Total No. of Questions :4] **SEAT No. :**

P706 **[Total No. of Pages :2**

[5315]-244

S.Y.B.Sc.(Vocational-II)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Principles & Applications of Analog and Digital Communications

(Semester-II) (Paper - IV)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt the following questions.

a) State whether the following statements are TRUE or FALSE. Justify your answers. **[2]**

i) Examples of transceivers include televisions, fax machines, cellular telephones, and computer modems.

ii) Most of the signals and waveforms that we discuss and analyze are expressed in the time domain whereas in telecommunication we discuss and analyze signals in the frequency domain as well.

b) Comment on the following statements. **[4]**

i) mQAM and mPSK are normally used in old days MODEMs for high data transfer rate, where m denotes number of symbols.

ii) According to fourier analysis, complex signals and distorted sine waves are made up of a fundamental sine wave and numerous harmonic signals.

c) Attempt the following. **[6]**

i) For a PAM transmission of a voice signal with $f_m = 3$ kHz, calculate the transmission bandwidth B_T, if the width of each pulse, $\tau = 0.1T_s$ and the sampling frequency $f_s = 8$ kHz.

ii) Give range of frequency and bandwidth for

a) Voice signal for telephony.

b) Music signal.

c) TV signal (Picture).

d) Digital data using MODEM (old system).

P.T.O.

iii) Calculate the percent power saving for a SSB signal if the AM wave is modulated to a depth of

a)100%, b) 75%.

Q2) Attempt ANY TWO of the following. **[8]**

a) Write short note on inter -symbol interference.

b) Write short note on CDMA.

c) Write note on pulse and DTMF dialing.

Q3) Attempt ANY TWO of the following. **[8]**

a) Compare frequency modulation and amplitude modulation techniques in communication system. Discuss indirect method of generating FM.

b) Explain the function of modem at transmitting end and receiving end.

c) Explain clearly difference between instantaneous, natural and flattop samples in PAM system.

Q4) Attempt ANY TWO of the following. **[12]**

a) Find the Nyquist rate and Nyquist interval for the signal

$X(t) = 5\cos(1000\pi t)\cos(4000\pi t)$.

b) The Output voltage of transmitter is given by, 50 (1+0.6 sin 628t) sin (3.14×10^7t), this voltage is fed to a load of 600Ω. Determine Carrier frequency, Modulating frequency, Carrier power and Mean power output.

c) A 20 MHz carrier is modulated by a 400 Hz modulating signal. The carrier voltage is 5V and the maximum deviation is 10kHz. Write down the mathematical expression for the FM and PM waves. If the modulating frequency is increased to 2 kHz keeping everything else constant write down the expression for the FM and PM waves.

OR

Q4) Attempt ANY TWO of the following. **[12]**

a) Explain PCM

b) Explain super heterodyne AM receiver with a neat block diagram.

c) Explain PAM -TDM.

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