , calculate the amplifier noise factor and noise figure