

II B. Tech II Semester Regular/Supplementary Examinations, April/May - 2019**ANALOG COMMUNICATION**

(Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answer **ALL** the question in **Part-A**3. Answer any **FOUR** Questions from **Part-B****PART -A**

1. a) Explain the need of modulation in communication system with one example. (3M)
- b) List out few applications of DSB-SC modulation. (2M)
- c) Explain the few Comparisons of FM & AM. (2M)
- d) Define the term fidelity and explain its importance in Receivers. (2M)
- e) Define the term Average noise figure in detail. (2M)
- f) List out different type of Pulse modulation systems in detail. (3M)

PART -B

2. a) Draw and Describe an expression for AM wave and sketch its frequency spectrum. (7M)
- b) A tone modulated AM-signal with a modulation index of "m" and base band signal Frequency of ω_m is detected using envelope detector, whose time constant is RC, for Effective demodulation, show that $(1/RC) \geq [m \omega_m / (\sqrt{1-m^2})]$. (7M)
3. a) Draw the block diagram and explain generation of DSB-SC signal using balanced modulator. (7M)
- b) Discuss the effect of frequency and phase error in demodulation of DSB-SC wave using synchronous detector. (7M)
4. a) Explain the generation of N.B.F.M using narrow band P.M generator along with necessary equations. (7M)
- b) Draw the circuit diagram of Phase locked loop for detection of FM and explain its operation. (7M)
5. a) Draw the block diagram of Super hetrodyne receiver and Explain the function of each block in detail. (7M)
- b) List out the different Classification of Transmitters and explain any one type in detail. (7M)
6. a) Explain the threshold noise effects in angle modulation system with suitable diagrams? (7M)
- b) Explain the concept about pre-emphasis and de-emphasis along with circuit diagrams. (7M)
7. a) Explain the concept of how a PPM signal can be generated from PWM signal along with circuit diagram. (7M)
- b) Draw the block diagram of Time Division Multiplexing and explain the function of each block in detail. (7M)



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1. a) Derive P_t in Amplitude modulation. (2M)
- b) List out few comparisons of SSB and DSB-SC modulation. (3M)
- c) Define the terms wideband FM and Narrowband FM? (3M)
- d) Define the terms Image frequency and Image frequency rejection ratio. (2M)
- e) Explain the different noise sources available in communication receiver. (2M)
- f) List out few comparisons of PAM and PPM. (2M)

PART -B

2. a) What do you understand of modulation index? What is its significance? (7M)
- b) Draw the circuit diagram of Switching modulator and explain its operation in detail. (7M)
3. a) Explain the principle of coherent detector of DSB-SC modulated more with a neat block diagram. (7M)
- b) List out few Applications of different AM Systems in detail. (7M)
4. a) Define angle modulation? Explain different types of angle modulations with mathematical expressions. (7M)
- b) A Sinusoidal carrier of 10V, 5MHz is frequency modulated by sinusoidal message signal of 50V, 100 kHz and $K_f=50$ kHz/V. Find Δf , β , band width and power. (7M)
5. a) Draw the block Schematic for FM broadcast receiver and explain the function of each unit. (7M)
- b) Draw the block diagram of FM Transmitter and explain the function of each block in detail. (7M)
6. a) Explain the noise performance of DSB-SC receiver and prove its S/N ratio is unity. (7M)
- b) Discuss the threshold effect for AM with envelope detector along with derivation. (7M)
7. a) Explain the PPM generation from PWM with a neat block diagram and necessary figures. (7M)
- b) Explain the different methods for generation of PWM along with circuit diagrams. (7M)



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PART -A

1. a) What are the basic constituents of a communication system along with block diagram? (3M)
- b) Explain the concept of Vestigial side band modulation along with wave forms. (2M)
- c) List out the different Advantages and Applications of FM? (2M)
- d) What are the main requirements of AM broadcast transmitters, along with block diagram. (3M)
- e) Define the term noise figure and noise equivalent temperature. (2M)
- f) Explain the different applications of TDM. (2M)

PART -B

2. a) With suitable diagram explain the square-law diode modulation method for AM generation? (7M)
- b) An amplitude modulated voltage is given by $V = 100 (1 + 0.4 \cos 100 t + 0.001 \cos 3000t) \cos 10^6 t$. State all frequency components present in the voltage, and find modulation index for each modulating voltage term. What is the effective modulation index of V? (7M)
3. a) How do you detect SSB waves? Explain with neat diagram. (7M)
- b) Find the various frequency components and their amplitudes in the voltage given by $v(t) = 100 (1 + 0.6 \cos 5000t - 0.3 \cos 100t) \sin 6 \times 10^6 t$. Draw the single sided spectrum. Also evaluate the modulated and sideband power. (7M)
4. a) What is angle modulation? Explain frequency deviation, percent modulation, phase deviation and modulation index in detail. (7M)
- b) Explain the Armstrong method of FM generation along with circuit diagram. (7M)
5. a) Explain the following terms in detail (7M)
 (i) Amplitude limiting (ii) Frequency changing and tracking
- b) In a broadcast Super Heterodyne Receiver having no RF amplifier is tuned to 555kHz. The local oscillator frequency is adjusted to 1010kHz and the quality factor is 100. Calculate the intermediate frequency, image frequency and image rejection ratio. (7M)



6. a) What is noise? Explain the difference between thermal noise and shot noise in detail. (7M)
b) Explain about noise effect in DSB-SC and obtain necessary expression for figure of merit. (7M)
7. a) Describe the synchronization procedure for PAM, PWM and PPM signals in detail. (7M)
b) What is FDM? Explain the importance of FDM over TDM along with circuit diagram. (7M)



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PART -A

1. a) List out the few comparisons of TDM and FDM. (3M)
- b) How can you obtain a DSB-SC signal? What is the Band-width of DSB-SC signal? (3M)
- c) Define Single tone frequency modulation. (2M)
- d) Define the terms sensitivity and selectivity. (2M)
- e) Explain, how noise can be calculated in a communication system. (2M)
- f) List out the different advantages of FDM over TDM. (2M)

PART -B

2. a) Derive an expression for AM wave and sketch its frequency spectrum. (7M)
- b) Draw the circuit diagram of Envelope detector and explain its operation along with wave forms. (7M)
3. a) List out the methods for generation of SSB-SC signal and explain any one of the method in detail. (7M)
- b) Discuss the process of generation of VSB waves along with its applications. (7M)
4. a) Explain the detection of FM wave using balanced frequency discrimination along with circuit diagram. (7M)
- b) Explain about the spectra of NBFM and WBFM along with its applications. (7M)
5. a) Define AGC? Explain the different types of AGC occurred in Receivers. (7M)
- b) Draw the circuit diagram of Communication Receiver and explain the function of each block in detail. (7M)
6. a) What is FM threshold effect? How threshold reduction is achieved in FM receiver in detail. (7M)
- b) Write short notes on Noise in AM System and how to avoid it. (7M)
7. a) Define PAM? Explain the generation of PAM along with circuit diagram. Give merits and demerits of PAM. (7M)
- b) For a PAM transmission of voice signal having maximum frequency equal to $f_m=8\text{KHz}$ calculate the transmission bandwidth. It is given that the sampling frequency $f_s=16\text{KHz}$ and the pulse duration $\tau=0.5\text{ TS}$ (7M)

