G 1046 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

DIGITAL COMMUNICATION TECHNIQUES (L)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Explain the significance of complimentary error function.
2. Explain the methods to combat ISI with examples.
3. What is the need and principle of a Preset equalizer ? Explain.
4. Define and explain the parameters of eye pattern.
5. Define and explain the significance of BER and probability of error.
6. What is OOK modulation ? Explain it with its schematic diagram.
7. State and explain sampling theorem.
8. What is the principle and applications of DM ? Explain.
9. Define and explain noise.
10. A speech signal occupying the bandwidth of 300 Hz to 3 kHz is converted into PCM format for use in digital communication. If the sampling frequency is 8 kHz and each sample is quantized into 256 levels, what is the output bit rate ?

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 12 *marks.*

11. State and prove the properties of optimum transmitting and receiving filters.

Or

12. Explain the concept of base band binary data transmission system with a neat diagram.

Turn over

13. Explain the principle of zero forcing equalizer with a neat diagram. Explain its design details with an example.

Or

14. Explain the significance of eye pattern with neat diagrams. Also explain how PRBS is generated, with a diagram.

15. Compare and contrast different digital modulation formats. Derive probability of error for PSK and FSK modulation formats.

Or

16. Explain the QPSK format with diagrams. Bring out its mathematical representations.

17. (a) Explain A law and μ law in detail. (6 marks)

    (b) Explain the principle of compandar, in detail. (6 marks)

Or

18. Write technical notes on :

    (a) Quantization.

    (b) DPCM.

(6 + 6 = 12 marks)

19. Derive the relation the relation between noise figure and noise temperature. Explain their significances.

Or

20. Write technical notes on :

    (i) Detection of binary signals in Gaussian noise. (6 marks)

    (ii) Correlation realization of matched filter. (6 marks)

[5 × 12 = 60 marks]

G 1056 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering/Information Technology/Applied Electronics and Instrumentation Engineering/Electronics and Instrumentation Engineering

DIGITAL SIGNAL PROCESSING (LTAS)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Define signal flow graph. Draw the signal flow graph of first order digital filter.
2. Determine the order of low pass Butterworth filter that has 3 dB attenuation at 500 Hz and an attenuation of 40 dB at 1000 Hz.
3. What are the properties of FIR filters ?
4. Mention the necessary and sufficient condition for linear phase characteristics in FIR filter.
5. What are the differences and similarities between DIF and DIT algorithms ?
6. If H(k) is the N-point DFT of a sequence h (n), prove that H(k) and H (N-k) are complex conjugates.
7. Express the fraction (–7/32) in signed magnitude and two's complement notations using 6 bits.
8. Compare fixed point and floating point representations.
9. Explain sub band coding.
10. Write down the main features of DSP based instruments.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Consider a second order IIR filter with $H(z)=\frac{1}{(1-0.5z^{-1})(1-0.45z^{-1})}$. Find the effect on quantization on pole locations of the given system function in direct form and in cascade form. Take b = 3 bits.

Or

12. Explain lattice structure of IIR system.

Turn over

13. Using a rectangular window technique design a low pass filter with pass band gain of unity, cut off frequency of 1000 Hz and working at a sampling frequency of 5 kHz. The length of the impulse response should be 7.

Or

14. A band pass FIR filter of length 7 is required. If is to have lower and upper cut-off frequencies of 3 kHz and 5 kHz respectively. The sampling frequency is 24 kHz. Determine the filter coefficients using Hanning window. Assume the filter to be causal.

15. Discuss in detail the important properties of the Discrete Fourier Transform.

Or

16. Compute a 8 point DFT using DIT FFT radix z algorithm :

$X(n) = \{0.5, 0.5, 0.5, 0.5, 0, 0, 0, 0\}$.

17. Consider the truncation of negative fraction numbers represented in $(\beta + 1)$ – bit fixed point binary form including sign bit. Let $(\beta\text{-}b)$ bits be truncated. Obtain the range of truncation errors for signed magnitude, 2's complement and 1's complement representations of the negative numbers.

Or

18. Consider the transfer function $H(z) = H_1(z)H_2(z)$ where $H_1(z) = 1/\left(1 - a_1 z^{-1}\right)$ and $H_2(z) = 1/\left(1 - a_2 z^{-1}\right)$. Find the output round off noise power. Assume $a_1 = 0.5$ and $a_2 = 0.6$ and find output round off noise power.

19. Discuss in detail about (a) DSP based measurement system ; (b) Radar signal processing.

Or

20. Compare Channel vocoder and homomorphic vocoder.

(5 × 12 = 60 marks)

G 1065 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

RADIATION AND PROPAGATION (L)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. What is an isotropic radiator ? Compute its directivity.
2. Define radiation resistance. What is its significance ?
3. What are the features of pattern multiplication principle ? Explain.
4. What is the principle of binomial array ? Enumerate its features.
5. Differentiate V and Rhombic antenna.
6. What are the choice of substrate materials for Micorstrip antenna ?
7. Define Fading. Mention the types of fading.
8. Define 1. Skip Zone 2. Multihop propagation 3. Ray path.
9. Whatis Anochoic Chamber ? Explain the importance of it.
10. Why polar plot is preferred in antenna pattern measurement ? Explain.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 12 *marks.*

11. (a) Define and explain the parameters of an antenna.
    (b) Derive the radiation resistance of a Oscillating Electric Dipole.

Or

12. (a) State and prove Lorentz reciprocity theorem.
    (b) Derive FRIIS Transmission formula. Explain the applications of it.
13. (a) Explain the significance of an antenna array. Derive Antenna Array factor.
    (b) Discuss the pattern multiplication principle in detail with neat diagrams.

Or

Turn over

14. (a) Explain the development of folded dipole antenna from a 2 wire short circuited transmission line, with neat diagrams.

    (b) Explain the principle of operation of Offset feed parabolic reflector with a neat diagram.

15. Explain the construction of 2 element Yagi Uda antenna, with a diagram. Explain the applications and limitations of it. Derive Gain expression for 2 element Yagi Uda antenna.

Or

16. Explain the geometry and principle of operation of a rectangular microstrip antenna with a diagram. Explain the design details of an microstrip antenna.

17. (a) Discuss the factors involved in the propagation of radio waves.

    (b) Explain the 2 ray model of Space wave propagation with a diagram.

Or

18. (a) Explain the characteristics of sky waves. Also derive their characteristic equations.

    (b) Write a technical note on ""Duct Propagation".

19. Draw a neat block diagram for antenna Gain and radiation pattern measurement. Explain the procedure in detail.

Or

20. (a) Explain the SWR method of measuring antenna input impedance, with a neat block diagram.

    (b) Write short notes on "Antenna Indoor measurements".

(5 × 12 = 60 marks)

G 1427 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

EC 010 603—RADIATION AND PROPAGATION (EC)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Define Radiation Resistance.
2. Write short notes on plasma antennas.
3. State Reciprocity theorem.
4. What is meant by Radiation intensity ?
5. Define critical frequency.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain briefly about binomial arrays.
7. What is meant by fading ? What are the different types of fading ?
8. How will you measure impedance of an antenna ?
9. Write short notes on Maximum Usable Frequency (MUF).
10. Derive the equation for field strength of space wave.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Derive the power radiated and radiation resistance of half wave depole.

Or

Turn over

12. Write short notes on : (a) Effective height ; (b) Effective aperture and derive the relationship between effective aperture and directivity.

13. Derive the equation for field strength at a distant point due to n isotropic point sources.

Or

14. Define Broadside Array. How will you design a BSA cobat are the properties of BSA.

15. Explain the principle and working of Helical antenna.

Or

16. Explain briefly :

    (a) Microstrip antennas.

    (b) Yagi-Uda antenna.

17. Explain the effect of earth's magnetic field on effective dielectric constant of ionised regions.

Or

18. Write short notes on :

    (a) Skip distance ;

    (b) Virtual height ;

    (c) Diversity Reception.

19. How will you measure the directional pattern and gain of an antenna ?

Or

20. Define the steps to measure the range of an antenna.

(5 × 12 = 60 marks)

G 1441 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

EC 010 604—COMPUTER ARCHITECTURE AND PARALLEL PROCESSING (EC)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Discuss the differences between Architecture and Hardware.
2. What are the different types of division techniques ?
3. What is static RAM ?
4. What are Interconnection networks ?
5. What is SMPS ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain stored program concept.
7. Discuss the steps involved in the execution of a complete instruction.
8. Discuss the bus standards.
9. Explain the pipelining hazards.
10. Discuss dual core processors.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. (a) Explain Assemblers, Linkers and Loaders. (8 marks)

    (b) Discuss the functions of OS. (4 marks)

Or

Turn over

12. (a) Explain the concept of pipelining. (6 marks)

(b) Explain Multithreading in processors. (6 marks)

13. (a) Explain Microprogrammed control units. (8 marks)

(b) Discuss single bus and multibus organisation. (4 marks)

Or

14. (a) Explain Booth's algorithm. (8 marks)

(b) Explain Fast Adders. (4 marks)

15. (a) Explain MMU. (4 marks)

(b) Explain the different types of memories used in computer. (8 marks)

Or

16. Explain I/O accessing in detail.

17. (a) Explain the instruction sets for pipelining. (6 marks)

(b) Discuss how performance is enhanced by pipelining. (6 marks)

Or

18. (a) Explain Flynn's classification. (4 marks)

(b) Explain Message passing architecture. (8 marks)

19. Explain the block diagram and architecture of a common PC.

Or

20. Discuss the different types of storage devices.

[5 × 12 = 60 marks]

G 1456 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

EC 010 605—MICROCONTROLLERS AND APPLICATIONS (EC)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Represent the simplified internal architecture of 8051 with a neat diagram.
2. How should the following on-chip data memory locations be addressed ?
   (a) Lower 128 bytes from OOH to ⁻]FH.
   (b) Upper 128 bytes from 8OH to FFH.
   (c) Special function registers located within 8OH to FFH.
3. Mention the operating modes of timers in 8051 and state the reasons for having different modes.
4. What is meant by resolution in ADC ?
5. Give the features of program stack memory in PIC 18 micro-controller.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Compare the flags present in 8051 and 8085.
7. What is the maximum total size of data memory, which may be directly addressed by the 8752 micro-controller ? What type of address bus make it possible ? Explain.
8. Develop an ISR for low level sensitive INTI and then enable or disable it.
9. Write a note on the seven segments display interfacing.
10. State the significances of the important registers of PIC 18 micro-controller.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Elaborate on the Harvard architecture of 8051 with necessary diagrams.

Or

12. Explain the purpose of each pin of the 8051 micro-controller with a neat diagram.

13. Describe the major addressing modes of 8051 with suitable examples.

Or

14. Explain conditional branching instructions with suitable examples.

15. Discuss about the external interrupts of 8051 highlighting the three SFRs.

Or

16. Explain the functioning of Timer O and SFRs for Timer O.

17. Elaborate on the interfacing of DIP switch with 8051 with a neat diagram.

Or

18. Explain how a stepper motor can be interfaced to 8051 with a neat diagram.

19. Discuss about the memory organization of PIC 18 with necessary diagrams.

Or

20. Elaborate on the different addressing modes of PIC-18.

(5 × 12 = 60 marks)

G 1488 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

EC 010 606 L04—MEDICAL ELECTRONICS (Elective) (EC)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What are resting and action potentials ?
2. If a person eats a large meal, does his heart rate increase ? Why ?
3. List the types of modulations used in biotelemetry.
4. What do you understand by the term "blood count" ?
5. What are the advantages of NMR imaging systems ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the different types of needle electrodes.
7. Explain ECG and its waveform.
8. Draw and describe EEG waveform and the characteristics of sleep.
9. What are the applications of spirometers ? Explain with its applications.
10. Explain how are X-rays generated.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. (a) Distinguish between polarizable and non-polarizable electrodes. (4 marks)

    (b) Explain the theory of electrode-skin interface. (8 marks)

Or

Turn over

12. (a) Explain the different heart sounds in human body. (7 marks)

(b) Describe the functional organization of peripheral nervous system. (5 marks)

13. Anatomically describe the human heart and its functional valves with respect to its self excitatory SA node impulse formation and the fibre bundles. Correlate the ECG wave to the atrial/ventricular systole and diastole.

Or

14. (a) Explain the principle of cardiac pace maker. (6 marks)

(b) Describe any *one* type of defibrillator. (6 marks)

15. Describe the 10–20 lead system used in EEG and also explain the procedure to record the EEG signal.

Or

16. (a) Explain the classification of EEG based on the frequency bands. (7 marks)

(b) Discuss the human EEG patterns for different stages of sleep. (5 marks)

17. What are the requirements for a Bio-potential amplifier ? Explain with neat diagram, a flow-through system for continuous oxygen consumption measurement. Give an example of a portable servo controlled flow-through system for the same.

Or

18. Explain how pH of blood is measured using a pH glass electrode. What is a salt bridge and what are the buffer solutions ? Give the diagram for an AgCl electrode used in pH measurements.

19. With a neat block diagram explain CAT scanning. Differentiate between CT scanning and CAT scanning.

Or

20. Explain the working principle and applications of :

(i) Collimators and detectors and

(ii) Various types of displays used in medical imagining.

[5 × 12 = 60 marks]

G 1490 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

EC 010 606 L06—TELEVISION AND RADAR ENGINEERING (Elective I) [EC]

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What is flickering effect ? Explain.
2. What is the bandwidth needed colors signal transmission ? Explain.
3. Briefly explain about Wavetrap.
4. Explain the operation of delay line canceller.
5. What is 3D Radar ? Explain.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Write down the advantages and disadvantages of V.S.B. transmission.
7. Explain about the generation of chrominance signal.
8. Describe the working principle of 3DTV.
9. What are the different system lasses ? Explain.
10. With a block diagram explain the working of a simple radar.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Explain how the horizontal retrace period of 12 μs and vertical retrace of 20 line period is effectively utilized in 625 line TV system.

Or

12. With a neat block diagram explain the working of the sync processing part of a TV receiver.

Turn over

13. Using block diagram explain the working principle of NTSC coder.

Or

14. (a) Explain how differential phase error is overcome in PAL system. (6 marks)

(b) Write down the merits and demerits of SECAM system. (6 marks)

15. With a neat block diagram explain about digital transmission. Also write the advantages.

Or

16. (a) Give an account on cable distribution system. (8 marks)

(b) What is the need of scrambling in cable TV transmission ? Explain. (4 marks)

17. With a neat schematic diagram, explain the working of conical scan method tracking.

Or

18. (a) Explain the working principle of non coherent MTI radar. (7 marks)

(b) Make a comparison of different trackers. (5 marks)

19. (a) Explain the working of electronically steered phased array antenna. (8 marks)

(b) Describe about lens antenna. (4 marks)

Or

20. Give a detailed account on different radar displays.

[5 × 12 = 60 marks]

G 1409 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Applied Electronics and Instrumentation/Electronics and Communication/ Electronics and Instrumentation Engineering (AI, EC, EI)

AI 010 602/ EC 010 602 and EI 010 602—DIGITAL SIGNAL PROCESSING

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. List out any *four* properties of z-transform.
2. Distinguish between minimum and non-minimum phase system.
3. Physically realizable and stable IIR filters cannot have linear phase. Why ?
4. What is frequency warping ?
5. List out any *four* comparison between linear convolution and circular convolution.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Determine the z-transform and region of convergence of the sequence.

   (a) $\left(\frac{1}{2}\right)^n u[-n]$.

   (b) $\delta[n+1]$.

7. Determine the frequency response of a system with single zero and pole.
8. Realize $y(n) + y(n+1) + \frac{1}{4} y(n-2) = x(n)$ in cascade form.

Turn over

9. Convert the analog filter with system function $H_a(s)$ into digital filter using impulse invariance method. Assume T = 0.2S.

$$H_a(s) = \frac{16(s+2)}{(s+3)(s^2+2s+5)}.$$

10. Determine the response of the LTI system whose input $x(n)$ and impluse response $h(n)$ are given by :

$x(n) = \{4, 3, 2, 1\}$; $h(n) = \{1, 2, 3, 4\}$.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Explain the process of changing the sampling rate in the discrete-time operation.

Or

12. What is aliasing ? Explain the reconstruction of a band limited signal from its samples.

13. A discrete-time causal LTI system has the system function.

$$H(z) = \frac{\left(1+0.2z^{-1}\right)\left(1-9z^{-2}\right)}{\left(1+0.81z^{-2}\right)}.$$

(a) Is the system stable.

(b) Find expression for a minimum phase system $H_1(z)$ and an all pass system $H_{ap}(z)$ such that $H(z) = H_1(z)\, H_{ap}(z)$.

Or

14. Explain the properties of minimum phase system.

15. Obtain an analog Chebyshev filter transfer function that satisfies the constraints :

$$\frac{1}{\sqrt{2}} \le |H(j\Omega)| \le 1 \; ; \quad 0 \le \Omega \le z$$
$$|H(j\Omega)| < 0.1 \; ; \quad \Omega \ge 4.$$

Or

16. A causal linear time invariant system is given by :

$$H(z) = \frac{1+2z^{-1}+z^{-2}}{1-\frac{3}{4}z^{-1}+\frac{1}{8}z^{-2}}.$$

Draw the signal flow graphs for implementation of the system in each of the forms :

(i) Direct form I.

(ii) Direct form II.

(iii) Cascade of first order systems.

17. Design a Chebyshev low pass filter with the specifications $\alpha_p = 1\,dB$ ripple in the passband $0 \le \omega \le 0.2\,\pi$, $\alpha_s = 15\,dB$ ripple in the stop band $0.3\pi \le \omega \le \pi$ using bilinear transformation.

Or

18. Design a band stop filter to reject frequencies in the range 1 to 2 rad/sec using rectangular window with N = 7.

19. Compute 8 point DFT of : $x(n) = \{2, 2, 2, 2, 1, 1, 1, 1\}$ using radix – 2 DIT FFT.

Or

20. Perform linear convolution of the following sequences by : (i) Overlap add method ; and (ii) Overlap save method.

$x[n] = \{-1, 1, 2, -1, 1, 2, -1, 1, -1\}$ and $h[n] = \{2, 3, -2\}$.

(5 × 12 = 60 marks)

G 1403 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

EC 010 601—DIGITAL COMMUNICATION TECHNIQUES (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

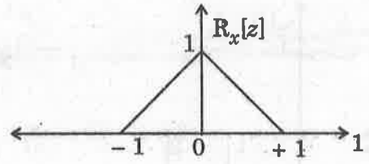
Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. An auto correlation function of a wide sense stationary process X (t) is shown below. Find the power spectral density S_x (f) of the random process X (t).



2. What are the main three properties of the matched filter receiver ?
3. A computer outputs binary data at the rate of 50 kbps that is transmitted using a baseband binary PAM system, which is designed to have a raised cosine pulse spectrum. Find the transmission bandwidth required for a roll-off factor of $\alpha = 0.8$.
4. How the eye diagram is formed using CRO ?
5. Write a short note on M-ary system.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Write Gram Schimdt procedure steps for finding the orthonormal basis functions for N = 2.
7. Describe the working of a non-coherent receiver.

Turn over

8. Describe the working of a DPCM transmitter and receiver.

9. Sketch NRZ-bipolar, RZ-unipolar, Manchester and Differential Manchester line codes for the bit stream 011011.

10. Describe coherent MSK system with necessary diagrams.

(5 × 5 = 25 marks)

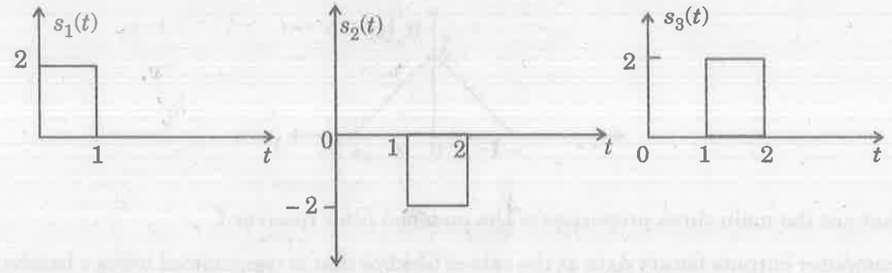
Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Explain auto-correlation and power spectral density of a stationary random process along with its properties.

Or

12. Apply Gram Schmidt orthogonalisation to obtain ortho normal basis functions for the signals shown below. Express the signals in terms of ortho normal basis functions.



13. How the known signals can be detected in noise using an ML-receiver ?

Or

14. Derive the expression for probability of error calculation in a matched filter receiver.

15. Explain sampling procedure mathematically along with derivation of interpolation formula.

Or

16. Explain PCM and derive the SNRo of PCM system.

17. Explain the practical Nyquist's solution for controlled ISI and write short note on Nyquist filter and Nyquist pulse shaping function.

Or

18. Explain carrier synchronization and symbol synchronization technique.

19. Explain MPSK waveform generator and MPSK receiver.

Or

20. Explain generation and detection of BFSK.

(5 × 12 = 60 marks)