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**Examination: Even Semester Examination 2023**

**Paper Name: Analog and Digital Communications**  
**Time: 3 Hours**

**Paper Code: BTECE-401**  
**Maximum Marks: 75**

**Section A**

**Note: Attempt all the questions**

| Q. No. | Question                                                                                                                                                                    | Marks | CO  | BL  |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|-----|
| 1.     | Explain Pre emphasis and De-emphasis and write down their need.                                                                                                             | 5     | CO1 | BL3 |
| 2.     | Analyse TDM and FDM for multiplexing,                                                                                                                                       | 5     | CO2 | BL2 |
| 3.     | Discuss equalization technique in brief.                                                                                                                                    | 5     | CO3 | BL4 |
| 4.     | Discus QAM in brief.                                                                                                                                                        | 5     | CO5 | BL1 |
| 5.     | Write down the significance of SSB. Discuss various types in brief.                                                                                                         | 5     | CO5 | BL2 |
| 6.     | What is digital modulation trade-off. Explain advantages of digital modulation over analog modulation.                                                                      | 5     | CO1 | BL5 |
| 7.     | The carrier power is 9 Kw and the total power is 10.125 kw. Compute the modulation index $m_a$ . If another sine wave have 0.5 modulation Index then calculate total power. | 5     | CO1 | BL6 |

**Section B**

**Note: Attempt any four (4) Questions**

**(4x10=40)**

| Q. No. | Question                                                                                                                           | Marks | CO  | BL  |
|--------|------------------------------------------------------------------------------------------------------------------------------------|-------|-----|-----|
| 1.     | Define double side AM wave and discuss why AM wave have poor efficiency.                                                           | 10    | CO1 | BL2 |
| 2.     | Explain in detail equalization technique and discuss why synchronization is necessary for carrier recovery for digital modulation. | 10    | CO1 | BL1 |
| 3.     | Explain sampling, quantization and encoding process in detail with proper example.                                                 | 10    | CO3 | BL5 |

|    |                                                                                                                                                                                                                                                                                                                                        |    |                             |     |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------|-----|
| 4. | (a) Discuss ISI (Inter Symbol Interference) in brief.<br>(b) Distinguish between ASK, FSK and PSK.                                                                                                                                                                                                                                     | 10 | CO4                         | BL3 |
| 5. | A convolution encoder which has two shift register with two stage, constraint length $k=3$ , two modulo-2 adders and an output multiplexer. The generator sequence of encoder are $g_1 = (1,1,1)$ and $g_2 = (1,0,1)$<br><br>(a) Draw block diagram of encoder.<br>(b) Find code rate and output code word for message sequence 10011. | 10 | CO5                         | BL1 |
| 6. | Write a short note on any two of the followings:<br><br>a. Delta Modulation<br>b. Optimum demodulation of digital signal over band limited channel<br>c. Angle Modulation<br>d. Gaussian and white Noise Characteristics                                                                                                               | 10 | CO3,<br>CO5,<br>CO1,<br>CO2 | BL2 |

BL: Blooms Taxonomy Level; (1-remembering, 2-understanding, 3-apply, 4-analyse, 5- evaluate, 6-create)