3hrs **Total Marks: 80**

N.B: 1. Question no. 1 is compulsory.
2. Attempt any three questions out of remaining five questions.

Q1. Attempt all four: 20M

a) Explain the need for modulation in communication systems.
b) What is the difference between Simple AGC and Delayed AGC.
c) Draw the frequency spectrum of AM wave and explain.
d) Explain sampling theorem.

Q2. (a) Draw the block diagram of single side band AM transmitter and explain each block. 10M
(b) How does phase shift method efficiently suppress unwanted side band? Explain with diagram. 10M

Q.3 (a) Explain the generation of direct FM signals. What is the difference between direct and indirect FM. 10M
(b) Explain in detail the generation and detection of PPM. 10M

Q.4 (a) What is demodulation? Explain balanced slope detector method of FM demodulation with the help of neat diagram.
(b) Draw the block diagram of the following and explain TRF Receiver and Super heterodyne Receiver 10M

Q.5 (a) Explain the terms PAM, PWM, PPM. Explain the principle of delta modulation. 10M
(b) An AM transmitter radiates 5 MHZ carrier with 80KW power, carrier is modulated by 600HZ and 2 KHZ signals. 10M
(i) What will be the total modulation index if each signal modulates at 60 % of modulation?
(ii) Determine the transmitted power.
(iii) Draw the frequency spectrum of modulated signal.
(iv) What is % of power saving if one of the sideband and carrier is suppressed?

Q.6 Write in brief any two 20M
(a) Varactor diode modulator
(b) Foster Seeley discriminator.
(c) Pre Emphasis and De-emphasis.

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