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C033513(033)

B. Tech. (Fifth Semester) Examination, Nov.-Dec. 2021

AKTE ~~New~~ Scheme)

(Information & Technology)

PRINCIPLES of COMMUNICATION

(BT-3033)

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all the questions. Part (a) of all questions is compulsory and having 4 marks. Attempt any* ***two*** *from (b), (c) and (d) and having 8 marks in each question.*

1. (a) Define modulation. What are the two needs of modulation? 4

(b) Explain with mathematical expression generation of SSB-SC signal using phase shift method. 8

(c) Draw and explain the circuits of envelop detector. What is the limitation of square law demodulation which is resovled by enveloped detector? 8

(d) Explain the square law diode modulation and demodulation method for AM generation. 8

2. (a) Compare NBFM and WBFM. 4

(b) A given Am broadcast station transmits a total of 50 kW when the carrier is modulated by a sinusoidal signal with a modulation index of 0·707.

Calculate :

(i) Carrier power

(ii) Transmission efficiency

(iii) Peak amplitude of carrier assuming the antenna to be represented by $50 + j\,\Omega$ load. 8

(c) Write a short note on Noise performance in FM and comparision with AM. 8

(d) Explain generation of FM using phase modulated

and generation of PM using frequency modulator. Write the difference btetween PM and FM. 8

3. (a) What is sampling theorem? 4

(b) Explain generation and detection of PWM signal with neat diagram. 8

(c) What is frequency division multiplexing? Draw the block diagram of FMD system and explain its working. 8

(d) An analog signal is expressed by the equation

$$x(t) = 3\cos 50\,\pi t + 10\sin 300\,\pi t + \cos 100\,\pi t .$$

Calculate the Nyquist rate for this signal. 8

4. (a) Compare QPSK and QAM. 4

(b) Explain working of BPSK demodulator with block diagram. 8

(c) Describe Mary PSK generator with block diagram. 8

(d) Draw block diagram of DPSK generator with waveforms. 8

5. (a) What is an optical fiber? 4

(b) A fiber having core refractive index $n_1 = 1 \cdot 5$ and cladding refractive index $n_2 = 1 \cdot 45$.

Calculate :

(i) Numeric Aperture

(ii) Acceptance Angel

(iii) Critical Angel 8

(c) Write short note on : 8

(i) Step index optical fiber

(ii) Graded index optical fiber

(d) Draw and explain block diagram of satellite communication system. 8