**Code: 15A04402**

**R15**

B.Tech II Year II Semester (R15) Regular & Supplementary Examinations May/June 2018

**ANALOG COMMUNICATION SYSTEMS**

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

**PART – A**

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define quadrature null effect in DSB-SC.
(b) Distinguish the bandwidth of modulated wave in DSB-SC and SSB.
(c) Write the expression of Carson's rule and identify the term in the expression.
(d) Write the expression for average power of FM signal and bandwidth of NBFM.
(e) Define noise equivalent bandwidth and effective noise temperature.
(f) Write the expression for envelope and phase components of the narrow band noise n(+).
(g) Write the Nyquist criteria for sampling the band limited signals.
(h) What is sensitivity and selectivity of radio receiver?
(i) What is entropy and average information rate of the source?
(j) State Shannon-Hartley theorem.

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

2 (a) Illustrate the time and frequency domain characteristics of standard amplitude modulation.
(b) An amplitude modulated waveform has the form $x(t) = 10(1 + 0.5\cos 2000\pi t)\ cos\ 20000\ \pi t$, sketch the amplitude spectrum of x(t).

**OR**

3 (a) Explain the operation of envelope detector with neat diagram and waveforms, bring out the significance of RC time constant of the circuit in detection of the message signal without distortion.
(b) Derive an expression for the SSB modulated wave for which upper sideband is retained.

**UNIT – II**

4 Show that the WBFM spectrum has an infinite number of sidebands.

**OR**

5 (a) With neat circuit diagram and expressions, explain the generation of FM signals using direct method.
(b) With block schematic, explain frequency division multiplexing.

**UNIT – III**

6 Derive the expression for figure of merit of AM receiver with single tone modulation.

**OR**

7 (a) Discuss the characteristics RC filtered white noise.
(b) Find the figure of merit when the depth of AM modulation is (i) 100%. (ii) 50%. (iii) 30%.

**UNIT – IV**

8 Explain the generation and demodulation scheme of PPM.

**OR**

9 Illustrate the generation an detection of PWM.

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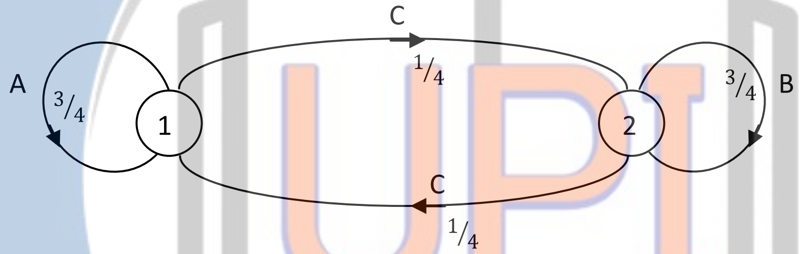
**UNIT – V**

10 Consider an information source modeled by a discrete ergodic Markoff random process whose graph in as shown in figure below. Find the source entropy (H) and the average information context per symbol in message containing one & two symbols (i.e. find $G_1$ and $G_2$.




**OR**

11 For the joint probability matrix given below determine (i) H(x). (ii) H(y). (iii) H(x, y). (iv) H(y)/(x).

$$P(x,y) = \begin{array}{c c} & \begin{array}{cccc} y_1 & y_2 & y_3 & y_4 \end{array} \\ \begin{array}{c} x_1 \\ x_2 \\ x_3 \\ x_4 \end{array} & \begin{bmatrix} 0.05 & 0 & 0.2 & 0.05 \\ 0 & 0.1 & 0.1 & 0 \\ 0 & 0 & 0.2 & 0.1 \\ 0.05 & 0.05 & 0 & 0.1 \end{bmatrix} \end{array}$$

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