Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 70515

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Third/Fourth Semester

Electronics and Communication Engineering

EC 8491 – COMMUNICATION THEORY

(Common to : Computer and Communication Engineering/Geoinformatics Engineering))

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Define Coherent detection.

2.   Draw the frequency spectrum of both DSB-SC and SSB-SC.

3.   Draw the block diagram of a system for generating a narrow band FM.

4.   Why frequency modulation is more preferred for voice transmission?

5.   List the properties of the cumulative distributive function.

6.   What are the properties of an autocorrelation function?

7.   What is FM threshold effect?

8.   Define noise figure and noise equivalent temperature.

9.   Write about non uniform quantization.

10. What is meant by aliasing?

PART B — (5 × 13 = 65 marks)

11. (a)   Give main idea about super heterodyne receiver with neat block diagram and explain the various parameters.   (13)

Or

(b)   Identify the need for carrier suppression in AM system? Draw and explain the functioning of such system.   (13)

12. (a) Explain in detail about any two methods of FM discriminator. (13)

Or

(b) Explain the principle of indirect method of generating a wideband FM signal. (13)

13. (a) State and prove the properties of Gaussian process. (13)

Or

(b) Describe in detail about Random variable, Ergodic process and Central limit theorem. (13)

14. (a) Express and derive the output SNR for FM reception. Also obtain the figure of merit. (13)

Or

(b) Evaluate the effective noise temperature of a cascade amplifier from Friss formula. (13)

15. (a) Elaborate the concept of PCM with neat diagram and discuss the various phase modulation schemes. (13)

Or

(b) Write about Frequency Division Multiplexing system for N-number of channels with neat diagram. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Propose the Power Spectral Density of in-phase and quadrature phase noise a narrow band noise. Find the PDF of sine wave pulse noise. (15)

Or

(b) A mixer circuit has noise figure of 12dB. It is preceded by an amplifier that has an equivalent noise temperature of 200K and power gain of 30dB. Calculate the equivalent noise temperature referred to the input of the amplifier. (15)