4E1330

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B.Tech. IV Sem. (Main/Back) Examination - 2023

Information Technology

4IT3-04 Principle of Communication

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, Attempt **any five** questions out of **Seven** questions from **Part B** and **three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

Part - A

(word lmit 25)

All questions are **compulsory** **(10×2=20)**

1. What is the over - modulation in AM?
2. Calculate the modulation index, m of an Amplitude modulation wave if its V_{max}(p-p) = 5.9 divisions and V_{min}(p-p) = 1.2 divisions.
3. What is the need of pre - emphasis circuit in FM?
4. Explain the flat - top sampling.
5. How PWM is different than PPM?
6. What do you mean by Quantization in PCM?
7. What is the Delta modulation?
8. Define the term 'pulse shaping'.
9. How QPSK is different than PSK modulation?
10. Define FHSS.

Part - B

(Word limit 100)

Attempt any **five** questions **(5×4=20)**

1. Derive an expression for total power of an AM wave in terms of carrier power and modulation index.
2. Explain the operation of TDM with the help of suitable diagram and application.
3. Discuss the DPCM technique with the help of suitable diagram.
4. Explain the terms 'Line coding' and 'Inter - symbol interference' in a digital modulation.
5. Compare the FHSS with DSSS using suitable diagrams.
6. Draw the block diagram of a PLL and explain its working principle in brief?
7. Explain the terms 'Aliasing' and 'Interpolation' in Pulse Analog Modulation.

Part - C

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any **Three** questions **(3×10=30)**

1. An antenna has an impedancce of 40 V. An unmodulated AM signal produces a current of 4.8 A. The modulation is 90 percent. Calculate (a) the carrier power, (b) the total power, and (c) the sideband power. The transmitter experiences an antenna current change from 4.8 A unmodulated to 5.1 A. What is the percentage of modulation?
2. Compare PAM, PWM and PPM modulation schemes with the help of suitable applications.
3. Derive the expressions for signal to quantization noise ratio in PCM and Delta modulation techniques.
4. Explain the following digital modulation techniques (any two) ;
   i. MSK.
   ii. FSK.
   iii. QPSK.
5. Write short notes on the following (any two) :
   i. CDMA.
   ii. Coherent BPSK.
   iii. Pseudo - Noise Sequences.
