CBCS SCHEME

USN

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019

Digital Communication

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Define Hilbert transform. What are its applications. Prove that a signal g(t) and its Hilbert transform $\tilde{g}(t)$ are orthogonal over the entire time interval $(-\infty, \infty)$. **(05 Marks)**

b. Determine the pre-envelope and complex envelope of the RF pulse defined by $x(t) = A\,\text{rect}\left(\frac{t}{T}\right)\cos(2\pi f_c t)$. **(06 Marks)**

c. Compare the power spectra of various line codes in terms of bandwidth, DC component, Noise immunity and synchronization capability, with neat sketch. **(05 Marks)**

OR

2 a. Express bandpass signal s(t) in canonical form. Also explain the scheme for deriving the inphase and quadrature components of the bandpass signal s(t). **(06 Marks)**

b. Explain with relevant expressions, the procedure for computational analysis of a bandpass system driven by a bandpass signal. **(06 Marks)**

c. What is the advantage of HDB3 code over conventional alternate mark inversion(AMI) code. Code the pattern "10100000110000011000000" using HDB3 encoding and AMI encoding. **(04 Marks)**

Module-2

3 a. Explain the geometric representation of set of M energy signals as linear combination of N orthonormal basis functions. illustrate for the case N = 2 and M = 3, with necessary diagrams and expressions. **(08 Marks)**

b. Using the Gram–Schmidt orthogonalization procedure, find a set of orthonormal basic functions to represent the three signals $s_1(t)$, $s_2(t)$ and $s_3(t)$ shown in Fig.Q3(b). also express each of these signals in terms of the set of basis functions. **(08 Marks)**

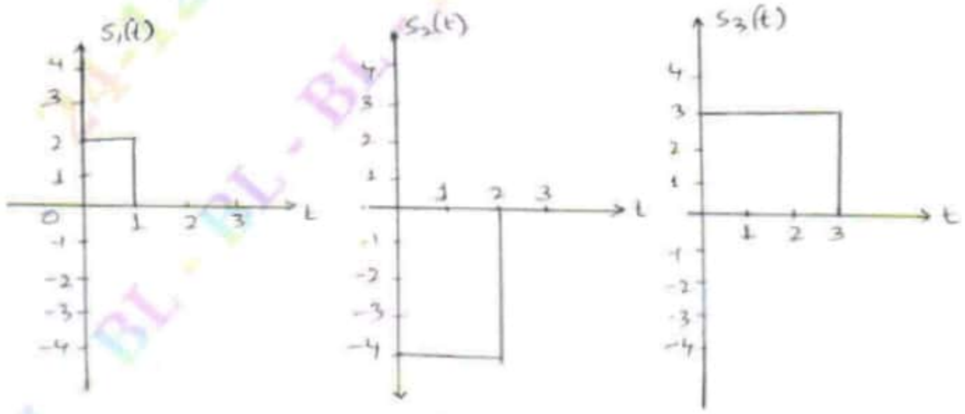

Fig.Q3(b)