[Time: Three Hours]   **[Marks:80]**

<div align="center">Please check whether you have got the right question paper.</div>

N.B:
1. Question.No.1 is compulsory.
2. Attempt any three questions out of remaining five.
3. Figures to the right indicate full marks.
4. Assume suitable data if required and mention the same in answer sheet.

Q.1 Solve <u>**any four**</u>.   **20**
    a) Explain the function of AFC loop in FM.
    b) What do you mean by double spotting?
    c) What is quantization? Explain types of quantization.
    d) Why IF is selected as 455 KHz in AM?
    e) Define noise figure and noise factor.

Q.2 a) Draw the block diagram of phase cancellation SSB generator and explain how carrier and unwanted **10**
       sidebands are suppressed?

    b) An AM transmitter radiates 5 MHz carrier with 80KW power, carrier is modulated by 600HZ and 2 KHz **10**
       signals.
       1. What will be the total modulation index if each signal modulates at 60% of modulation?
       2. Determine the transmitted power.
       3. Draw the frequency spectrum of modulated signal.
       4. What is % of power saving if one of the sideband and carrier is suppressed?

Q.3 a) Explain the operation of Foster Seeley discriminator with the help of circuit diagram and phasor **10**
       diagram.

    b) Explain the principle and generation of indirect method of FM generation. **10**

Q.4 a) What are the drawbacks of delta modulation? Explain the method to overcome these drawbacks. **10**

    b) State and prove sampling theorem for band limited signal. **10**

Q.5 a) Explain super heterodyne radio receiver in detail with block diagram. **10**

    b) Explain the principle and working of transistor direct PM Modulator **10**

Q.6 Write short notes on: (<u>**any four**</u>) **20**
    a) PLL FM demodulator
    b) μ −law and A-law companding
    c) Vestigial sideband w.r.t broadcast television
    d) Frequency division duplexing (FDM)
    e) Pre emphasis and de-emphasis circuit
    f) Aliasing error and aperture effect

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