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

(New Scheme)

(IT Engg. Branch)

PRINCIPLES of COMMUNICATION SYSTEM

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions. Part (a) of each unit is compulsory and carry 2 marks. Attempt any **two** part from (b), (c) and (d) of each question.*

Unit-I

1. (a) Define modulation index.   2

(b) Derive expression for AM wave. Justify that frequency translation takes place in modulation.   7

(c) Explain any one of synchronous detection technique of DSB-SC signal.   7

(d) Explain filter method of SSB generation. What are its limitation.   7

Unit-II

2. (a) Define phase and frequency modulation and their relationship.   2

(b) A baseband or modulating signal

$$x(t) - 5\cos 2\pi\, 15 \times 10^{3} t$$

angle modulates a carrier signal a $\cos w_c t$.   7

(i) Determine the modulation index and BW for

(a) FM system

(b) PM system

(ii) Find the change in the BW and modulation index for both FM and PM if modulating frequency is reduced to $5\,\text{kHz}\cdot k_p = k_r = 15\,\text{kHz/volt}$.

(c) Explain band width of FM signal. What is effect of modulation on BW?   7

(d) Explain indirect method of FM generation.   7

Unit-III

3. (a) Why are analog signals digitized?   2

(b) For a PAM transmission of voice signal maximum frequency of signal is $f_m = 3$ kHz. Calculate the transmission BW. Assume that the sampling frequency $f_s = 8$ kHz and the pulse duration $\tau = 0\cdot 1\, Ts$.   7

(c) Compare PCM, DM, ADM and DPCM.   7

(d) What is the limitation DM? How is it overcome?   7

Unit-IV

4. (a) Define M-Ary PSK.   2

(b) Explain operation of differentially encoded PSK system. Explain why errors always occur in pairs in this system.   7

(c) How is MSK better than QPSK? Explain its principle. 7

(d) Explain coherent BASK generation and detection with expression and block diagram. 7

Unit-V

5. (a) What are the frequency pairs which are commonly used in uplink and downlink purpose in satellite communication. 2

(b) Draw and explain block diagram of satellite communication system. (uplink system, transponder, downlink system). Why uplink and downlink frequencies are different. 7

(c) Explain principles of light propagation in optical fiber. 7

(d) Explain Losses in fibers. 7