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Vellore Institute of Technology

School of Information Technology and Engineering

Fall Semester 2022-2023

Continuous Assessment Test – II

Programme Name & Branch : B.Tech (IT)

Course Name & code: BITE203L, Principles of Communication Systems

Class Number (s):1239/1227/1231/1233/1235

Slot: D2+TD2

Faculty Name (s): Prof Suganya P/ Prof Kumaresan P/ Prof Nithya S/ Prof Pradeepa M / Prof Sumathi D

Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s): Answer All Questions

Q.No.	Question	Max Marks
1.	(a) Two identical amplifiers are connected in cascade. The overall available power gain is 1600 and the overall noise figure is 5.1 Determine available power gain and noise figure of individual stages.	5
	(b) The noise figure of the individual stages of a two-stage amplifier is 2.03 and 1.54 respectively. The available power gain of the first stage is 62. Evaluate the overall noise figure.	5
2.	A Receiver with 75Ω input resistance operates at temperature of 31°C. The received signal is at 89MHz with a bandwidth of 6MHz. The received signal voltage of 8.3μV is applied to an amplifier with noise figure of 2.8 dB. Find i) Input Noise Power ii) Input Signal Power iii) SNR in dB iv) Effective Temperature	10

3.	An AM receiver, operating with a sinusoidal modulating wave of 80% modulation (k_a=0.8) and average message power P=0.5, has a post-detection signal-to-noise ratio of 30 dB. What is the corresponding pre-detection signal-to-noise ratio? Assume the transmission bandwidth is 2W.	10
4.	An FM system, operating at a pre-detection SNR of 14 dB, requires a post-detection SNR of 30 dB, and has a message power of 1watt and bandwidth of 50 kHz. Using Carson's rule, estimate the transmission bandwidth of the system.	10
5.	(a) A superheterodyne AM receiver has an IF, RF and Local oscillator frequencies of 400kHz, 600KHz and 1010 kHZ respectively. Determine Image frequency and IFRR for a preselector Q of 100. (b) When the value of the input signal to noise ratio falls below a particular value a rapid fall of the output signal to noise ratio is observed by the receiver. Explain the cause and how will you overcome it at the receiver's end.	5 5