B.TECH. DEGREE IV SEMESTER (SUPPLEMENTARY) EXAMINATION IN INFORMATION TECHNOLOGY/COMPUTER SCIENCE AND ENGINEERING
JUNE 2001

IT/CS 405 COMMUNICATION ENGINEERING

(1998 Admissions)

Time: 3 Hours Maximum Marks: 100

I. (a) Write an expression for instantaneous frequency of an FM Wave. What is meant by modulation index, m_f, of an FM wave? In an FM system with audio frequency 500 Hz and AF voltage 2.4 V, the deviation is 4.8 KHz. If the modulating voltage is increased to 6V, what will be the deviation? Calculate the modulation Indices in the two cases. (10)

(b) What are the advantages of SSB transmission over DSB full carrier transmission? Why is the latter used in commercial broadcasting? (10)

OR

II. (a) An AM transmitter radiates 10 kW when Modulation is absent. When carrier is modulated by a sine wave of 1 KHz, it radiates 11.25 kW. Find modulation index. What is the maximum value of modulation index in the case of an AM wave? Sketch modulated waveform for this maximum modulation index. (10)

(b) Compare frequency and amplitude modulation from the following points of view:

(i) Transmitted power when modulation depth is varied.
(ii) Use of Class C amplifier for amplifying modulated wave.
(iii) Bandwidth requirement. (10)

III. (a) Explain Armstrong method of frequency modulation. (10)

(b) Explain vestigial sideband transmission in case of TV signals. (10)

OR

IV. (a) Give block diagram of an AM transmitter and explain function of each block. (10)

(b) Explain filter method of sideband suppression. Bring out the difficulty in filtering when modulating signal has low frequency components. (10)

V. Explain the layer structure of ionosphere and propagation of e.m. waves through ionosphere. (20)

OR

VI. Explain directivity, radiation resistance, bandwidth, beam width and polarization of an antenna. An antenna has a radiation resistance of 72 ohms and a loss resistance of 8 ohms. What is its efficiency? (20)

VII. (a) State sampling theorem for low pass signal. What happens if the signal is sampled at a rate less than the minimum required? What is the sampling rate used for commercial telephony? (10)

(b) Explain with diagram PAM, PWM and PPM. How is PPM obtained from PWM signal? (10)

OR

VIII. (a) Explain why quantization is used in pulse code modulation of speech signal. What is meant by quantization noise? How is it reduced? (10)

(b) Explain the principle of delta modulation. What is its advantage over PCM? (10)

IX. (a) Explain main advantages and disadvantages of fibre optic communication over radio communication. (10)

(b) Explain important advantages and disadvantages of geo-stationary orbit over satellite at lower orbit for long distance communication. (10)

OR

X. (a) What are the various factors considered in the choice of frequencies for satellite communication? (10)

(b) Explain various mechanisms that give rise to signal degradation in optical fibre. (10)

***