

22P406

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Name:

Reg.No:

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2024

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19P PHY4 E14 - COMMUNICATION ELECTRONICS

(Physics)

(2019 Admission onwards)

Time : 3 Hours

Maximum : 30 Weightage

Section A

Answer *all* questions. Each question carries 1 weightage.

1. Quantitatively illustrate the frequency spectrum of DSBSC AM wave.
2. Differentiate between Foster- Seeley Discriminator and ratio detector.
3. Differentiate between mid-rise type and mid-thread type quantization.
4. Discuss companding in PCM systems.
5. Write a short note on AM receiver.
6. What is delayed and advanced DT signals?
7. Distinguish between near-field and far-field regions.
8. What are the properties of log-periodic antennas?

(8 × 1 = 8 Weightage)

Section B

Answer any *two* questions. Each question carries 5 weightage.

9. Discuss the armstrong method of FM generation. How is it different from the direct method of FM generation?
10. Discuss PAM in detail.
11. Discuss about AM transmitters, FM transmitters .
12. Analyze the radiation from a quarter wave monopole antenna. Draw the radiation patterns.

(2 × 5 = 10 Weightage)

Section C

Answer any *four* questions. Each question carries 3 weightage.

13. Determine efficiency and the percentage of total power carried by sidebands in AM wave for tone modulation when $\mu=1, 0.5, 0.3$.

14. Quantitatively analyse a square law modulator.
15. Write in detail about microwave systems.
16. Discuss the principles of A/D and D/A conversion.
17. With the help of suitable block diagrams, explain the properties of convolution.
18. A communication system is to be established at a frequency of 60MHz with a transmitted power of 1kW. The field strength of the directive antenna is 3 times that of a half-wave antenna. $h_t = 50\text{m}$, $h_r = 5\text{m}$. A field strength of $80\mu\text{V/m}$ is required to give satisfactory reception. Find the range of the system.
19. When the maximum electron density of the ionospheric layer corresponds to refractive index of 0.92 at the frequency of 10MHz, find the range if the frequency is MUF itself. The height of the ray reflection point on the ionospheric layer is 400km. Assume flat earth and negligible effect of earth's magnetic field.

(4 × 3 = 12 Weightage)
