



**R22 Regulation** **Subject code: 4E4DB**  
**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Autonomous, Accredited by NAAC with 'A+' Grade)

**B.Tech IV Semester Regular Examinations, July 2024**

**ANALOG AND DIGITAL COMMUNICATIONS**  
(ECE)

**Maximum Marks: 60**

Date:20.07.2024 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A		CO	Bloom Tx
All the following questions carry equal marks		(10X1M=10 Marks)	
1.a)	Justify the need for modulation.	CO1	BL2
b)	A 400 W carrier is modulated to a depth of 75%. Calculate the total power in the modulated wave.	CO1	BL3
c)	Define modulation index of FM.	CO2	BL3
d)	What are the advantages of angle modulation and also list its disadvantages?	CO2	BL2
e)	Why feedback is used in the AM transmitter? Explain	CO3	BL2
f)	What is the need for AGC circuit?	CO3	BL1
g)	Classify the different methods of Pulse modulation techniques.	CO4	BL1
h)	State the principle of Adaptive delta modulation.	CO4	BL1
i)	What are the advantages of PSK?	CO5	BL1
j)	Define ISI.	CO5	BL3
Part-B			Bloom Tx level
Answer All the following questions.		(5X10M=50Marks)	
2	Considering single tone modulation, derive time domain and frequency domain expression for AM wave and draw its spectrum. (10)	CO1	BL3
OR			
3	Draw a neat block diagram, COSTAS receiver used for demodulation of DSBSC wave. (10)	CO1	BL4
4	Explain Narrow band FM with necessary circuit. (10)	CO2	BL3
OR			
5	With block diagrams and equations explain how PLL can be used for demodulation of FM wave. (10)	CO2	BL2
6	A. Discuss about FM transmitter. B. A single-tone FM is represented by the voltage equation as: $v(t) = 12\cos(6 \times 10^6 t + 5\sin 1250t)$ Determine the following: (i) Carrier frequency (ii) Modulating frequency (iii) Modulation index (iv) What power will this FM wave dissipate in $10\Omega$ resistors? (3+7)	CO3	BL5

	OR		
7	A. Explain the operation of Superheterodyne receiver with a neat schematic diagram. B. Explain Automatic Gain Control (AGC). (5+5)	CO3	BL2
8	A. Explain with a neat block diagram PPM generation and detection. B. Write short notes on time division multiplexing. (5+5)	CO4	BL2
	OR		
9	Illustrate the function of PCM in detail with relevant diagrams. (10)	CO4	BL3
10	What is known as Binary phase shift keying? Discuss in detail the BPSK transmitter and Receiver and also obtain the minimum double sided Nyquist bandwidth. (10)	CO5	BL2
	OR		
11	Derive the expression for probability of error of ASK. (10)	CO5	BL4