

Premier University
Course Code: EEE 309
Course Title: Communication Engineering

Marks: 35

Time: 2 Hour

Answers **All five** questions

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|-------|---|----------|
| 1. a) | Why modulation technique is used in communication channel while transmitting a signal? | 03 |
| b) | An amplifier operating in the frequency range of 20 to 25 MHz has an input resistor of $3k\Omega$ and the ambient temperature is 28°C . Find out the thermal noise voltage. | 04 |
| 2. a) | “In AM modulated wave 67% power is lost to transmit the carrier signal, only 33% power is contained in the sidebands when modulation index is 1” – justify the statement. | 04 |
| b) | A 80v, 10KHz carrier is modulated with the help of a 3v, 50Hz signal. Calculate the amplitude of each sideband and frequency of the sidebands. | 03 |
| 3. a) | Why single sideband techniques are used instead of double sideband? Calculate the percentage power savings when the carrier and one of the sidebands are suppressed in an amplitude modulated wave modulated to a depth of 80%. | 01+02=03 |
| b) | Why does modulation index need to be less than 1? | 02 |
| c) | Explain noise figure. | 02 |
| 4. a) | Justify the following sentence, “The bandwidth required for amplitude modulation is twice the frequency of modulating signal”. | 04 |
| b) | Explain how Envelop Detector Demodulates an Amplitude Modulated Signal. | 03 |
| 5. a) | State Kepler’s law. Describe how satellite works in space. | 02 |
| b) | A RADAR operates at 1 GHz with a 5MW peak transmitted pulse power to detect 200Km range objects whose cross section is $1m^2$. If the receiver has bandwidth of 1.9KHz, and 10dB noise figure, what is the radius of antenna? | 05 |