

B.TECH SEM – IV (2007 COURSE) (COMPUTER ENGG.) :
WINTER - 2017

SUBJECT : DATA COMMUNICATIONS SYSTEMS

Day : Tuesday
Date : 21/11/2017

Time : 02.30 PM TO 05.30 PM
Max. Marks : 80

W-2017-2406

N B.

- 1) Q.1 and Q.5 are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from each Section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer books.
- 4) Draw neat labeled diagrams **WHEREVER** necessary.

SECTION – I

- Q.1** a) Consider analog signal $x(t) = 3 \cos 50\pi t + 10 \sin 300\pi t - \cos 100\pi t$ what is the Nyquist rate for this signal. (05)
b) What is the necessity of non uniform quantization and explain companding? (05)
c) Explain the following terms with reference to information theory: (05)
i) Entropy ii) Information rate iii) Channel capacity
- Q.2** a) Discuss about slope overload distortion and granular noise in detail modulation and how it is removed in ADM. (07)
b) A television signal with a bandwidth of 4.2 MHz is transmitted using binary PCM, the number of quantization level is 512 calculate (06)
i) Code word length ii) Transmission bandwidth
iii) Final bit rate iv) Output signal to quantization noise ratio
- Q.3** a) Explain the super-heterodyne radio receiver with neat block diagram. (07)
b) The output voltage of a transmitter is given by $500(1 + 0.4 \sin 3140t) \sin 6.28 \times 10^7 t$. This voltage is fed to a load of 600Ω . Determine : (06)
i) Carrier frequency
ii) Modulating frequency
iii) Carrier power
iv) Mean power output
- Q.4** a) State and explain Shannon's theorem of channel capacity. What is the maximum capacity of a noiseless channel whose width is 150 Hz in which the value of the data transmitted may be indicated by any of 10 different amplitudes? (07)
b) List the properties of a line code should have. Draw the following bit pattern in RZ, NRZ, AM and Manchester code 10110010. (06)

SECTION – II

- Q.5** a) Draw block diagram of modem and state its various functions. (05)
b) Explain various frequency bands used for satellite communication. (05)
c) Write short notes on: (05)
i) Frequency Reuse ii) GPRS.
- Q.6** a) How BPSK signal is generated? Explain the scheme to recover baseband signal in BPSK. (07)
b) What are multiplexer and concentrator modem? Compare them. (06)
- Q.7** a) With the help of block diagram explain satellite earth station. (07)
b) What is geostationary satellite? How its height is calculated? (06)
- Q.8** a) Draw and explain cell structure in mobile communication. (07)
b) Enlist various special services provided by cellular phone, and Write short note :- Wi-Fi. (06)

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