CBCS SCHEME

1

USN

# Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020
## Digital Communication

Time: 3 hrs. Max. Marks: 80

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



### Module-1

1 a. Define Hilbert transform. State the properties of it. **(04 Marks)**

b. Obtain the Hilbert transform of

i) $x(t) = (\cos 2\pi Ft + \sin 2\pi Ft)$

ii) $x(t) = e^{-j2\pi Ft}$ **(04 Marks)**

c. Explain canonical representation of band pass signal. **(08 Marks)**

**OR**

2 a. Derive the expression for the complex low pass representation of bandpass systems. **(08 Marks)**

b. For the given data stream 11011100. Sketch the line code

i) Unipolar NRZ

ii) Polar NRZ

iii) Unipolar RZ

iv) Bipolar NRZ **(04 Marks)**

c. Draw the power spectra of NRZ unipolar and NRZ polar format. **(04 Marks)**

### Module-2

3 a. Show that the energy of a signal is equal to squared length of the signal vector. **(08 Marks)**

b. Obtain the decision rule for maximum likelihood decoding and explain the correlation receiver. **(08 Marks)**

**OR**

4 a. Explain the correlation receiver using product integrator and matched filter. **(08 Marks)**

b. Three signals $s_1(t)$, $s_2(t)$ and $s_3(t)$ are shown in Fig.Q.4(b). Apply Gram Schmidt procedure to obtain an orthonormal basis for the signals. Express signals $s_1(t)$, $s_2(t)$ and $s_3(t)$ in terms of orthonormal basis functions. **(08 Marks)**

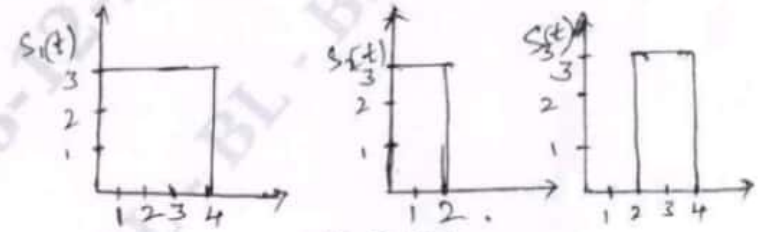


Fig.Q.4(b)

### Module-3

5 a. With necessary diagrams, explain the generation and reception of BPSK signal. **(10 Marks)**

b. Given the binary data 10010011, draw the BPSK and DPSK waveforms. **(06 Marks)**