Graphic Era HILL UNIVERSITY
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University under section 2(f) of UGC Act, 1956

Mid Term Evaluation (Odd) Semester Examination September 2025

Roll no.....

Name of the Course: Btech (ECE)
Semester: Vth
Name of the Paper: Analog and Digital Communication
Paper Code: TEC-501

Time: 1.5 hour **Maximum Marks: 50**

Note:
(i) Answer all the questions by choosing any one of the sub-questions
(ii) Each question carries 10 marks.

Q1. (10 Marks)

a. Draw the block diagram of communication system and explain the function of each block.

OR

b. Define modulation. Explain the need of modulation in communication system.

Q2. (10 Marks)

a. Define frequency modulation. Derive an expression for a single tone frequency modulated wave.

OR

b. An angle modulated signal is described by:

$S(t) = 5 \cos [2\pi\ 10^6 t + 200\sin(10^3 \pi t)]$.

(i). Considering $S(t)$ as a PM signal with $k_p = 100$ rad/volt, find the modulating signal $m(t)$.
(ii). Considering $S(t)$ as an FM signal with $k_f = 10^5$ Hz/volt, find the modulating signal m(t).

Q3. (10 Marks)

a. Discuss the method of generation of SSB-SC signal.

OR

b. An AM broadcast radio transfer radiates 10 K watts of power if modulation percentage is 60. Calculate how much of this is the carrier power.

Q4. (10 Marks)

a. Discuss simple slope detector method of FM demodulation.

OR

b. A single-tone FM is represented by the voltage equation as:

$V(t) = 12\cos (6 \times 10^8 t + 5 \sin 1250t)$

Determine the following:
i. Carrier Frequency
ii. Modulation Frequency
iii. Modulation Index
iv. What power will FM wave dissipate in 10-ohm resistors.

Q5. (10 Marks)

a. Derive an expression for the frequency spectrum and bandwidth of an amplitude modulated signal.

OR

b. Explain the concept of Pre-Emphasis and De-Emphasis in FM systems.