

Con. 2585-09. Principles of Communication Engineering VR-3828
(REVISED COURSE)

(3 Hours)

[Total Marks : 100

- N.B.:** (1) Question No. 1 is compulsory.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) Assume **suitable data** if **necessary**.

1. Answer the following (Any **four**) :— 20
- What is the difference between noise and interference ? Explain different types of noise.
 - What is quantization ? Explain types of quantization.
 - In AM why IF is selected 455 KHz ?
 - How ratio detector provides Amplitude limiting ?
 - Why sampling freq. $(f_s) \geq 2 f_m(\max)$, f_m is modulating signal freq.
2. (a) Derive equation for total transmitted power, total side band power and signal side band power for AM wave and draw freq. spectrum for DSBFC. 10
- (b) Explain Indirect method of FM generation. 10
3. (a) What are the characteristics of a radio receiver explain in detail. 10
- (b) One input to an AM DSBFC modulator is 800 KHz carrier with amplitude of 40 Vp. The second input is 25 KHz modulating signal whose amplitude is sufficient to Produce a $\pm 10V$ change in the amplitude of the envelope. Calculate :— 10
- Upper and lower side band frequencies.
 - Modulation Index and % modulation.
 - Draw the enveloped and show V max and V min.
 - Draw the output freq. spectrum.
 - Total power in the AM wave for the load resistance of 200 Ω .
4. (a) Explain the working of Foster-seeley discriminator with neat circuit diagram and phasor diagram. 10
- (b) State and prove sampling theorem for Low pass signal. 10

5. (a) An electronic device operating at temperature of 17°C with a bandwidth of 10 KHz. Calculate :— 5
- (i) Thermal noise power in volts.
 - (ii) RMS noise voltage for $100\ \Omega$ internal and $100\ \Omega$ load resistance.
- (b) Draw the block diagram of Pulse code modulation techniques and explain each block. 10
- (c) Explain how PPM is generated from PWM. 5
6. (a) Consider the analog signal $m(t) = 4 \sin 100\pi t + 3 \cos 250\pi t$. What is the Nyquist rate and sampling rate for this signal ? 5
- (b) Explain the phase shift method for SSB generation. 5
- (c) What are the draw backs of delta modulation ? How adaptive delta modulation solve these problem ? 10
7. (a) An audio and video signal has maximum frequency of 4 MHz. If the signal is converted to PCM bit stream with 512 quantization levels, determine the no. of bits per second generated by the PCM system. Assume that the signal is sampled at the rate of 20% above the Nyquist rate. 8
- (b) Explain the following (any two) :— 12
- (i) ISB with neat block diagram.
 - (ii) FM noise triangle.
 - (iii) Advantages of digital communication system over analog communication system.