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Daffodil International University

Department of Electrical and Electronic Engineering
Faculty of Engineering
Term Final Examination, Spring – 2025

Course Code: 0714-311 | Course Title: Communication Engineering
Section: A,B,C,D | Level-Term: L2-T2 | Teacher's Initial: FHT
Full Marks: 40 | Exam Date: June 28, 2025 | Time: 2 Hours

CO's represents one of the learning outcomes of the course.
Figures on the right hand side indicate marks allocated for that question.
Answer all Questions

Q1. **(a) Sketch** DSB signal $\varphi_{AM}(t)$ for modulation indices of $\mu = 0.5$ and 1, when $m(t)=B\cos\omega_{mt}$. This case is referred to as tone modulation because the modulating signal is a pure sinusoid (or tone). CO2, C2 — 4

(b) Explain the details of rectifier detection of AM demodulation. CO2, C2 — 4

Q2. **(a) Sketch** FM and PM wave for the modulating signal m(t) shown in following Fig.1. The constant k_f and k_p are $2\pi\times10^5$ and 10π respectively, and the carrier frequency is 100 MHz. CO2, C3 — 5

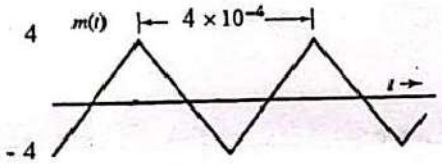


Fig.1

(b) An FM signal has a frequency deviation of 5 kHz and a modulating frequency of 1 kHz. **Calculate** the modulation index and comment on whether the modulation is narrowband or wideband. CO2, C3 — 3

Q3. **(a) Define** pulse amplitude modulation (PAM). **Illustrate** with an example how an analog signal is converted into a digital signal using PCM. 6

(b) Classify the sampling technique. 2

Q4. **(a) Determine** the peak frequency deviation of a BFSK signal with a mark frequency of 51 kHz and space frequency of 55 kHz, input bit rate of 2 kbps. 2

(b) Determine the baud necessary to pass a 10 kbps binary signal using amplitude shift keying. 2

(c) Given the data signal 010011101101 and a sinusoidal carrier, **sketch** the corresponding ASK, FSK, and BPSK signals. 4

Q5. **(a) Explain** the mechanism behind Frequency Division Multiplexing (FDM) that allows multiple signals to share a communication channel and be individually recovered. 5

(b) Describe the process of asynchronous TDM and how it differs from synchronous TDM. 3