V. V. Sangha's

Rao Bahadur Y. Mahabaleswarappa Engineering College

Cantonment, Ballari – 583104, Karnataka

Department of Electronics & Communication Engineering

SUBJECT: DIGITAL COMMUNICATION

CODE: 18EC61

Academic Year

2020 - 2021

EVEN SEM

CONTENT

VISION AND MISSION OF THE INSTITUTE AND DEPARTMENT

VISION OF THE INSTITUTION

To Produce Professionally Excellent, Knowledgeable, Globally Competitive and Socially Responsible Engineers and Entrepreneurs.

MISSION OF THE INSTITUTION

M1	To Provide Quality Education in Engineering and Management.
M2	To Establish a Continuous Industry-Institute Interaction, Participation and Collaboration to Contribute Skilled Engineers.
M3	To Develop Human Values, Social Values, Entrepreneurship Skills and Professional Ethics among the Technocrats.
M4	To Focus on Innovation and Development of Technologies by Engaging in Cutting Edge Research areas.

VISION OF THE DEPARTMENT

To Produce Professionally Excellent, Knowledgeable, Globally Competitive and Socially Responsible Electronics and Communication Engineers and Entrepreneurs.

MISSION OF THE DEPARTMENT

M1	To Provide Quality Education in Electronics and Communication Engineering.
M2	To Establish a Continuous Industry-Institute Interaction, Participation and Collaboration to Contribute Skilled Electronics and Communication Engineers.
M3	To Develop Human Values, Social Values, Entrepreneurship Skills and Professional Ethics among the Technocrats.
M4	To Focus on Innovation and Development of Technologies by Engaging in Electronics and Communication Research areas.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1	Graduates of Electronics & Communication Engineering course will have successful professional career.
PEO2	Graduates of Electronics & Communication Engineering course will pursue higher education or to become an Entrepreneur.
PEO3	Graduates of Electronics & Communication Engineering course will have ability for lifelong learning and to serve the society.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO 1	Ability to Design, Develop and Test the Electronics Circuits & Communication Systems.
PSO 2	Ability to Develop Excellent Programming and Problem Solving skills in the field of Embedded System.

Academic Calendar of EVEN semesters of UG Programmes for 2020-2021

Semesters / EVENTS	IV semester B.E./B.Tech.	IV semester B.Arch./ B.Plan.	VI semester B.E./B.Tech.	VI semester B.Plan./B.Arch	VIII semester B.E./B.Tech.	VII semester B.Plan./B.Arch.
Commencement of EVEN Semester	19.04.2021	19.04.2021	19.04.2021	19.04.2021	19.04.2021	19.04.2021
Last Working day of EVEN Semester	07.08.2021	07.08.2021	07.08.2021	07.08.2021	20.07.2021	20.07.2021
Practical Examinations	09.08.2021 To 19.08.2021	09.08.2021 To 19.08.2021	09.08.2021 To 19.08.2021	---	---	---
Theory Examinations	23.08.2021 To 09.09.2021	23.08.2021 To 09.09.2021	23.08.2021 To 09.09.2021	10.08.2021 To 31.08.2021	#22.07.2021 To 30.07.2021	#22.07.2021 To 30.07.2021
Internship	---	---	---	---	---	---
Internship Viva-Voce	---	---	---	---	02.08.2021 To 06.08.2021	---
Professional training / Organization study	---	---	---	---	---	---
Commencement of ODD Semester	13.09.2021	13.09.2021	13.09.2021	13.09.2021	---	09.08.2021 (IX sem Arch)

- The classroom sessions for even the semester should commence from the dates mentioned above. The classroom sessions for all the semesters would be in **Offline /Online/blended mode** until further orders.
- The Institute needs to function for **six days** a week with additional hours (**Saturday is a full working day).** #if required the college can plan to have extra classes even on **Sundays also**.
- If any of the above dates are declared to be a holiday then the corresponding event will come into effect on the next working day.
- Notification regarding the Calendar of Events relating to the conduct of **University Examinations** will be issued by the Registrar (Evaluation) from time to time.
- The faculty/staff shall be available to undertake any work assigned by the University.
- Academic Calendar may be modified based on guidelines/directions issued in the future by MHRD/UGC/AICTE/State Government.
- Revised Academic Calendar is also applicable for **Autonomous Colleges.** In case if any changes are to be affected by Autonomous Colleges in the academic terms and examination schedule, they could do so with the approval of the University.

17/6/2021.

REGISTRAR

RaoBahadur Y Mahabaleswarappa Engineering College, Ballari

Department of Electronics and Communication Engineering

Academic Calendar of Events
EVEN Semester 2020-21(April 2021-Sept 2021)

	III, V& VII Sem B.E/B.Tech
Pre Placement Training	For VI Semester Students of all Branches from 20th to 25th Sep 2021
Commencement of ODD Semester	19th April 2021
Admission Publicity in and around Ballari	March 2021
Six Days National Webinar on **"Intellectual Property Rights and IP Management for Start - up"** by Mrs. Priyadarshini Singh ,Research Scholar	26th April to 1st may
I Internal Assessment Test	10th, 11th & 12th June 2021 (Thu, Fri & Sat-Online)
Last date for sending IA Marks (SMS)	14st June 2021
Parents Meet	15h June 2021
2nd International Virtual Conference on **"Futuristic Trends in Embedded Systems and Networking" ICFTEN 2021** in association with IFERP and RYMEC	7th-8th July 2021
II Internal Assessment Test	16th, 17th & 18th July 2021 (Tue, Wed & Thu-Online)
Last date for sending IA Marks (SMS)	19th July 2021
Parents Meet	20th July 2021
Department forum "Talentronics"	2nd August 2021
Current Covid 19 Situation and How to Overcome All Diseases by Dr. Khadar Vali	2nd August 2021
Mini project exhibition for 8th sem students	4th august 2021
Farewell day for final year students	8th August 2021
Six Days Workshop on **Basics of Machine Learning using Python**	30th August to 4th Sept 2021
III Internal Assessment Test	12th,13th &14th August 2021(Thu, Fri & Sat-Online)
Last date for sending IA Marks (SMS)	15th August 2021
Mini project exhibition for 6th sem students	18th august 2021
Parents Meet	16th August 2021
Last Working Day	**07/08/2021**
Practical Examination	09/08/2021 to 19/08/2021
Theory Examination	23/08/2021 to 09/09/2021
NBA SAR audit by Ms. Manisha .	7th Sept 2021
NAAC Presentation by DR H Girish ,Coordinator and Dean	13th Sept 2021
Commencement of EVEN Semester	**13/09/2021**

Head of the Department
Electronics & Communication Engg.
R. Y. M. Engineering College,
(Formerly Vijayanagar Engg. College)
BELLARY-583 104.

COURSE EVALUATION AND ASSESSMENT SCHEME-2018

	What		To Whom	When/ Where (Frequency in the course)	Max Marks	Evidence Collected
Direct Assessment Methods	IA	Internal Assessment Tests	Students	Thrice(Average of three IA Tests)	30	Blue Books
		Assignment		Thrice(Before IA Test and average of 3 is taken)	10	Assignment Books
		Practical Assessment		Once	40	Practical evaluation
	FE	Final Examination		End of Course (Answering One of two questions from five Modules	100	Result sheet
		Practical Examination		One question from lot	100	Result sheet
Indirect Assessment Methods	Students Feedback		Students	End of the course	-	Questionnaire
	Course Exit Survey					

Questions for IA and FE will be designed to evaluate the various educational components (Bloom's taxonomy)

COURSE EVALUATION AND ASSESSMENT SCHEME-2017

	What		To Whom	When/ Where (Frequency in the course)	Max Marks	Evidence Collected
Direct Assessment Methods	IA	Internal Assessment Tests	Students	Thrice(Average of three IA Tests)	30	Blue Books
		Assignment		Thrice(Before IA Test and average of 3 is taken)	10	Assignment Books
		Practical Assessment		Once	40	Practical evaluation
	FE	Final Examination		End of Course (Answering One of two questions from five Modules)	100	Result sheet
		Practical Examination		One question from lot	100	Result sheet
Indirect Assessment Methods	Students Feedback		Students	End of the course	-	Questionnaire
	Course Exit Survey					

Questions for IA and FE will be designed to evaluate the various educational components (Bloom's taxonomy)

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI

Department of Electronics and Communication Engineering

COURSE PLAN 2020-21 (EVEN)

Staff Name: Mrs ANITHA A /Mrs Manasa K.C	**Course Type: Core/ Elective(Open/Professional)**	**Sem / Sec: 6th SEM A/B**
Course Name: DC	**Course Code:18EC61**	**Total Number of Lecture Hours:50**
Max marks:50	**Prerequisites:** S&S,PCS,DE	

Sl.No	Module Name	Lecture Hours Required
01	Bandpass Signal to Equivalent Lowpass: Line codes:	**10**
02	Signaling over AWGN Channels-	**10**
03	Digital Modulation Techniques:	**10**
04	Communication through Band Limited Channels:	**10**
05	Principles of Spread Spectrum:	**10**

Sl.No	Date	Time	Topic to be Covered
1	19/4/21	9:30-10:30	**Module 1**:Hilbert transform
2	20/4/21	11:30-12:30	Pre envelopes, Complex envelopes,
3	21/4/21	3:00-4:00	Canonical representation of bandpass signals,
4	19/4/21	9:30-10:30	Complex low pass representation of bandpass systems,
...5..	20/4/21	11:30-12:30	Complex representation of band pass signals and systems
6	21/4/21	3:00-4:00	**Line codes:** Unipolar, Polar, Bipolar (AMI) and
7	26/4/21	9:30-10:30	Manchester code
8	27/4/21	11:30-12:30	Their power spectral densities
9	28/4/21	3:00-4:00	problems
10	3/5/21	9:30-10:30	**Module2:Signaling over AWGN Channels-** Introduction, Geometric
11	4/5/21	11:30-12:30	Gram-Schmidt Orthogonalization procedure,
12	5/5/21	3:00-4:00	Conversion of the continuous AWGN channel into a vector channel,
13	10/5/21	9:30-10:30	Optimum receivers using
14	11/5/21	11:30-12:30	coherent detection: ML Decoding,
15	12/5/21	3:00-4:00	Correlation receiver, matched filter receiver
16	17/5/21		problems
17	18/5/21	9:30-10:30	**Module3:Digital Modulation Techniques**: Phase shift Keying techniques using coherent detection
18	19/5/21	11:30-12:30	generation, detection and error probabilities of BPSK
19	24/5/21	3:00-4:00	QPSK, M–ary PSK
20	25/5/21	9:30-10:30	M–ary QAM Frequency shift keying techniques using Coherent detection: BFSK
21	26/5/21	11:30-12:30	Problems and derivations
22	31/5/21	3:00-4:00	generation, detection and error probability
23	1/6/21	9:30-10:30	Non coherent orthogonal modulation techniques: BFSK, DPSK Symbol representation
24	2/6/21	11:30-12:30	Block diagrams treatment of Transmitter and Receiver,
25	7/6/21	3:00-4:00	Probability of error (without derivation of probability of error equation
26	8/6/21	9:30-10:30	**Module4: Communication through Band Limited Channels**: Digital Transmission through Band limited channels:
27	9/6/21	11:30-12:30	Digital PAM Transmission through Band limited Channels
28	14/6/21	3:00-4:00	Signal design for Band limited Channels:
29	15/6/21	9:30-10:30	Design of band limited signals with controlled ISI-Partial Response signals,
30	17/6/21	11:30-12:30	Probability of error for detection of Digital PAM
31	21/6/21	3:00-4:00	Design of band limited signals for zero ISI–The Nyquist Criterion (statement only),
32	22/6/21	9:30-10:30	problems
33	23/6/21	11:30-12:30	PSK,FSK,ASK
34	28/6/21	3:00-4:00	PSK,FSK,ASK DERIVATIONS
35	29/6/21	9:30-10:30	Symbol–by–Symbol detection of data with controlled ISI
36	30/6/21	11:30-12:30	Probability of error for

			detection of Digital PAM with Zero ISI
37	5/7/21	3:00-4:00	problems
38	6/7/21	9:30-10:30	**Module5:Principles of Spread Spectrum:** Spread Spectrum Communication Systems,
39	7/7/21	11:30-12:30	: Model of a Spread Spectrum Digital Communication System
40	12/7/21	3:00-4:00	Direct Sequence Spread Spectrum Systems
41	13/7/21	9:30-10:30	Effect of De-spreading on a narrowband Interference
42	14/7/21	11:30-12:30	Probability of error (statement only),
43	19/7/21	3:00-4:00	Some applications of DS Spread Spectrum Signals,
44	20/7/21	9:30-10:30	Ds spread spectrum with and without priority
45	21/7/21	11:30-12:30	Ds spread spectrum with and without priority problems
46	22/7/21	3:00-4:00	Generation of PN Sequences, Frequency Hopped Spread Spectrum,
47	26/7/21	9:30-10:30	CDMA based on IS-95
48	27/7/21	11:30-12:30	CDMA based on IS-95 apllications
49	28/7/21	3:00-4:00	Problems
50	28/7/21	3:00-4:00	Discussion of all the modules briefly

Teaching and Learning Tools: Blackboard/PowerPoint presentation/webinar/lab

Text Books:

1. **Simon Haykin, "Digital Communication Systems", John Wiley & sons**, First Edition, 2014, ISBN 978-0-471-64735-5.

2. **John G Proakis and Masoud Salehi, "Fundamentals of Communication Systems"**, 2014 Edition, Pearson Education, ISBN 978-8-131-70573-5.

Reference Books:

1. **B.P.Lathi and Zhi Ding, "Modern Digital and Analog communication Systems"**, Oxford University Press, 4th Edition, 2010, ISBN: 978-0-198-07380-2.
2. **Ian A Glover and Peter M Grant, "Digital Communications"**, Pearson Education, Third Edition, 2010, ISBN 978-0-273-71830-7.
3. **John G Proakis and Masoud Salehi, "Communication Systems Engineering"**, 2nd Edition, Pearson Education, ISBN 978-93-325-5513

Digital Library/E-Resources:

1. URL: http://delnet.nic.in
2. Click the link : http://103.44.2.243/

Innovative Practices:

1. **Presentation by students and mini project**
2. **DC Quiz**

Note: Planning of syllabus is done as per VTU curriculum

Staff Signature **HOD, ECE**

			detection of Digital PAM with Zero ISI
37	5/7/21	3:00-4:00	problems
38	6/7/21	9:30-10:30	**Module5:Principles of Spread Spectrum:** Spread Spectrum Communication Systems,
39	7/7/21	11:30-12:30	: Model of a Spread Spectrum Digital Communication System
40	12/7/21	3:00-4:00	Direct Sequence Spread Spectrum Systems
41	13/7/21	9:30-10:30	Effect of De-spreading on a narrowband Interference
42	14/7/21	11:30-12:30	Probability of error (statement only),
43	19/7/21	3:00-4:00	Some applications of DS Spread Spectrum Signals,
44	20/7/21	9:30-10:30	Ds spread spectrum with and without priority
45	21/7/21	11:30-12:30	Ds spread spectrum with and without priority problems
46	22/7/21	3:00-4:00	Generation of PN Sequences, Frequency Hopped Spread Spectrum,
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49	28/7/21	3:00-4:00	Problems
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Staff Signature

HOD, ECE

Electronics & Communication Engg.
R.Y.M. Engineering College,
(Formerly Vijayanagar Engg. College)
BELLARY-583 104.

V.V.Sangha's

RAO BAHADUR Y MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI

Department of Electronics & Communication Engineering

Time Table

Staff Name: Manasa. K. Chigateri	**Sem :** 6th **Sec:** B
Course Name: Digital Comm / DSS(P)	**Course Code:** 18EC61 / 15/17ECL654
Lab Name: Communication Lab	**Code:** 18ECL67

ONLINE

Day	9am-9:55am	9:55am-10:50am	10:50am-11:00am	11.00am-11.55am	11.55am-12.50pm	12.50pm-2.15pm	2.15pm-3.10pm	3.10pm-4.05pm	4.05pm-5pm
Monday	← DC →		BREAK			BREAK			
Tuesday				← DC →					
Wednesday							← DC →		
Thursday	← DSS →								
Friday				← DSS →					
Saturday							← DSS →		

BE 2018 Scheme Sixth Semester EC Syllabus

B. E. (EC / TC)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
SEMESTER – VI

DIGITAL COMMUNICATION

Course Code	**18EC61**	**CIE Marks**	**40**
Number of Lecture Hours/Week	**03 + 02 (Tutorial)**	**SEE Marks**	**60**
		Exam Hours	**03**

CREDITS – 04

Course Learning Objectives: This course will enable students to:

- Understand the mathematical representation of signal, symbol, and noise.
- Understand the concept of signal processing of digital data and signal conversion to symbols at the transmitter and receiver.
- Compute performance metrics and parameters for symbol processing and recovery in ideal and corrupted channel conditions.
- Compute performance parameters and mitigate channel induced impediments in corrupted channel conditions.

Module-1	RBT Level
Bandpass Signal to Equivalent Low pass: Hilbert Transform, Pre-envelopes, Complex envelopes, Canonical representation of bandpass signals, Complex low pass representation of bandpass systems, Complex representation of band pass signals and systems **(Text 1: 2.8, 2.9, 2.10, 2.11, 2.12, 2.13).** **Line codes:** Unipolar, Polar, Bipolar (AMI) and Manchester code and their power spectral densities **(Text 1: Ch 6.10).** Overview of HDB3, B3ZS, B6ZS **(Ref. 1: 7.2)**	**L1,L2,L3**
Module-2	
Signaling over AWGN Channels- Introduction, Geometric representation of signals, Gram-Schmidt Orthogonalization procedure, Conversion of the continuous AWGN channel into a vector channel, Optimum receivers using coherent detection: ML Decoding, Correlation receiver, matched filter receiver **(Text 1: 7.1, 7.2, 7.3, 7.4).**	**L1,L2,L3**
Module – 3	
Digital Modulation Techniques: Phase shift Keying techniques using coherent detection: generation, detection and error probabilities of BPSK and QPSK, M–ary PSK, M–ary QAM **(Relevant topics in Text 1 of 7.6, 7.7).** Frequency shift keying techniques using Coherent detection: BFSK generation, detection and error probability **(Relevant topics in Text 1 of 7.8).** Non coherent orthogonal modulation techniques: BFSK, DPSK Symbol representation, Block diagrams treatment of Transmitter and Receiver, Probability of error (without derivationof probability of error equation) **(Text 1: 7.11, 7.12. 7.13).**	**L1,L2,L3**
Module-4	
Communication through Band Limited Channels: Digital Transmission through Band limited channels: Digital PAM Transmission through Band limited Channels, Signal design for Band limited Channels: Design of band limited signals for zero ISI–The Nyquist Criterion (statement only), Design of band limited signals with controlled ISI-Partial Response signals, Probability of error for detection of Digital PAM: Probability of error for detection of Digital PAM with Zero ISI, Symbol–by–Symbol detection of data with controlled ISI **(Text 2: 9.1, 9.2, 9.3.1, 9.3.2).** Channel Equalization: Linear Equalizers (ZFE, MMSE), **(Text 2: 9.4.2).**	**L1,L2,L3**
Module-5	
Principles of Spread Spectrum: Spread Spectrum Communication Systems: Model of a Spread Spectrum Digital Communication System, Direct Sequence Spread Spectrum Systems, Effect of De-spreading on a narrowband Interference, Probability of error (statement only), Some applications of DS Spread Spectrum Signals, Generation of PN Sequences, Frequency Hopped Spread Spectrum, CDMA based on IS-95 **(Text 2: 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.5, 11.4.2).**	**L1,L2,L3**
Course Outcomes: At the end of the course, the students will be able to: • Associate and apply the concepts of Bandpass sampling to well specified signals and channels. • Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels.	

• Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels. • Demonstrate that bandpass signals subjected to corruption and distortion in a bandlimited channel can be processed at the receiver to meet specified performance criteria.	

Question paper pattern:

- Examination will be conducted for 100 marks with question paper containing 10 full questions, each of 20 marks.
- Each full question can have a maximum of 4 sub questions.
- There will be 2 full questions from each module covering all the topics of the module.
- Students will have to answer 5 full questions, selecting one full question from each module.
- The total marks will be proportionally reduced to 60 marks as SEE marks is 60.

Text Books:

1. Simon Haykin, "Digital Communication Systems", John Wiley & sons, First Edition, 2014, ISBN 978-0-471-64735-5.
2. John G Proakis and MasoudSalehi, "Fundamentals of Communication Systems", 2014 Edition, Pearson Education, ISBN 978-8-131-70573-5.

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3. Bernard Sklar and Ray, "Digital Communications - Fundamentals and Applications", Pearson Education, Third Edition, 2014, ISBN: 978-81-317-2092-9.

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
DEPARTMENT OF ELECTRONICS &COMMUNICATIONENGINEERING

Name of the Staff: Mrs. ANITHA A / MANASA K CHIGATERI				
Course Name: DIGITAL COMMUNICATION				
Course Code: 18EC61	**Sem:**	**6**	**Year**	**2020-21**

COURSE OUTCOME STATEMENTS	
	At the end of the course, students will be able to ….
CO309.1	Outline the concepts of Bandpass sampling to well specified signals and channels.(L2)
CO309.2	Illustrate the performance parameters of signaling over AWGN channels.(L2)
CO309.3	Have detailed understanding of digital communication basics including matched filters, signal space methods and optimal receiver design. (L1)
CO309.4	Demonstrate that bandpass signals subjected to corruption and distortion in a band limited channel can be processed at the receiver to meet specified performance criteria.(L3)
CO309.5	Explain the principle operation of spread spectrum modulation scheme.(L2)

CO-PO/PSO Mapping

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO309.1	3	3											2	
C0309.2	2	2	3	3									2	
CO309.3	2		2	3									3	
CO309.4	2	3	2										2	
CO309.5	2	3	2										3	
AVG	**2.20**	**2.75**	**2.25**	**3.00**									**2.40**	

CO	PO	Mapping	Justification
C309.1	PO1	3	Apply the basic knowledge of communication systems and used to derive the bandpass signals.
	PO2	3	Identifying the suitable method to define the properties of bandpass signals.
	PSO1	2	Students are able to design complex envelops of bandpass signals and systems together.
C309.2	PO1	2	Apply the knowledge of mathematics and engineering fundamentals to derive the modulation techniques.
	PO2	2	Students are able to identify the modulation techniques like BPSK,FSK,ASK etc and analyze complex engineering problems .
	PO3	3	Students are able to design different kinds of modulation techniques like ASK,FSK,PSK,BPSK,QPSK and also able to solve the complex problems.
	PO4	3	Able to design and also make the different research works and also able to design experiments based on the modulation techniques.
	PSO1	2	Ability to design and develop in communication systems
C309.3	PO1	2	Apply the knowledge of the mathematics and fundamental to derive and solve the optimum receiver problems
	PO3	2	Design solutions for complex engineering problems and designs system for the matched filters and optimal receivers
	PO4	3	Based knowledge and research methods including design for signal spacing methods
	PSO1	3	Ability to design and develop matched filter in communication systems
C309.4	PO1	2	Apply the knowledge of digital electronics to design and solve the line code problems
	PO2	3	identify the line code method and solve the complex problems
	PO3	2	Design solutions for complex engineering problems and design the system for line codes and spread spectrum modulation
	PSO1	2	Design and develop the line codes and spread spectrum modulation in communication system
C309.5	PO1	2	Apply the knowledge of digital electronics circuits & to design the types of Spread spectrum systems.
	PO2	3	Identify the PN sequence method and solve the complex problems.
	PO3	2	Design solutions for complex engineering problems and design the system for line codes and spread spectrum modulation
	PSO1	3	Design and develop the line codes and spread spectrum modulation in communication system

Course Coordinator

Staff Signature

Department of Electronics & Communication Engg. R.Y.M. Engineering College (Formerly Vijayanagar Engg. College) BELLARY-583 104

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
DEPARTMENT OF ELECTRONICS &COMMUNICATIONENGINEERING

CO Analysis

Name of the Staff: Mrs. Anitha , Mrs. Manasa K Chigateri				
Course Name: Digital Communication				
Course Code: 18EC61	**Sem: EVEN**	**6**	**Year**	**2020-21**

CO's	Description
C390.1	Outline the concepts of Bandpass sampling to well specified signals and channels.(L2) **Action: Outline** **Knowledge:** • Concept of Bandpass sampling • Specified signals and channels. **Condition:** None **Criterion:** None
C390.2	Illustrate the performance parameters of signaling over AWGN channels.(L2) **Action:** Illustrate **Knowledge:** Performance parameters of signaling over AWGN. **Condition:** None **Criterion:** None
C390.3	Have detailed understanding of digital communication basics including matched filters, signal space methods and optimal receiver design. (L1). **Action:** Have **Knowledge:** • Understanding of digital communication basics. • matched filters, • signal space methods • Optimal receiver design. **Condition:** None **Criterion:** None
C390.4	Demonstrate that bandpass signals subjected to corruption and distortion in a band limited channel can be processed at the receiver to meet specified performance criteria(L3). **Action:** Demonstrate **Knowledge:** Understanding of bandpass signals subjected to corruption and distortion. **Condition:** None **Criterion:** None
C390.5	Explain the principle operation of spread spectrum modulation scheme.(L2) **Action:** Explain **Knowledge:** Understanding the principle operation of spread spectrum modulation scheme **Condition:** None **Criterion:** None

Course Coordinator

Electronics & Communication Engg. RYMEC. Ballari. C.C.

Staff Signature

Department of
Electronics & Communication Engg
R.Y.M. Engineering College,
(Formerly Vijayanagar Engg. College)
BELLARY-583 104.

(ONLINE)

Rao Bahadur .Y. Mahabaleshwarappa Engineering College Bellary

Dept ECE	2020 - 2021	Title: Report on Syllabus S tatus

REPORT ON SYLLABUS STATUS

Semester	Branch	Subject	Section	Name of the Staff
6	ECE	DC	A	Mrs. Manasa. K. Chigateri

Sl.No	Date	Period	Topics Covered	Remarks
01	19/4/21	1st	Introduction to Digital Comm.	Module 1 completed
02	20/4/21	2nd	Block diagram of DC Basics	
3	26/4/21	1st	Module 5: Spread spectrum System	
4	27/4/21	2nd	DSSS & problems	
5	28/4/21	3rd	Applications of DSSS	
6	3/5/21	1st	Frequency hopped spread Spectr	
7	4/5/21	2nd	problems & applications of FHSS	
8	5/5/21	3rd	CDMA Explanation	
9	10/5/21	1st	Module 2: AWGN Channels Introdu	Module 2 Completed
10	11/5/21	2nd	Geometric representation of s	
11	12/5/21	3rd	Gram schmidt orthogonal procedure	
12	17/5/21	1st	Conversion, coherent detection	
13			Receiver, ML decoding	
14	18/5/21	2nd	Correlation receiver & Matched	
15			filter	
16	19/5/21	3rd	Module 3: Bpsk BSK, psk modula	Module 3 completed
17			-tion techniques	
18	24/5/21	1st	Generation detection error	
19			probability of Bpsk, Qpsk, Mary	
20			psk, Bpsk	
21	25/5/21	2nd	Non coherent modulation schem	
22	2		Bpsk, Dpsk, symbol representa	
23	26/5/21	3rd	Transmitter & Receiver block diagram	
24	31/5/21	1st	Module 4: Introduction to	Module 4
25	~~1/6/21~~		Hilbert Transform, properties	
26	1/6/21	2nd	pre-envelopes, Complex envelope	
27	3/6/21	3rd	Canonical representation of band	
28			pass Signals, Complex Represen-	
29			-tations of Bp and system	

Signature
Staff In-charge
Manasa. K. Chigateri
Name of the Staff

Signature
Head of the Department

Rao Bahadur .Y. Mahabaleshwarappa Engineering College Bellary

Dept ECE	2020 - 2021	Title: Report on Syllabus S tatus

REPORT ON SYLLABUS STATUS

Semester	Branch	Subject	Section	Name of the Staff
6	ECE	DC	A	Mrs. Manasa. K. Chyalari

Sl.No	Date	Period	Topics Covered	Remarks
30	7/6/21	1st	Line codes (unipolar, polar, Bi-polar Manchester coding power spectral densities & problems	Module 1 Completed
31	14/6/21	1st		
32	15/6/21	2nd	Module 4: Communication through Band limited Channels Digital PAM	
33	16/6/21	3rd	Block diagram of PAM & its Equation	
34	21/6/21	1st	Signal design for Band limited Channels & its Eye pattern	
35	22/6/21	2nd	Controlled ISI - Partial Response Signals.	
36	23/6/21	3rd	probability error of PAM	
37	28/6/21	1st	The Nyquist Criterion and problems discussions	
38	29/6/21	2nd	PSK, DPSK, ASK detection	
39	30/6/21	3rd	Symbol by Symbol detection of Data Controlled ISI	
40				
40	5/7/21	1st	probability error for Digital PAM	
42	12/7/21	1st	problems on ASK, FSK & PSK	
43	14/7/21	2nd	Discussion on IA papers & Assignments	
44	19/7/21	1st	problems on Module 3	
45	20/7/21	2nd	Clearing doubts about M1&M2	
46	21/7/21	3rd	Clearing doubts about M3, M4 & M5	

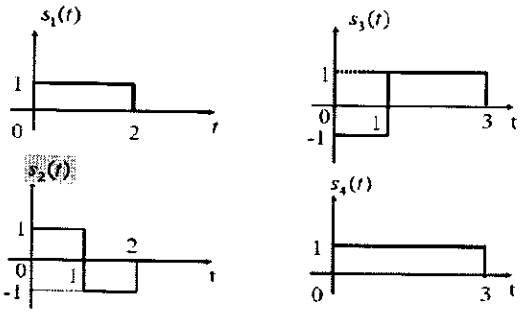
Signature
Staff In-charge
MANASA. K. C.
Name of the Staff

Signature
Head of the Department

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BELLARY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

DC ASSIGNMENT -I (2020-21 EVENSEM)

Staff Name: Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A**
Course Name: DIGITAL COMMUNICATION	**Course Code: 18EC61**	**Date:16/05/2021 Time: 2.30 PM- 4.00PM**
Max Marks: 10	**Prerequisites: Digital Electronics and Communication systems**	

Q No	QUESTIONS	Marks	BTL	CO	PO
1	Explain the model of Spread Spectrum CommunicationSystem with neat block Diagram.		L5	5	1,2
2	Explain the CDMA system based on IS_95, with neat Block Diagram.	10	L2	5	1,2
3	Explain frequency hopped spread spectrum technique with neat block diagram. Write the chiprate, jamming margin and processing gain equation.		L2	5	1,2
4	Explain the working of direct sequence spread spectrum transmitter and receiver with neat diagram and waveform expression	10	L2	5	1,2
5	Define PN Sequence? Explain the generation of Maximum Length Sequence.		L1	5	1,2
6	Explain the necessary equation and diagram of Matched Filter Receiver.	10	L2	2	1,2
7	Explain the geometric signal representation of Signals and express energy of the signals in terms of the signal Vector.	10	L2	2	1,2
8	Explain how to convert continuous AWGN channel into a vector channel		L2	2	1,2
9	Explain the correlation receiver with neat diagram and explain the maximum –likelihood decoder Blocks.		L2	2	1,2
10	Find an orthonormalset for this set of signals by applying the Gram-Schmidt procedure.A set of four waveform is illustrated as below 	10	L1	2	1,2

Note: BTL(BloomsTaxonomy) CO(CourseOutcome) PO (ProgramOutcome)

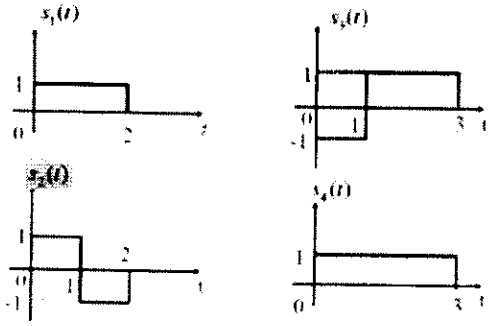
IAC Coordinator
Dr.PrabhavathiS

Staff Incharge
Mrs. Manasa K C

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Electronics and Communication Engineering
CONTINUOUS INTERNAL EVALUATION (CIE)-I (2020-21 EVEN SEM)

Staff Name: Mrs. Anitha A Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A & B**
Course Name: Digital Communication	**Course Code: 18EC61**	**Date:10/06/2021 Time: 10.30 AM- 12.00 PM**
Max Marks: 50	**Prerequisites: Communication Systems, ADC & DAC**	

NOTE: Answer any five questions, each question carrying 10 Marks.

Q No	QUESTIONS	Marks	BTL	CO	PO
1	a) Illustrate the model of Spread Spectrum Communication System with neat block Diagram. b) Solve for the minimum value of Processing Gain, A direct sequence spread spectrum signal is designed to have the power ratio of P_R/P_N at the intended receiver is 10^{-2}. If the desired E_b/N_o = 10 for acceptable performance.	6M 4M	L2 L3	5	1,2
	OR				
2	Define PN Sequence? Demonstrate the generation of Maximum length Sequence with an example.	10M	L1, L2		
3	Develop the geometric signal representation of Signals and express energy of the signals in terms of the signal Vector.	10M	L3		
	OR				
4	a) Find an orthonormal set for this set of signals by applying the Gram-Schmidt procedure. A set of four waveform is illustrated as below  b) How to convert continuous AWGN channel into vector channel write it in brief.	6M 4M	L1	2	1,2,3
5	Interpret the working of direct sequence spread spectrum transmitter and receiver with neat diagram and waveform expression.	10M	L2	5	1,2
	OR				
6	Outline the CDMA system based on IS_95, with neat Block Diagram				
7	Explain frequency hopped spread spectrum technique with neat block diagram. Write the chip rate, jamming margin and processing gain equation.	10M	L2	5 2	1,2
	OR				
8	Explain the correlation receiver with neat diagram and explain the maximum –likelihood decoder Blocks.				

9	Develop an expressions for mean and variance of the correlator outputs. Also show that the correlator outputs are statistically independent.	10M	L3	2	1,2
	OR				
10	Outline the necessary equation and diagram of Matched Filter Receiver.		L2		

Note: BTL (Blooms Taxonomy) **CO (Course Outcome)** **PO (Program Outcome)**

IA Coordinator

(Dr. Prabhavathi S)

Staff Incharge

(Mrs. Anitha A /Mrs. Manasa K C)

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RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI

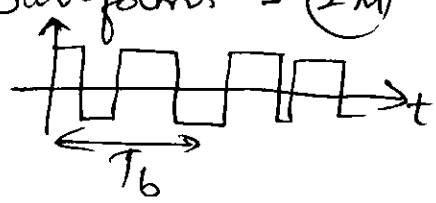
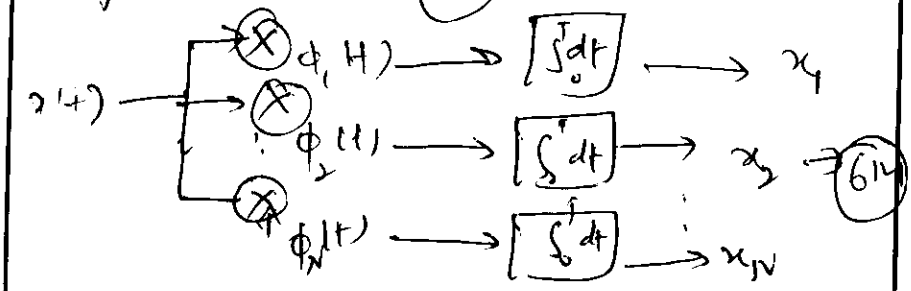
Department of Electronics and Communication Engineering

SCHEME OF EVALUATION CONTINUOUS INTERNAL EVALUATION (CIE)-1 (2020-21 EVENSEM)

Staff Name: Mrs. Anitha A Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A & B**
Course Name: Digital Communication	**Course Code: 18EC61**	**Date:10/06/2021 Time: 10.30 AM- 12.00PM**
Max Marks: 50	**Prerequisites: Communication Systems, ADC & DAC**	

NOTE: Answer any five questions, each question carrying 10 Marks.

Q No	SCHEME	Marks	BTL	CO	PO
1	a) Diagram — 2 Marks Explanation - 4M b) processing gain Calculation $P_G = 10$ 2M Formula Substitution — 2M	6M 4M	L2 L3		
2	(OR) PN Sequence is a Pseudo random sequence — 1 M generation & Maximum Sequence explanation with diagram (6 M) Example of Sequence 1011011 — (3M) m — m-1 — ... — m+1 → sequence	10M	L1, L2	5	1,2
3	Explanation of Signals in Vector form $E_i = \int_0^{T_b} s_i^2(t)\,dt$ — (4M) $s_i(t) \xrightarrow{\text{Trans}} \Sigma \xrightarrow{\text{Rcd}} x(t)$ $w(t)$	10M 6M	L3		
4	$P_c = \pi_1 P(\hat{M}=0/1\text{ sent}) + \pi_2 P(\hat{M}=1/0\text{ sent})$ → (6M) a) $s_{i1} = \int_0 s_i(t)\,\phi_1(t)$ → 1M $\phi_2(t)$, $g_3(t) = s_3(t) + \sqrt{2}\,\phi_2(t)$ (5M) b) $x(t) = s_i(t) + w(t)$ $x_j = s_{ij} = \int_0 s_i(t)\,\phi_j(t)$ (4M)	4M	L1	2	1,2,3
5	Diagram — (3M) Explanation — (4M)	10M	L2	5	1,2

6	Waveforms – (2M)  T_b = bit duration CDMA System based on IS_95 Forward link diagram & Explanation 5M Reverse link diagram & Explanation 5M				
7	FH-SSS Information sequence → Encode → FSK Modulator → Mixer → Channel → Mixer → FSK demodulation → (4) ↑ fp ← Freq Synthesizer M			5 2	
8	Explanation — (6M)  (6M) Ex Detector part → (2M) Ex Transmitter part → (2M)	10M	L2		1,2
9	Digital Characteristics & correlator type $x(t) = S_{ij}(t) + w(t)$ → (2M) $S_{ij} = \int_0 S_i(t)\,\phi_j(t)\,dt$ Mean: $x'(t) = x(t) - \sum x_j \phi_j(t)$ $x_{ij} = S_{ij} + k[w_j]_{j=1}$ → (2M) Variance = $E[w_j^2]$ → (4M)	10M			
10	Equations → (4M) Diagram → (2M) Explanation → (4M)				

Note: BTL(BloomsTaxonomy) CO(CourseOutcome) PO (ProgramOutcome)

IACoordinator

Staff Incharge

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Electronics and Communication Engineering

CIE-1 PERFORMANCE ANALYSIS

Continuous Internal Evaluation 1- DC (18EC61)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
CO mapping	CO309.5	CO309.5	CO309.2	CO309.2	CO309.5	CO309.5	CO309.5	CO309.2	CO309.2	CO309.2
Max Marks /Question	10	10	10	10	10	10	10	10	10	10
Total marks of class /question		326	353		340	20	303	30		349
No. of students attended		36	36		35	2	32	3		36
No of students scored > 65% of marks/Question		36	36		35	2	32	3		36
Percentage of students scored>65% of marks/Question										

Mark range	0-10	11 to 20	21-30	31-40	41-50
No. Of Students	--	--	--	--	36

Note: 2018 Scheme Format

DC ASSIGNMENT -II (2020-21 EVEN SEM)

Staff Name:Mrs. Anitha A / Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A/ B**
Course Name: DIGITAL COMMUNICATION	**Course Code: 18EC61**	**Date:19/06/2021**
Max Marks: 10	**Prerequisites: Digital Electronics and Communication systems**	

Q No	QUESTIONS	Marks	BTL	CO	PO
1	Illustrate the Hlbert Transform with an Example. State the Properties of it.	10	L3	1	1,2
2	a) Define Pre-envelope and complex envelope of real value signals. b) Relate the expressions for the complex low pass representation of band pass signals.		L2,L1	1	1,2
3	Outline the expression for error probability of BPSK modulation technique using coherent detection.	10	L2	3	1,2
4	a) Explain the generation and optimum detection of DPSK with neat block diagram. b) Construct the constellation of QAM for M=4 and draw the signal diagram.		L2,L3	3	1,2
5	a) Find a binary data is transmitted over an AWGN channel using binary PSK at a rate of 1MBPS. It is desired to have a average probability Pe< 10^{-4}. Noise power spectral density is $N_0/2$ = 1x10-^{12} W/HZ. Determine the average carrier power required at the receiver input, if detector is coherent type. b) Illustrate the operation of DPSK by using binary sequence 10010011.	10	L1	3	1,2
6	Illustrate the time-domain procedure for complex representation of band-pass signals and systems.		L2	3	1,2
7	Explain the BFSK operation and also error probability by using non coherent detection with neat sketch	10	L2	3	1,2
8	a) Explain how to obtain canonical representation of band pass signals. b) How efficient simulation for communication system is achieved?		L2, L1	1	1,2
9	Construct the generation of QPSK modulation techniques with signal constellation diagram and Power spectral density equations.	10	L2	3	1,2
10	a) Relate a procedure for the computational analysis of a band-pass system driven by a band pass signal. b) Outline the relationship between Cartesian and polar representation of band-pass signal.		L2,L3	1	1,2

Note: BTL (Blooms Taxonomy) **CO (Course Outcome)** **PO (Program Outcome)**

Staff Incharge

Mrs. Anitha A/ Mrs. Manasa K C

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Electronics and Communication Engineering
CONTINUOUS INTERNAL EVALUATION (CIE)-II (2020-21 EVEN SEM)

Staff Name: Mrs. Anitha A Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A & B**
Course Name: Digital Communication	**Course Code: 18EC61**	**Date:17/07/2021 Time: 03.00 PM- 04.30 PM**
Max Marks: 50	**Prerequisites: Communication Systems, ADC & DAC**	

NOTE: Answer any five questions, each question carrying 10 Marks.

Q No	QUESTIONS	Marks	BTL	CO	PO
1	a) Define Pre-envelope and complex envelope of real value signals. b) Relate the expressions for the complex low pass representation of band pass signals.	10M	L3	1	1,2
	OR				
2	Illustrate the Hlbert Transform with an Example. State the Properties of it.		L2,L1	1	1,2
3	Construct the generation of QPSK modulation techniques with signal constellation diagram and Power spectral density equations.	10M	L2	3	1,2
	OR				
4	a) Relate a procedure for the computational analysis of a band-pass system driven by a band pass signal. b) Outline the relationship between Cartesian and polar representation of band-pass signal.		L2, L3	1	1,2
5	Explain the BFSK operation and also error probability by using non coherent detection with neat sketch.	10M	L2	5	1,2
	OR				
6	a) Explain how to obtain canonical representation of band pass signals. b) How efficient simulation for communication system is achieved?				
7	a) Find a binary data is transmitted over an AWGN channel using binary PSK at a rate of 1MBPS. It is desired to have a average probability Pe< 10^{-4}. Noise power spectral density is $N_0/2$ = 1x10-^{12} W/HZ. Determine the average carrier power required at the receiver input, if detector is coherent type.	10M	L1	3	1,2
	b) Illustrate the operation of DPSK by using binary sequence 10010011.		L2	3	1,2
	OR				
8	Illustrate the time-domain procedure for complex representation of band-pass signals and systems.				
9	Outline the expression for error probability of BPSK modulation technique using coherent detection.	10M	L2	3	1,2
	OR				
	a) Explain the generation and optimum detection of DPSK with neat block diagram.				
10	b) Construct the constellation of QAM for M=4 and draw the signal diagram.		L2,L3	3	1,2

Note: BTL (Blooms Taxonomy) **CO (Course Outcome)** **PO (Program Outcome)**

IA Coordinator

(Dr. Prabhavathi S)

Staff Incharge

(Mrs. Anitha A /Mrs. Manasa K C)

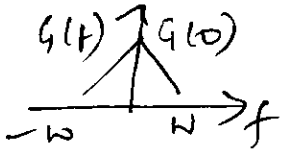
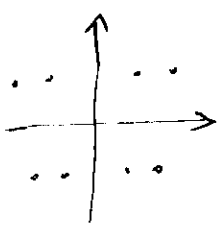
RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI

Department of Electronics and Communication Engineering

SCHEME OF EVALUATION CONTINUOUS INTERNAL EVALUATION (CIE)-II (2020-21 EVEN SEM)

Staff Name: Mrs. Anitha A Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A & B**
Course Name: Digital Communication	**Course Code: 18EC61**	**Date:17/07/2021 Time: 03:00PM- 4.30 PM**
Max Marks: 50	**Prerequisites: Communication Systems, ADC & DAC**	

NOTE: Answer any five questions, each question carrying 10 Marks.

Q No	SCHEME	Marks
1	a) pre-envelope defination — 2 Marks Complex envelope & real value-signals — 2 Marks b) $s(t) \longrightarrow [h(t)] \longrightarrow x(t) \longrightarrow$ 2M Bandpass s/m & Comm^n Chanel Explination → 4M	10 M
2a)	Hilbert Transform $x(jw) = \int_{-\infty}^{\infty} x(t)\, e^{-jwt}\, dt \rightarrow$ $x(t) = \frac{1}{2\pi} \int_{-\infty}^{\infty} x(jw)\, e^{-jwt}\, dw$ — 3M properties → 4M Example → 3M Hilbert Transform & low pass signal 	
3	QPSK Modulation techniques → Generation (4M), Detection (4M)  Signal constellation (1M) Power Spectral density Equation (1M)	10M

4 a) $\bar{H}(f-f_c) = 2H(f)$, for $f>0$ to determine $\bar{H}(f)$ 10 (06+04)

b) $X(f) = \frac{1}{2}\bar{H}(f)\bar{S}(f)$, $\bar{S}(t) = S_I(t) + jS_Q(t)$

c) $\bar{x}(t) = F^{-1}[\bar{X}(f)]$ (6M)

b)

$S_I(t)$ & $S_Q(t)$ $\quad \alpha(t) = \sqrt{S_I^2(t)+S_Q^2(t)}$

$\phi(t) = \tan^{-1}\left(\frac{S_Q(t)}{S_I(t)}\right)$

$S_I(t) = \alpha(t)\cos[\phi(t)]$

$S_Q(t) = \alpha(t)\sin[\phi(t)]$ [4M]

5 BFSK Block diagram ⟶ (4M)

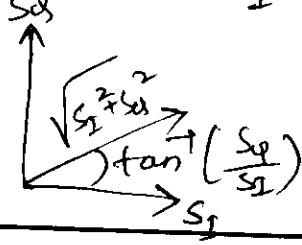
probability of error $P_e = \frac{1}{2}\operatorname{erfc}\left(\sqrt{\frac{2E_b}{P_c}}\right)$ (2M)

$S_I(t)$ & $S_Q(t)$ ⟶ (4M)

6 a) Canonical representation of Band-pass signal (6M)

$S(t) = \operatorname{Re}[\bar{S}(t)\exp(j2\pi f_c t)]$ ⟶ 2M

$\bar{S}(t) = S_I(t) + jS_Q(t)$ } 4M



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IA Coordinator

(Dr. Prabhavathi S)

Staff Incharge

(Mrs. Anitha A /Mrs. Manasa K C)

6 b) procedure for Efficient Simulation of Communication systems.

1) The low-pass equivalents of etc i/c band-pass signals → (2M)

2) The FFT algorithm to perform FT → (2M)

7 a) Let $E_b = PT_b$

$N_0/2 = 1 \times 10^{-12}$ W/Hz → (2M)

$$T_b = \frac{1}{\text{bit rate}} = \frac{1}{10^6} = 10^{-6}$$

$$\left(\frac{E}{N_0}\right) = \frac{PT_b}{N_0} = \frac{P \times 10^{-6}}{2 \times 10^{-12}} = 0.5 \times P \times 10^6$$ } (2M)

$$P_e = 0.5 \operatorname{erfc} \sqrt{(0.5 \times P \times 10^6} \leq 2 \times 10^{-4}$$ } (2M)

$$\boxed{P \geq 1.315 \times 10^{-6} \text{ W}}$$

7 b) 10010011

$\{b_k\}$		1	0	0	1	0	0	1
$\{q_{k-1}\}$		1	1	0	1	1	0	1
$\{q_k\}$	zero →	1	0	1	1	0	1	1
		0	0	↑	0	0	↑	0

(4M) Each carries (1M)

8) Time-domain approach def^n → (2M)

Equations → (4M)

(a) $s(t)$ → Band pass filter → o/p Signal $x(t)$

Mapper

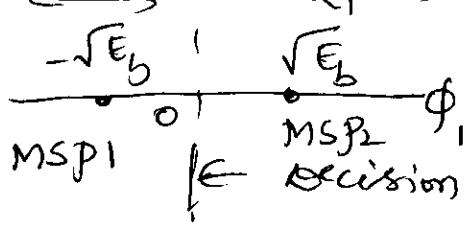
$\bar{s}(t)$ → Complex LPF → Scaled complex envelope of the o/p $2\tilde{x}(t)$ } (2M)

$$2\tilde{x}(t) = \tilde{h}(t) \star \tilde{s}(t) = [h_I(t) + j h_Q(t)] \star [s_I(t) + j s_Q(t)]$$

→ (2M)

(a) $$s_1(t) = \sqrt{\frac{2E_b}{T_b}} \cos 2\pi f_c t \quad 0 \le t \le T_b$$

$$s_2(t) = \sqrt{\frac{2E_b}{T_b}} \cos(2\pi f_c t + \pi) = -\sqrt{\frac{2E_b}{T_b}} \cos 2\pi f_c t \quad 0 \le t \le T_b$$ } (3M)



} (3M)

$$P_{10} = Q\left(\sqrt{\frac{2E_b}{N_0}}\right)$$

$$P_e = Q\left(\sqrt{\frac{2E_b}{N_0}}\right)$$ → (4M) Explanation

(10) a) Generation & detection of DPSK block diagram → 4M

Explanation → 2M

b) QAM for M = 4

Stage 1, Stage 2 Stage 3 Stage 4 → (4M)

$\begin{bmatrix}1\\1\end{bmatrix}\begin{bmatrix}1&0&1&1\end{bmatrix}$ $\begin{bmatrix}1\\1\end{bmatrix}\begin{bmatrix}0&1&0&0\end{bmatrix}$ $\begin{bmatrix}0\\0\end{bmatrix}\begin{bmatrix}0&1&0&0\end{bmatrix}$ $\begin{bmatrix}0\\0\end{bmatrix}\begin{bmatrix}1&0&1&1\end{bmatrix}$

$\begin{bmatrix}1&1&1&0&1&1\\0&1&0&1&1\end{bmatrix}$

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Electronics and Communication Engineering

CIE-2 PERFORMANCE ANALYSIS

Continuous Internal Evaluation 1- DC (18EC61)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
CO mapping	CO309.1	CO309.1	CO309.3	CO309.1	CO309.3	CO309.3	CO309.3	CO309.3	CO309.3	CO309.3
Max Marks /Question	10	10	10	10	10	10	10	10	10	10
Total marks of class /question	290	40	308	18	319		273	55	318	10
No. of students attended	32	4	34	2	36		30	6	35	1
No of students scored > 65% of marks/Question	32	4	34	2	36		30	6	35	1
Percentage of students scored>65% of marks/Question	100.00	100.00	100.00	100.00	100.00		100.00	100.00	100.00	100.00

Mark range	0-10	11 to 20	21-30	31-40	41-50
No. Of Students	--	--	--	--	36

Note: 2018 Scheme Format

DC ASSIGNMENT -III (2020-21 EVEN SEM)

Staff Name: Mrs. Anitha A / Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A/ B**
Course Name: DIGITAL COMMUNICATION	**Course Code: 18EC61**	**Date: 03/08/2021**
Max Marks: 10	**Prerequisites: Digital Electronics and Communication systems**	

Q No	QUESTIONS	Marks	BTL	CO	PO
1	Illustrate the following a) Polar RZ b) Polar NRZ c) Bipolar NRZ d) Manchester	10	L3,L2	1	1,2,3
2	Outline the expression for power spectral density of Manchester format and draw the spectrum.				
3	Summarize a brief note on a) B3ZS b) HDB3	10	L2	1,4	1,2,3
4	Explain the block diagram of PAM with neat sketch and necessary equations.				
5	a) State the Nyquist criterion for zero ISI. b) Construct the time domain and frequency domain characteristics of duo binary signals	10	L3, L2	4	1,2,3
6	Explain the linear adaptive equalizers based on NSE criterion.				
7	Explain the timing features pertaining to eye diagram and its interpretation for baseband binary data transmission systems.	10	L2	4	1,2,3
8	Illustrate the raised cosine spectrum with neat sketch and its equations.				
9	a) Explain the zero forcing equalizer. b) Explain the operation of linear transversal filter with neat sketch.	10	L2	4	1,2,3
10	Explain the design of band limited signals with controlled ISI.				

Note: BTL (Blooms Taxonomy) CO (Course Outcome) PO (Program Outcome)

Staff Incharge

Mrs. Anitha A/ Mrs. Manasa K C

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI

Department of Electronics and Communication Engineering

CIE-3 PERFORMANCE ANALYSIS

Continuous Internal Evaluation 3- DC (18EC61)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
CO mapping	CO309.1	CO309.1	CO309.1	CO309.1	CO309.4	CO309.4	CO309.4	CO309.4	CO309.4	CO309.4
Max Marks /Question	10	10	10	10	10	10	10	10	10	10
Total marks of class /question	320	10	291	9	30	298		328		330
No. of students attended	32	1	32	1	3	30		33		33
No of students scored > 65% of marks/Question	32	1	32	1	3	30		33		33
Percentage of students scored>65% of marks/Question	100.00	100.00	100.00	100.00	100.00	100.00		100.00	100.00	100.00

Mark range	0-10	11 to 20	21-30	31-40	41-50
No. Of Students	--	--	--	--	36

Note: 2018 Scheme Format

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI

Department of Electronics and Communication Engineering

CONTINUOUS INTERNAL EVALUATION (CIE)-III (2020-21 EVEN SEM)

Staff Name: Mrs. Anitha A Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A & B**
Course Name: Digital Communication	**Course Code: 18EC61**	**Date:12/08/2021 Time: 02:30 PM- 04.00 PM**
Max Marks: 50	**Prerequisites: Communication Systems, ADC & DAC**	

NOTE: Answer any five questions, each question carrying 10 Marks.

Q No	QUESTIONS	Marks	BTL	CO	PO
1	Illustrate the following a) Polar RZ b) Polar NRZ c) Bipolar NRZ d) Manchester **OR**	10M	L3,L2	1	1,2,3
2	Outline the expression for power spectral density of Manchester format and draw the spectrum.				
3	Summarize a brief note on a) B3ZS b) HDB3 **OR**	10M	L3,L2	1	1,2,3
4	Explain the block diagram of PAM with neat sketch and necessary equations.				
5	a) State the Nyquist criterion for zero ISI. b) Construct the time domain and frequency domain characteristics of duo binary signals **OR**	10M	L3, L2	4	1,2,3
6	Explain the linear adaptive equalizers based on MSE criterion.				
7	Explain the timing features pertaining to eye diagram and its interpretation for baseband binary data transmission systems. **OR**	10M	L2	4	1,2,3
8	Illustrate the raised cosine spectrum with neat sketch and its equations.				
9	a) Explain the zero forcing equalizer. b) Explain the operation of linear transversal filter with neat sketch. **OR**	10M	L2	4	1,2,3
10	Explain the design of band limited signals with controlled ISI.				

Note: BTL (Blooms Taxonomy) CO (Course Outcome) PO (Program Outcome)

IA Coordinator

(Dr. Prabhavathi S)

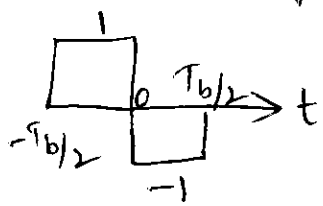
Staff Incharge

(Mrs. Anitha A /Mrs. Manasa K C)

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Electronics and Communication Engineering
SCHEME OF EVALUATION CONTINUOUS INTERNAL EVALUATION (CIE)-III (2020-21 EVEN SEM)

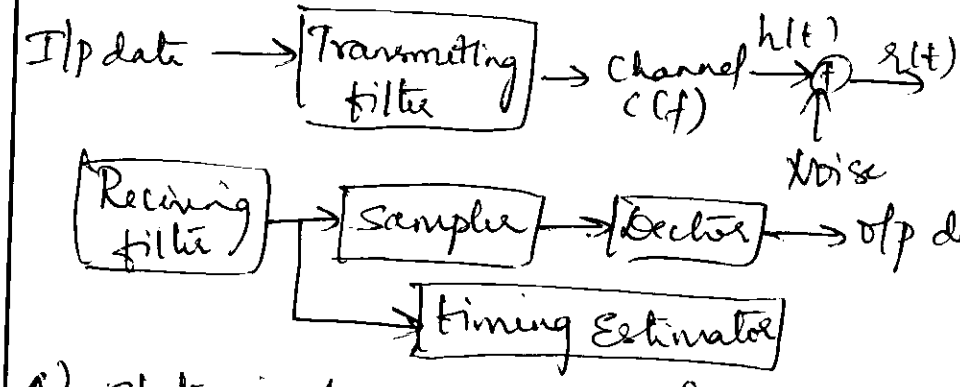
Staff Name: Mrs. Anitha A Mrs. Manasa K Chigateri	**Sem: 6th**	**Sec: A & B**
Course Name: Digital Communication	**Course Code: 18EC61**	**Date:12/08/2021 Time: 2.30 PM- 4.00 PM**
Max Marks: 50	**Prerequisites: Communication Systems, ADC & DAC**	

NOTE: Answer any five questions, each question carrying 10 Marks.

Q No	SCHEME	Marks
1	Defination of polar RZ → 1M Diagram – 1M } 2M Polar NRZ → 2M Bipolar defination → NRZ – 2M Manchester coding & diagram – [2+2]	10 [2+2 2+4]
2	Manchester coding has the Basic pulse V(f) as  → 2M $V(f) = T_b \text{Sinc}\left(\pi f \frac{T_b}{2}\right) \sin\left(\frac{\pi f T_b}{2}\right)$ Manchester NRZ	[2M + 6M]
3 4	BBZS where N = 3, here 3 zeros are replaced with either B0V or 00V → 1M B0V → If the no's of 1's since the substitution is even → 2M 00V → If the no. of 0's is since the last substitution is odd. → 2M Same as HDB3 format	(5M) + (5M)

4. PAM Block diagram — 4M

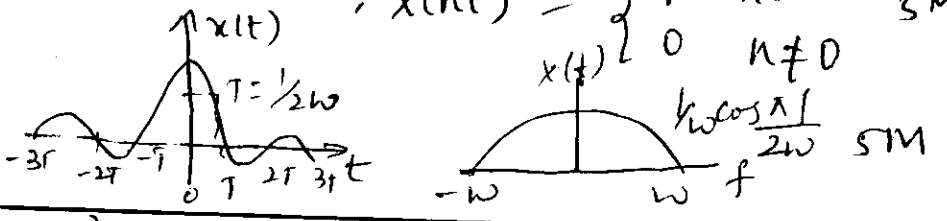
Explanation — 6M



8

5. a) State is 1M, $X(nT) = \begin{cases} 1 & n=0 \\ 0 & n \neq 0 \end{cases}$ 5M

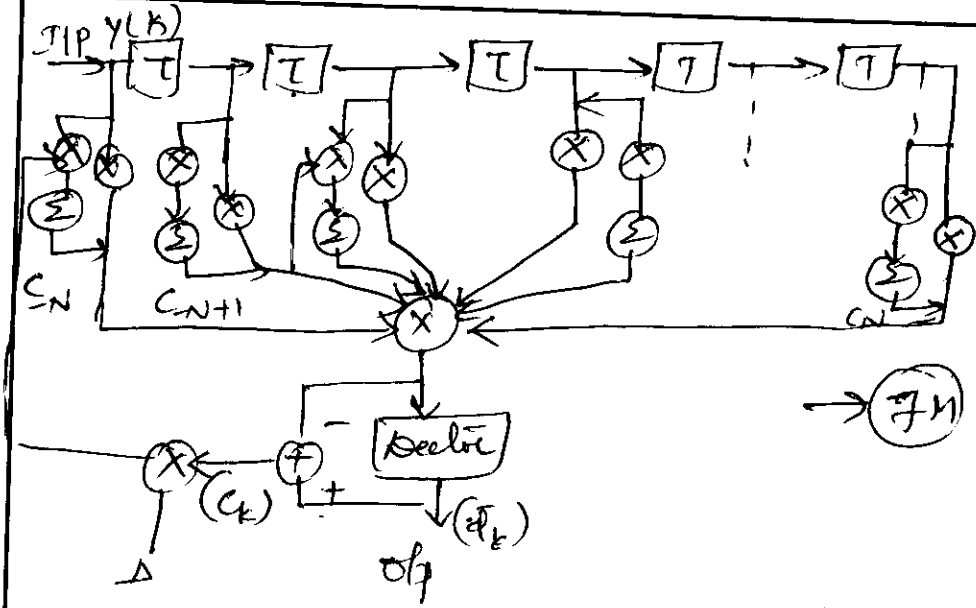
b)



5M

4

6.



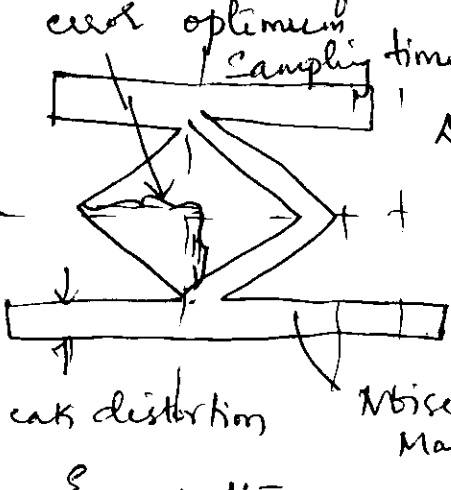
7M

Explanation of MSE Criterion — 3M

9

5

7.



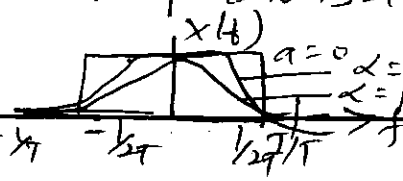
4M + 6M Explanation

(10) (6+4)

8. The pulse $x(t)$ having the raised cosine spectrum is $x(t) = \frac{\sin \pi t/T \cos(\pi \alpha t/T)}{\pi t/T \left(1 - 4\alpha^2 t^2/T^2\right)}$ (10M) (6+4)

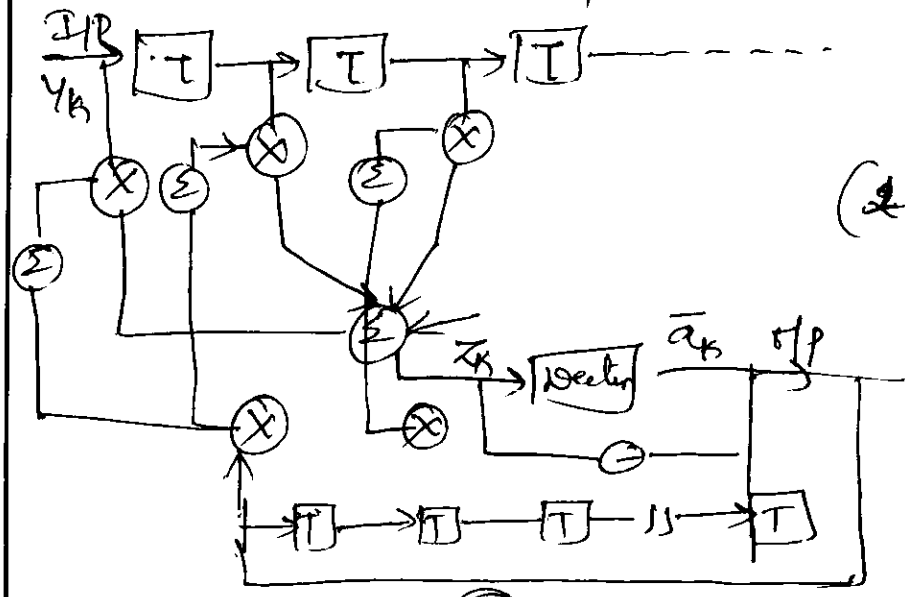
$= \text{sinc}(t/T) \frac{\cos(\pi \alpha t/T)}{1 - 4\alpha^2 t^2/T^2}$ (6M)

where $\alpha = 1/2$, B.W is 50%. $\alpha = 1$, B.W is 100%.



→ (4M)

9



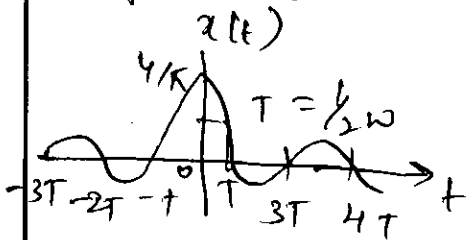
(8M)

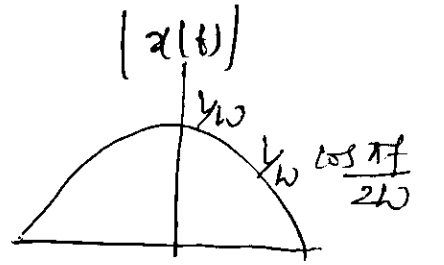
Explanation — (3M)

10

Diagram — Sketch — 2M

Explanation — 3M





{4M}

$x(nT) = \begin{cases} 1 & n = -1 \\ -1 & n = 1 \\ 0 & \text{otherwise} \end{cases}$

$X(f) = T + T e^{-j2\pi fT}$ (6M)

Note: BTL (Blooms Taxonomy) CO (Course Outcome) PO (Program Outcome)

IA Coordinator

(Dr. Prabhavathi S)

Staff Incharge

(Mrs. Anitha A /Mrs. Manasa K C)

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI

Department of Electronics and Communication Engineering

FINAL INTERNAL, ASSINGMENT AND EXTERNAL MARKS

Sl. No	USN NO	NAME	CIE	SEE	Total
1	3VC18EC002	AKASH H	40	40	80
2	3VC18EC003	AKASH SHASHIDHAR RAMDURG	38	34	72
3	3VC18EC004	ANKITHA N G	39	48	87
4	3VC18EC006	AVINASHGOUDA A HIREGOUDAR	39	42	81
5	3VC18EC010	BHARGAVI Y	39	40	79
6	3VC18EC012	CHANDHANA ND	39	39	78
7	3VC18EC017	E VAISHNAVI	39	49	88
8	3VC18EC020	GUDIPUTI DHARANI	39	34	73
9	3VC18EC022	HAFSA AFREEN	39	42	81
10	3VC18EC023	KADAPPA KADAGOUDAR	38	43	81
11	3VC18EC024	KAREESHMA BEGUM	39	34	73
12	3VC18EC026	KODI POOJA	39	39	78
13	3VC18EC028	KORI MADHUMOHANKUMAR	39	38	77
14	3VC18EC031	MANU NAIKODI	39	45	84
15	3VC18EC032	MEHTAJ BANU	40	49	89
16	3VC18EC033	N KEERTHI	40	46	86
17	3VC18EC037	NAVYA G	39	35	74
18	3VC18EC039	NITHYA SANTHOSHI H	39	47	86
19	3VC18EC040	PRAJWAL K S	39	42	81
20	3VC18EC042	RUMANA ANJUM	39	43	82
21	3VC18EC045	SACHIN DHAYAPULE	38	37	75
22	3VC18EC047	SAHANA P KEMBHAVI	39	41	80
23	3VC18EC048	SAI KALYAN YADAV B	39	40	79
24	3VC18EC049	SANDHYA P	40	33	73
25	3VC18EC051	SHINEY	38	43	81
26	3VC18EC053	SHIVAKUMAR C K	38	35	73
27	3VC18EC054	SHIVANI H	39	33	72

28	3VC18EC064	VAISHNAVI A	40	40	80
29	3VC18EC065	VASUDEV T M	39	40	79
30	3VC18EC067	VINAY JANGADI	39	37	76
31	3VC17EC001	AEJAZ AHMED	38	34	72
32	3VC17EC040	NITISH KUMAR M R	38	20	58
33	3VC17EC059	SAI DHEERAJ	39	30	69
34	3VC18EC021	H SHIVARAM REDDY	38	36	74
35	3VC18EC058	SUMALATHA	39	38	77
36	3VC16EC081	SHREENIVASA G P	38	31	69

HOD

Signature of faculty

Department of
Electronics & Communication Engg.
R.Y.M. Engineering College,
(Formerly Vijayanagar Engg. College)
BELLARY-583 104.

RAO BAHADUR Y MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
DEPARTMENT OF ELECTRONICS COMMUNICATION ENGNEERING

DIRECT & INDIRECT ATTAINMENT 2020-21

Faculty: Manasa K Chigateri					
Course Name: DIGITAL Communication					
Course Code: 18EC61	**Sem**	**6**	**Sec**	**A**	

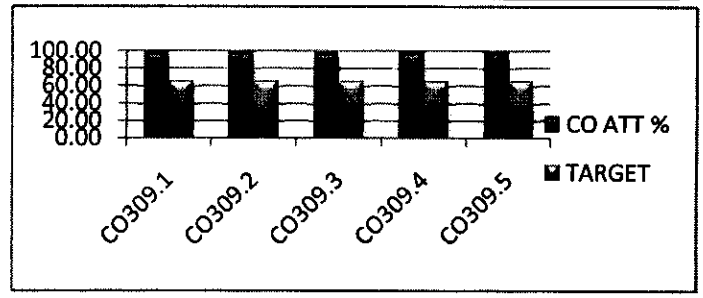
CO309.1	Outline the concepts of Bandpass sampling to well specified signals and channels.(L2)
CO309.2	Illustrate the performance parameters of signaling over AWGN channels.(L2)
CO309.3	Explain the digital communication basics including matched filters, signal space methods and optimal receiver design. (L1)
CO309.4	Demonstrate that bandpass signals subjected to corruption and distortion in a band limited channel can
CO309.5	Explain the principle operation of spread spectrum modulation scheme.(L2)

CO-PO/PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO309.1	3	3											2	
CO309.2	2	2	3	3									2	
CO309.3	2		2	3									3	
CO309.4	2	3	2										2	
CO309.5	2	3	2										3	
AVG	**2.20**	**2.75**	**2.25**	**3.00**									**2.40**	

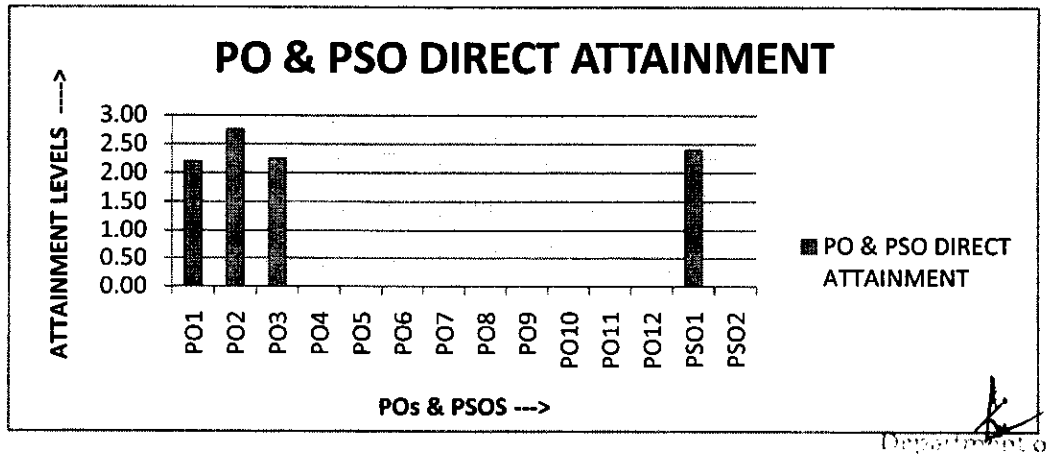
CO DIRECT & INDIRECT ATTAINMENT

	CO ATT	TARGET
CO309.1	97.99	65
CO309.2	98.24	65
CO309.3	97.82	65
CO309.4	98.10	65
CO309.5	98.13	65



	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PO ATT	2.20	2.75	2.25										2.40	

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
PO ATT	2.20	2.75	2.25										2.40	



Department of
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R.Y.M. Engineering College,
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Rao Bahadur Y Mahabaleswarappa Engineering College
Dept. of Electronics & Communication Engineering

Semester : 6A **Course Exit Survey** **020-21(EVEN SEM**

Course Outcomes for DIGITAL COMMUNICATION (18EC61)

CO309.1	Outline the concepts of Bandpass sampling to well specified signals and channels.(L2)
CO309.2	Illustrate the performance parameters of signaling over AWGN channels.(L2)
CO309.3	explian the detailed understanding of digital communication basics including matched filters, signal space methods and optimal receiver design. (L1)
CO309.4	Demonstrate that bandpass signals subjected to corruption and distortion in a band limited channel
CO309.5	Explain the principle operation of spread spectrum modulation scheme.(L2)

Course Exit Survey Guidelines: Excellent – 5, Very Good – 4, Good – 3,Average – 2, Below Average - 1

Sl. No	USN	Name of the Student	DC-18EC61					Students Signature
			CO303.1	CO303.2	CO303.3	CO303.4	CO303.5	
1	3VC18EC002	AKASH H	5	5	5	5	5	
2	3VC18EC003	SHASHIDHAR	5	5	5	5	5	
3	3VC18EC004	ANKITHA N G	5	5	5	5	5	
4	3VC18EC006	A A	5	5	5	5	5	Avinash
5	3VC18EC010	BHARGAVI Y	5	5	5	5	5	Bhargavi.Y
6	3VC18EC012	CHANDHANA NI	5	5	5	4	4	Chan.N.D.
7	3VC18EC017	E VAISHNAVI	5	5	5	5	5	
8	3VC18EC020	GUDIPUTI DHAR	5	5	5	4	5	G.Dhanaji
9	3VC18EC022	HAFSA AFREEN	5	5	5	5	5	
10	3VC18EC023	KADAPPA KADA	5	5	5	5	5	
11	3VC18EC024	KAREESHMA BE	5	5	5	5	5	
12	3VC18EC026	KODI POOJA	5	5	5	5	5	
13	3VC18EC028	KORI MADHUMC	5	5	5	5	5	
14	3VC18EC031	MANU NAIKODI	5	5	5	5	5	
15	3VC18EC032	MEHTAJ BANU	5	5	5	5	5	Mehtaj Banu.
16	3VC18EC033	N KEERTHI	5	5	5	5	5	N.Keerthi
17	3VC18EC037	NAVYA G	5	5	5	5	5	
18	3VC18EC039	NITHYA SANTHC	5	5	5	5	5	
19	3VC18EC040	PRAJWAL K S	5	5	5	5	5	
20	3VC18EC042	RUMANA ANJUM	5	5	5	5	5	
21	3VC18EC045	SACHIN DHAYAI	5	5	5	5	5	
22	3VC18EC047	SAHANA P KEME	5	5	5	5	5	
23	3VC18EC048	SAI KALYAN YA	5	5	5	5	5	
24	3VC18EC049	SANDHYA P	5	5	5	5	5	Sandhya P
25	3VC18EC051	SHINEY	5	5	5	5	5	
26	3VC18EC053	SHIVAKUMAR C	5	5	5	5	5	
27	3VC18EC054	SHIVANI H	5	5	5	5	5	

Rao Bahadur Y Mahabaleswarappa Engineering College
Dept. of Electronics & Communication Engineering

Semester : 6A **Course Exit Survey** **2020-21(EVEN SEM)**

Course Outcomes for DIGITAL COMMUNICATION (18EC61)

CO309.1	Outline the concepts of Bandpass sampling to well specified signals and channels.(L2)
CO309.2	Illustrate the performance parameters of signaling over AWGN channels.(L2)
CO309.3	explian the detailed understanding of digital communication basics including matched filters, signal space methods and optimal receiver design. (L1)
CO309.4	Demonstrate that bandpass signals subjected to corruption and distortion in a band limited channel
CO309.5	Explain the principle operation of spread spectrum modulation scheme.(L2)

Course Exit Survey Guidelines: Excellent – 5, Very Good – 4, Good – 3,Average – 2, Below Average - 1

Sl. No	USN	Name of the Student	DIC-18EC61					Students Signature
			CO303.1	CO303.2	CO303.3	CO303.4	CO303.5	
27	3VC18EC054	SHIVANI H	5	5	5	5	5	Shivani H
28	3VC18EC064	VAISHNAVI A	5	5	5	5	5	Vaishnavi
29	3VC18EC065	VASUDEV T M	5	5	5	5	5	Vasudev
30	3VC18EC067	VINAY JANGADI	5	5	5	5	4	
31	3VC17EC001	AEJAZ AHMED	5	5	5	5	5	
32	3VC17EC040	NITISH KUMAR M R	5	5	5	5	5	Nitish
33	3VC17EC059	SAI DHEERAJ	5	5	5	5	5	Sai Dheeraj
34	3VC18EC021	H SHIVARAM REDD	5	5	5	5	5	Reddy
35	3VC18EC058	SUMALATHA	5	5	5	5	5	Sumalatha
36	3VC16EC081	SHREENIVASA G P	5	5	5	5	5	Shreenivasa

Staff Incharge

Department of
Electronics & Communication Engg.
R.Y.M. Engineering College,
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BELLARY-583 104.

Rao Bahadur Y Mahabaleswarappa Engineering College
Dept. of Electronics & Communication Engineering

	6A	Self Assessment Report of Digital Communication	18EC61
1	Are you able to understand Importance of the concepts of Bandpass sampling to well specified signals and channels.		
2	Are you able to understand the signal representation and construction.		
3	Are you able to demonstrate knowledge in digital communication, constructs to Design and verify the digital circuit/system using modulation techniques.		
4	Are you able to understand the PAM system and nyquist criteria for zero ISI		
5	Are you able to understand Spread spectrum communication systems.		

Assesment Guidelines: **Excellent - 5** **Very good-4** **Good-3** **Average-4** **Below Average-1**

Semester : 6A **Academic Year 2020-21**

Sl. No	USN	Name of the Student	DC-18EC61					SIGNATURE
			1	2	3	4	5	
1	3VC18EC002	AKASH H	5	5	5	5	5	Akash.H
2	3VC18EC003	RAMDURG	5	5	5	5	5	
3	3VC18EC004	ANKITHA N G	5	5	5	5	5	
4	3VC18EC006	HIREGOUDAR	5	5	5	5	5	Avinash
5	3VC18EC010	BHARGAVI Y	5	5	5	5	5	Bhargavi.Y
6	3VC18EC012	CHANDHANA ND	5	5	5	5	5	Chand.N
7	3VC18EC017	E VAISHNAVI	5	5	5	5	5	
8	3VC18EC020	GUDIPUTI DHARANI	5	5	4	5	5	G.Dharani
9	3VC18EC022	HAFSA AFREEN	5	5	5	5	5	
10	3VC18EC023	KADAPPA KADAGOUDAR	5	5	5	5	5	
11	3VC18EC024	KAREESHMA BEGUM	5	5	5	5	5	Kareeshma.
12	3VC18EC026	KODI POOJA	5	5	5	5	5	K.Lina.
13	3VC18EC028	KORI MADHUMOHANKUMAR	5	5	5	5	5	
14	3VC18EC031	MANU NAIKODI	5	5	5	5	5	
15	3VC18EC032	MEHTAJ BANU	5	5	5	5	5	Mehtaj Banu.
16	3VC18EC033	N KEERTHI	5	5	5	5	5	N.Keerthi
17	3VC18EC037	NAVYA G	5	5	5	5	5	Navya.G
18	3VC18EC039	NITHYA SANTHOSHI H	5	5	5	5	5	nithya
19	3VC18EC040	PRAJWAL K S	5	5	5	5	5	Prajwal
20	3VC18EC042	RUMANA ANJUM	5	5	5	5	5	Rumana
21	3VC18EC045	SACHIN DHAYAPULE	5	5	5	5	5	
22	3VC18EC047	SAHANA P KEMBHAVI	5	5	5	5	5	
23	3VC18EC048	SAI KALYAN YADAV B	5	5	5	5	5	Sai Kalyan.
24	3VC18EC049	SANDHYA P	5	5	5	5	5	Sandhya P
25	3VC18EC051	SHINEY	5	5	5	5	5	Shiney
26	3VC18EC053	SHIVAKUMAR C K	5	5	5	5	5	

Rao Bahadur Y Mahabaleswarappa Engineering College
Dept. of Electronics & Communication Engineering

	6A	Self Assessment Report of Digital Communication	18EC61
1	Are you able to understand Importance of the concepts of Bandpass sampling to well specified signals and channels.		
2	Are you able to understand the signal representation and construction.		
3	Are you able to demonstrate knowledge in digital communication, constructs to Design and verify the digital circuit/system using modulation techniques.		
4	Are you able to understand the PAM system and nyquist criteria for zero ISI		
5	Are you able to understand Spread spectrum communication systems.		

Assesment Guidelines: **Excellent - 5** **Very good-4** **Good-3** **Average-4** **Below Average-1**

Semester : 5B **Academic Year 2020-21**

27	3VC18EC054	SHIVANI H	5	5	5	5	5	Shivani H
28	3VC18EC064	VAISHNAVI A	5	5	5	5	5	Vaishnavi A
29	3VC18EC065	VASUDEV T M	5	5	5	5	5	Vasudev
30	3VC18EC067	VINAY JANGADI	5	5	5	5	5	
31	3VC17EC001	AEJAZ AHMED	5	5	5	5	5	
32	3VC17EC040	NITISH KUMAR M R	5	5	5	5	5	Nitish kumar
33	3VC17EC059	SAI DHEERAJ	5	5	5	5	5	Sai Dheeraj
34	3VC18EC021	H SHIVARAM REDDY	5	5	5	5	5	Reddy
35	3VC18EC058	SUMALATHA	5	5	5	5	5	Sumalatha
36	3VC16EC081	SHREENIVASA G P	5	5	5	5	5	Shreenu

Staff Incharge

Electronics & Communication Engg.
R.Y.M. Engineering College
(Formerly Vijayanagar Engg. College)
BELLARY-583 104.

QUIZ ON DIGITAL COMMUNICATION-18EC61

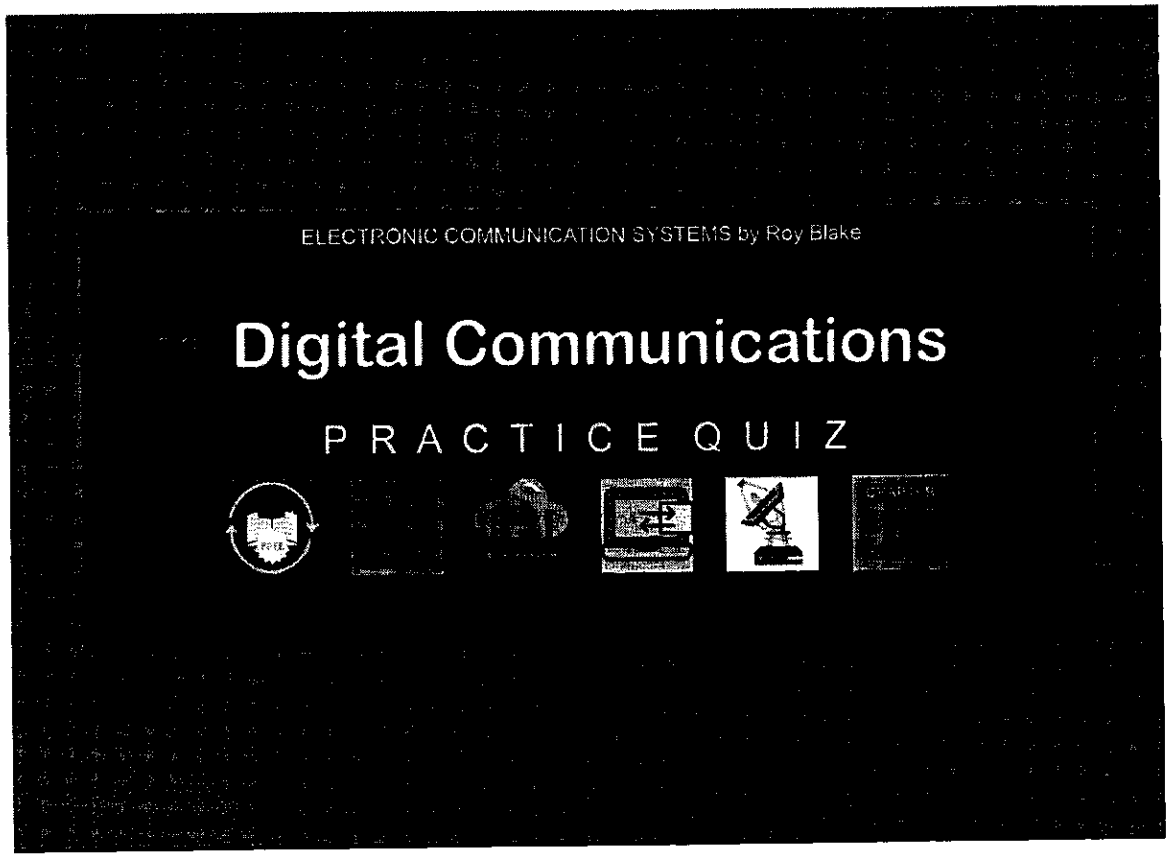
Department of ECE ORGANIZING A QUIZ ON DIGITAL COMMUNICATION AS A INNOVATIVE PRACTICE

* Required

1. Email *

RYMEC https://www.rymec.in/index.php/programs/under-graduate/electronics-communication-engineering

E-QUIZ ON DC



2. Full Name *

3. USN *

4. SEM *

Mark only one oval.

- A
- B

5. Synchronization available in digital communication are * 2 points

Mark only one oval.

- Symbol synchronization
- Frame synchronization
- Carrier synchronization
- All of the mentioned

6. Analog to digital conversion includes * 2 points

Mark only one oval.

- Option 1Sampling
- Quantization
- Sampling & Quantization
- None of the mentioned

7. The minimum nyquist sampling rate is given as, fs = * 2 points

Mark only one oval.

- 1/T
- T
- 2/T
- 2T

8. M-ary signalling produces _____ error performance with orthogonal signalling and _____ error performance with multiple phase signalling. * 2 points

Mark only one oval.

- Degraded, improved
- Improved, degraded
- Improved, improved
- Degraded, degraded

9. In which system, bit stream is portioned into even and odd stream? * 2 points

Mark only one oval.

- BPSK
- MSK
- QPSK
- FSK

10. Examples of double side band signals are * 2 points

Mark only one oval.

- ASK
- PSK
- ASK & PSK
- None of the mentioned

11. Which modulation is the most efficient one? * 2 points

Mark only one oval.

- ◯ BPSK
- ◯ BFSK
- ◯ QPSK
- ◯ QAM

12. The processing gain is given as 2 points

Mark only one oval.

- ◯ Wss/R
- ◯ R/Wss
- ◯ Wss/2R
- ◯ R/2Wss

13. Which type of demodulator is used in the frequency hopping technique? * 2 points

Mark only one oval.

- ◯ Coherent
- ◯ Non coherent
- ◯ Coherent & Non coherent
- ◯ None of the mentioned

14. If each pulse of the sequence to be detected is in _____ shape, the pulse can be detected without ISI. * 2 points

Mark only one oval.

- ◯ Sine
- ◯ Cosine
- ◯ Sinc
- ◯ None of the mentioned

QUIZ ON DIGITAL COMMUNICATION-18EC61

63 responses

Publish analytics

Full Name

63 responses

MANASA K CHIGATERI

manasa

Navya.G

Manu B n

Sandhya.P

Sumalatha

Aejaz Ahmed

Kori madhu mohan kumar

Shiva A

USN

63 responses

3vc

RESEARCH SCHLOAR

3VC18EC037

3VC18EC024

3VC

3VC18EC031

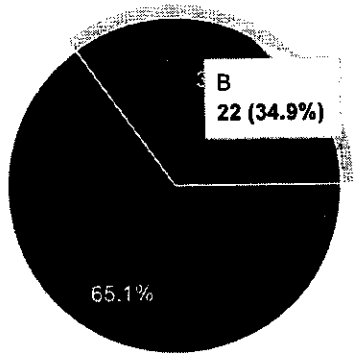
3VC18EC049

3VC18EC058

3VC17EC001

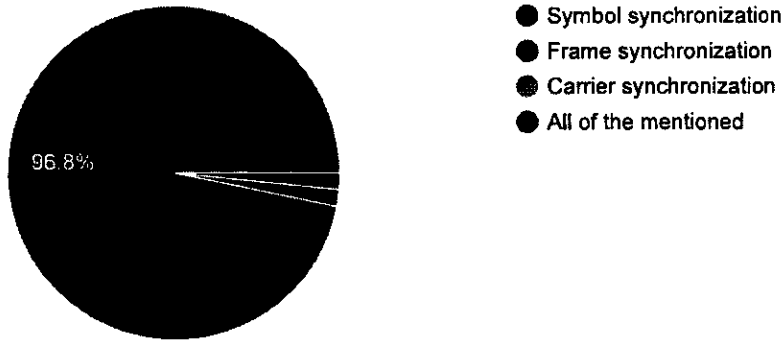
SEM

63 responses



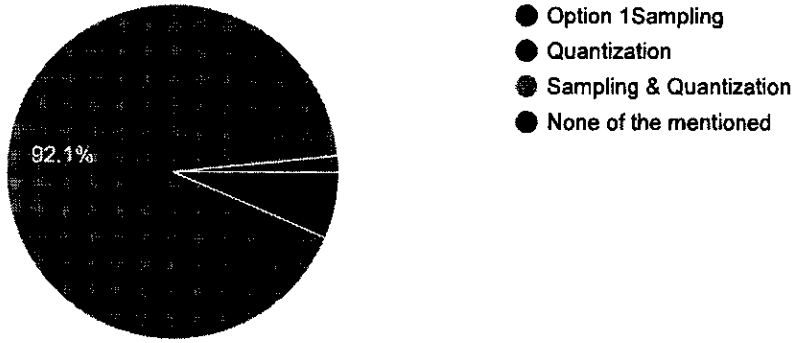
Synchronization available in digital communication are

63 responses



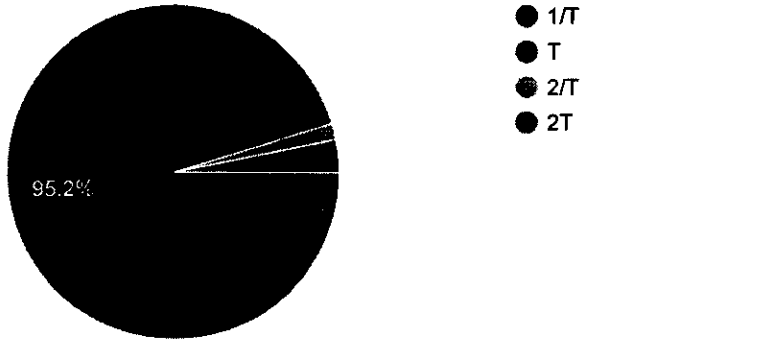
Analog to digital conversion includes

63 responses



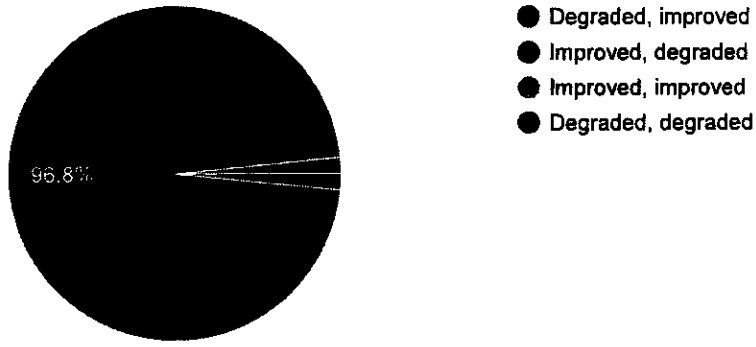
The minimum nyquist sampling rate is given as, fs =

63 responses



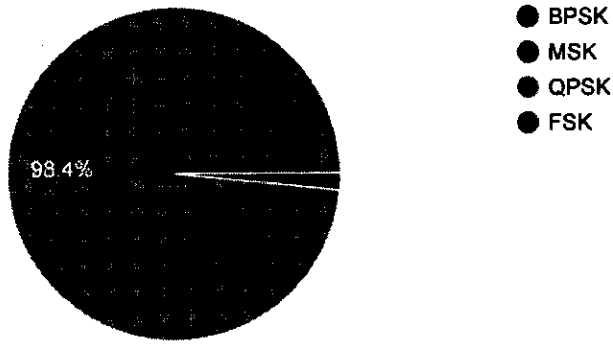
M-ary signalling produces _____ error performance with orthogonal signalling and _____ error performance with multiple phase signalling.

63 responses



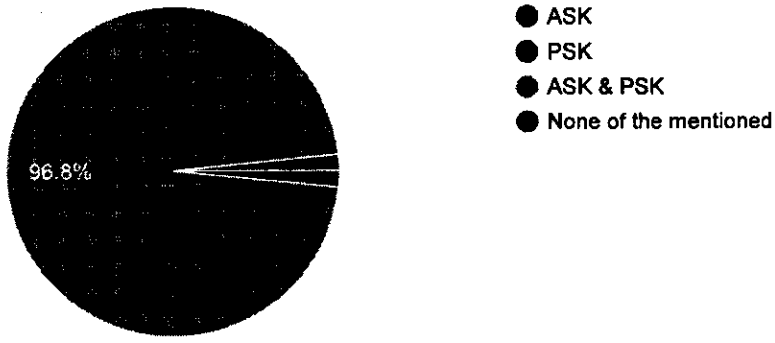
In which system, bit stream is portioned into even and odd stream?

63 responses



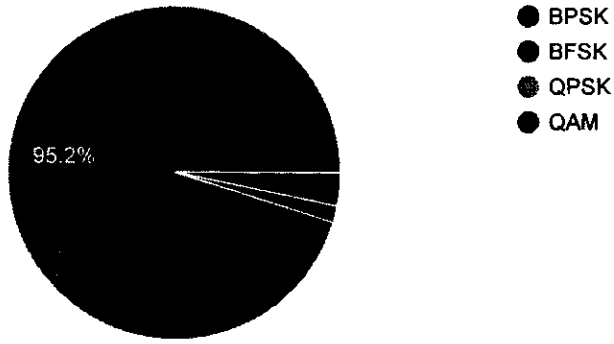
Examples of double side band signals are

63 responses



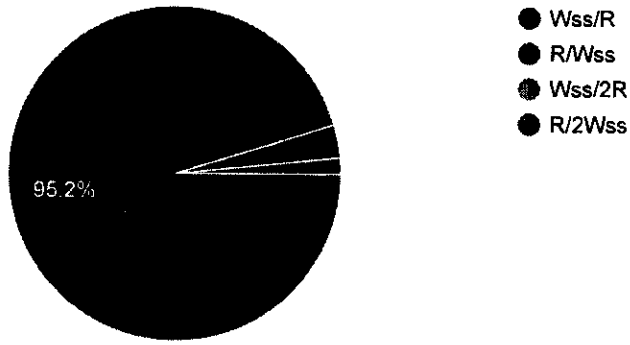
Which modulation is the most efficient one?

63 responses



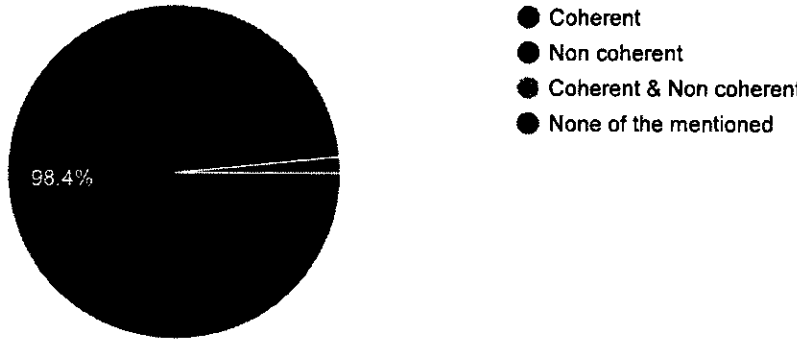
The processing gain is given as

63 responses



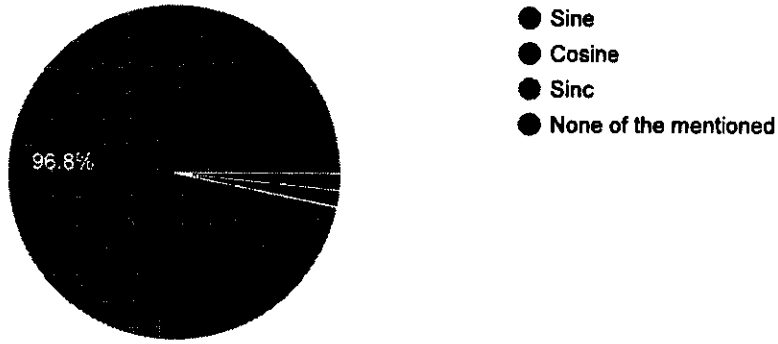
Which type of demodulator is used in the frequency hopping technique?

63 responses



If each pulse of the sequence to be detected is in _____ shape, the pulse can be detected without ISI.

63 responses



Timestamp	Email Address	Score	Full Name	USN	SEM	Synchronizatio n available in digital communication are	Analog to digital conversion includes	The minimum nyquist	In any signalling produces _____ error performance	In which system, bit stream is	Examples of double side band signals are	Which modulation is the most	The processing gain is given as	Which type of demodulator is used in the frequency hopping	If each pulse of the sequence to be
8/10/2021 14:56:55	manasakchigateri@rymec	20 / 20	manasa k c	3vc	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/10/2021 15:08:41	manasakchigateri@rymec	20 / 20	MANASA K CHIG	3VC	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/10/2021 15:13:43	manasakchigateri@rymec	20 / 20	MANASA K CHIG	3VC	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/10/2021 15:19:04	manasakchigateri@rymec	16 / 20	manasa	3vc	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	PSK	BPSK	Wss/R	Non coherent	Sinc
8/10/2021 15:29:37	manasakchigateri@rymec	14 / 20	manasa	11	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	BPSK	R/Wss	Non coherent	Sine
8/10/2021 15:33:50	manasakchigateri@rymec	20 / 20	MANASA K CHIG	RESEARCH S	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/10/2021 15:50:40	manasakchigateri20@gma	20 / 20	MANASA K CHIG	RESEARCH S	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:32:46	vinayjangadi0703@gmail.c	16 / 20	Vinay J	3VC18EC067	A	All of the mention	Quantization	1/T	Degraded, impro	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:33:57	shivaramr27@gmail.com	20 / 20	Shivaram Reddy	3VC18EC021	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:37:41	manunaikodi36@gmail.co	20 / 20	Manu B n	3VC18EC031	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:38:31	prajwalks22@gmail.com	20 / 20	PRAJWAL KS	3VC18EC040	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:39:09	keerthinnayak2001@gmai	20 / 20	N.KEERTHI	3VC18EC033	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:39:11	lsuma456@gmail.com	20 / 20	Sumalatha	3VC18EC058	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:41:05	vaishnavi.amaravathi23@	20 / 20	VAISHNAVI A	3VC18EC064	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:41:07	chandhanadevendra@gm	20 / 20	Chandhana.N.D.	3VC18EC012	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:41:30	hafsaafreen639@gmail.co	20 / 20	Hafsa Afreen	3VC18EC022	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:43:42	sachindhayapule083@gm	20 / 20	Sachin Dhayapule	3VC18EC045	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:45:50	akashramdurg2000@gma	20 / 20	Akash Ramdurg	3VC18EC003	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:47:11	sandhyapundi244@gmail.	18 / 20	Sandhya.P	3VC18EC049	A	Symbol synchroni	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:48:40	hakash340@gmail.com	20 / 20	AKASH H	3VC18EC002	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:50:21	kadappa09082000@gmail	20 / 20	Kadappa Kadagou	3VC18EC023	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:52:36	korimohankumar@gmail.c	20 / 20	Kori madhu moha	3V18EC028	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:55:01	shineyyy3@gmail.com	20 / 20	Shiney	3VC18EC051	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:55:46	shivanih12345@gmail.com	20 / 20	Shivani Shivani	3vc18ec054	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 9:57:48	avinashgouda21@gmail.c	20 / 20	Avinashgouda A H	3VC18EC006	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:02:45	aejazayodhi143@gmail.co	20 / 20	Aejaz Ahmed	3VC17EC001	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:03:28	saidheeraj1299@gmail.co	18 / 20	Sai Dheeraj	3VC17EC059	A	All of the mention	Quantization	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:04:53	bhargaviy88@gmail.com	20 / 20	BHARGAVI. Y	3VC18EC010	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:07:15	kalyan.ece.rymec@gmail.c	20 / 20	Sai Kalyan yadav	3VC18EC048	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:08:09	shreenivasagp175@gmail	20 / 20	SHREENIVASA G	3VC16EC081	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:09:52	navya.ece.rymec@gmail.c	20 / 20	Navya.G	3VC18EC037	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:31:47	mrinalinirs09@gmail.com	14 / 20	Mrinalini R S	3VC18EC041	B	All of the mention	Sampling & Quantizat	2T	Improved, degrac	QPSK	None of the	QAM	R/2Wss	Non coherent	Sinc
8/11/2021 10:33:01	sreekanthchowdary0802@	16 / 20	D.Sreekanth	3VC18EC014	B	All of the mention	Quantization	2T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:53:10	kamamchinnaganesh619@	20 / 20	Chinna Ganesh K	3VC18EC013	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:55:24	kodi.ece.rymec@gmail.co	20 / 20	Kodi pooja	3vc18ec026	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 10:55:34	aqsuppi.ece.rymec@gmai	20 / 20	Supritha. A. G	3VC18EC059	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 11:00:10	kavitakumari99.ece.rymec	20 / 20	KAVITA KUMARI	3VC18EC025	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 11:17:39	dharanigudiputi@gmail.co	20 / 20	Gudiputi Dharani	3VC18EC020	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 11:21:20	navya.ece.rymec@gmail.c	20 / 20	Navya.G	3VC18EC037	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 11:22:05	sahanak9296@gmail.com	20 / 20	Sahana Kembhav	3VC18EC047	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 11:24:37	bshirisha926@gmail.com	20 / 20	B.SHIRISHA	3VC18EC009	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 11:46:49	mehtajbanu999@gmail.co	20 / 20	Mehtaj Banu	3VC18EC032	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 11:58:11	panduranga58969@gmail.	20 / 20	B PANDU RANGA	3VC18EC008	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 12:42:31	kareeshmabegum050@gn	20 / 20	Kareeshmabegum	3VC18EC024	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 12:47:24	elluruvaishnavi2001@gma	20 / 20	E VAISHNAVI	3VC18EC017	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 12:56:50	shaikshafurta.ece.rymec@	20 / 20	Shaik Shaguftha	3vc16ec076	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/11/2021 14:53:33	shivuck2000@gmail.com	6 / 20	Shivakumar c k	3vc18ec053	A	Frame synchroniz	Quantization	2/T	Degraded, degrad	BPSK	ASK & PSK	BFSK	Wss/R	Non coherent	Cosine
8/11/2021 21:15:41	manjuchiru186@gmail.cor	18 / 20	Manjunatha B	3vc18ec030	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	None of the me	Sinc
8/11/2021 22:27:39	vidhya8861994822@gmai	20 / 20	S.Vidhya Shree	3VC18EC044	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/12/2021 7:40:47	bumesh8123@gmail.com	20 / 20	UMESH B	3VC18EC061	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc

Timestamp	Email Address	Score	Full Name	USN	SEM	Synchronization available	Analog to digital conversion	The minimum required sampling frequency to which system, bit stream	Examples of double side	Which modulation is the	The processing gain is gi	Which type of demodulation	If each pulse of the sequence to be detected in a ____ shape, the pulse can be detected without ISI.
8/10/2021 14:36:59			20 / 20			All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/10/2021 16:06:41			20 / 20	MANASA K CHIGATERI	3VC	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/10/2021 16:13:43			20 / 20	MANASA K CHIGATERI	3VC	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/10/2021 16:19:04			16 / 20	manasa	3vc	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	PSK	BPSK	Wavelt	Non coherent	Sinc
8/10/2021 16:20:37			14 / 20	manasa	11	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/10/2021 16:33:50			20 / 20	MANASA K CHIGATERI	RESEARCH SCHOLAR	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/10/2021 16:39:46			20 / 20	MANASA K CHIGATERI	RESEARCH SCHOLAR	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:32:45			19 / 20	Vinay J	3VC14IE067	All of the mentioned	Quantization	VT	Degraded, Improved	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:33:57			20 / 20	Shreejan Reddy	3VC16EC021	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:37:41			20 / 20	Nuha B h	3VC19EC031	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:39:31			20 / 20	PRAJWAL KB	3VC16EC049	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:39:58			20 / 20	N.KEERTHI	3VC16EC033	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:39:11			20 / 20	Sumukha	3VC16EC058	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:41:08			20 / 20	VAISHNAVI A	3VC16EC064	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:41:07			20 / 20	Chandhana.H.D.	3VC16EC012	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:41:20			20 / 20	Hafiz Ahsan	3VC16EC022	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:42:03			20 / 20	Sachin Dhoopade	3VC16EC046	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:48:39			20 / 20	Akash Ramdurg	3VC16EC003	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:47:11			18 / 20	Bandhavi.P	3VC16EC049	Symbol synchronization	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:48:49			20 / 20	AKASH H	3VC16EC062	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:50:21			20 / 20	Kadappa Kadapoodar	3VC16EC023	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:52:26			20 / 20	Rani madhu kishan kumar	3V16EC030	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:55:01			20 / 20	Shiney	3VC16EC051	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:55:46			20 / 20	Sharon Stewart	3vc16ec054	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 0:57:49			20 / 20	Arunaghosala A Hiregoud	3VC16EC008	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:02:45			20 / 20	Aejaz Ahmed	3VC17EC001	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:03:38			18 / 20	Bal Dheeraj	3VC17EC059	All of the mentioned	Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:04:53			20 / 20	BHARGAVI. Y	3VC16EC019	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:07:15			20 / 20	Bal Kishan yadav.B	3VC16EC048	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:09:39			20 / 20	BHUSHANA G P	3VC16EC061	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:09:52			20 / 20	Manya.G	3VC16EC037	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:31:47			14 / 20	Jasudevi.S	3VC16EC041	All of the mentioned	Sampling & Quantization	ZT	Improved, degraded	QPSK	None of the mentioned	QAM	NONe	Non coherent	Sinc
8/11/2021 10:32:01			16 / 20	D.Sreenidhi	3VC16EC014	All of the mentioned	Quantization	ZT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:32:10			20 / 20	Chinna Dhanush K	3VC16EC013	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:55:24			20 / 20	Sneh pooja	3vc19ec058	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 10:55:34			20 / 20	Supritha. A. G	3VC16EC059	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 11:02:10			20 / 20	KAVYA KUMARI	3VC16EC055	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 11:17:30			20 / 20	Gadipalli Dhanvi	3VC16EC020	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 11:21:29			20 / 20	Manya.G	3VC16EC037	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 11:22:08			20 / 20	Sahana Kesaharu	3VC16EC047	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 11:34:37			20 / 20	B.SHRISHA	3VC16EC060	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 11:48:49			20 / 20	Mehaj Banu	3VC16EC032	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 11:56:11			20 / 20	B PUNDU RANGA	3VC16EC009	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 12:42:21			20 / 20	Kausalya begam	3VC16EC024	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 12:47:24			20 / 20	E VAISHNAVI	3VC16EC017	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 12:56:58			20 / 20	Sneh Bragutha	3vc16ec076	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/11/2021 14:53:33			0 / 20	Bhavakumar s l	3vc19ec053	Frame synchronization	Quantization	ZT	Degraded, degraded	BPSK	ASK & PSK	BPSK	Wavelt	Non coherent	Cosine
8/11/2021 21:18:41			18 / 20	Manjunatha S	3vc19ec053	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	None of the mentioned	Sinc
8/11/2021 22:27:39			20 / 20	S.Vidhya Rama	3VC16EC044	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/13/2021 7:48:47			20 / 20	UMESH S	3VC16EC061	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/13/2021 7:53:17			20 / 20	K. Jayanth chaudary	3vc19ec027	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/13/2021 14:47:48			18 / 20	MANJUNATH HIREMATH	3VC16EC404	None of the mentioned	None of the mentioned	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/13/2021 18:05:14			20 / 20	Yamuna begam	3VC16EC064	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/13/2021 17:56:16			20 / 20	Dhanitha VH	3VC16EC018	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/13/2021 19:14:34			20 / 20	Mahesh C T	3VC16EC402	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/13/2021 20:01:08			20 / 20	Gowramma. Y	3VC16EC019	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/13/2021 23:07:06			20 / 20	Sadiqha nasa	3VC16EC046	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/16/2021 10:21:39			20 / 20	Mhajs Mahadik	3VC16EC402	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/16/2021 10:21:50			20 / 20	Shiva A	3VC16EC062	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/21/2021 12:27:11			20 / 20	Kumaraswamy	3VC16EC009	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/21/2021 12:38:36			20 / 20	Durga bhavani	3VC16EC016	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/21/2021 17:05:59			20 / 20	Ruthvik Anjum	3VC16EC042	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	Wavelt	Non coherent	Sinc
8/26/2021 18:02:20			15 / 20	Mahnoor	3VC16EC020	All of the mentioned	Sampling & Quantization	VT	Improved, degraded	QPSK	ASK & PSK	QAM	RZNRz	Non coherent	Sinc

8/12/2021 7:53:17	jayanthkondeti@gmail.com	20 / 20	K. Jayanth chowd	3vc18ec027	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/12/2021 14:47:43	manjuhh.17@gmail.com	18 / 20	MANJUNATH HIR	3VC19EC404	B	All of the mention	None of the mentione	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/12/2021 15:05:14	kareeshmabegum050@gn	20 / 20	Kareeshma begur	3VC18EC024	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/12/2021 17:55:16	dikshithavn@gmail.com	20 / 20	Dikshitha VN	3VC18EC015	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/12/2021 19:14:38	maheshct24@gmail.com	20 / 20	Mahesh C T	3VC19EC403	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/12/2021 20:01:09	gowriajay.77@gmail.com	20 / 20	Gouramma. T	3VC18EC019	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/12/2021 23:07:59	sadiqhanaaz092@gmail.c	20 / 20	Sadiqha naaz	3VC18EC046	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/19/2021 10:21:50	khajamainuddin479ec10@	20 / 20	Khaja Mainuddin	3VC19EC402	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/19/2021 10:21:50	shiva.angadi9999@gmail.(	20 / 20	Shiva A	3VC18EC052	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/21/2021 12:27:11	narasammasaraswati40@	20 / 20	Narasamma	3VC18EC036	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/21/2021 12:38:36	durgabhavani9244@gmail	20 / 20	Durga bhavani	3VC18EC016	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/21/2021 17:05:00	rumanaanjum092@gmail.(	20 / 20	Rumana Anjum	3VC18EC042	A	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	Wss/R	Non coherent	Sinc
8/28/2021 15:02:25	maimudamaimuda3@gma	18 / 20	Maimuda	3VC18EC029	B	All of the mention	Sampling & Quantizat	1/T	Improved, degrac	QPSK	ASK & PSK	QAM	R/Wss	Non coherent	Sinc

V.V. Sangha's

RAO BAHADUR Y.MAHABALESWARAPPA ENGINEERING COLLEGE

Cantonment, Ballari - 583 104 (Karnataka)

Organized by

Department of Electronics & Communication Engineering

Certificate of Appreciation

This is to certify that {{Full Name}} USN {{Other Identifier}} of {{Other Identifier2}} section has secured {{percent}} in online Quiz on *"DIGITAL COMMUNICATION"* on 11-07-2021

Dr. Savita Sonali
Vice Principal & HOD

Manasa K. Chigalur
Mrs Manasa K C
Course Co-ordinator

Mrs.Anitha.A
Course Co-ordinator

Timestamp	Email	Full Name	Other Identifier	Other Identifier 2	Total Score	Percent Score	Passed?	Certificate ID
08/10/2021 14:56:54	manasakchigateri@rymec.in	manasakchigateri@rymec.in	manasa k c	3vc		0	0.0%	FALSE	
08/10/2021 15:08:40	manasakchigateri@rymec.in	manasakchigateri@rymec.in	MANASA K CHIGATERI	3VC		20	100.0%	TRUE	FHIUIO-CE000001
08/10/2021 15:13:43	manasakchigateri@rymec.in	manasakchigateri@rymec.in	MANASA K CHIGATERI	3VC		20	100.0%	TRUE	FHIUIO-CE000002
08/10/2021 15:19:03	manasakchigateri@rymec.in	manasakchigateri@rymec.in	manasa	3vc		16	80.0%	TRUE	FHIUIO-CE000003
08/10/2021 15:29:36	manasakchigateri@rymec.in	manasa		11 B		14	70.0%	TRUE	FHIUIO-CE000004
08/10/2021 15:33:50	manasakchigateri@rymec.in	MANASA K CHIGATERI	RESEARCH SCHLOAR	A		20	100.0%	TRUE	FHIUIO-CE000005
08/10/2021 15:50:40	manasakchigateri20@gmail.com	MANASA K CHIGATERI	RESEARCH SCHLOAR	A		20	100.0%	TRUE	FHIUIO-CE000006
08/11/2021 9:32:46	vinayjangadi0703@gmail.com	Vinay J	3VC18EC067	A		16	80.0%	TRUE	FHIUIO-CE000007
08/11/2021 9:33:56	shivaramr27@gmail.com	Shivaram Reddy	3VC18EC021	A		20	100.0%	TRUE	FHIUIO-CE000008
08/11/2021 9:37:41	manunaikodi36@gmail.com	Manu B n	3VC18EC031	A		20	100.0%	TRUE	FHIUIO-CE000009
08/11/2021 9:38:31	prajwalks22@gmail.com	PRAJWAL KS	3VC18EC040	A		20	100.0%	TRUE	FHIUIO-CE000010
08/11/2021 9:39:10	lsuma456@gmail.com	Sumalatha	3VC18EC058	A		20	100.0%	TRUE	FHIUIO-CE000011
08/11/2021 9:39:08	keerthinnayak2001@gmail.com	N.KEERTHI	3VC18EC033	A		20	100.0%	TRUE	FHIUIO-CE000012
08/11/2021 9:41:04	vaishnavi.amaravathi23@gmail.com	VAISHNAVI A	3VC18EC064	A		20	100.0%	TRUE	FHIUIO-CE000013
08/11/2021 9:41:07	chandhanadevendra@gmail.com	Chandhana.N.D.	3VC18EC012	A		20	100.0%	TRUE	FHIUIO-CE000014
08/11/2021 9:41:30	hafsaafreen639@gmail.com	Hafsa Afreen	3VC18EC022	A		20	100.0%	TRUE	FHIUIO-CE000015
08/11/2021 9:43:41	sachindhayapule083@gmail.com	Sachin Dhayapule	3VC18EC045	A		20	100.0%	TRUE	FHIUIO-CE000016
08/11/2021 9:45:49	akashramdurg2000@gmail.com	Akash Ramdurg	3VC18EC003	A		20	100.0%	TRUE	FHIUIO-CE000017
08/11/2021 9:47:10	sandhyapundi244@gmail.com	Sandhya.P	3VC18EC049	A		18	90.0%	TRUE	FHIUIO-CE000018
08/11/2021 9:48:40	hakash340@gmail.com	AKASH H	3VC18EC002	A		20	100.0%	TRUE	FHIUIO-CE000019
08/11/2021 9:50:21	kadappa09082000@gmail.com	Kadappa Kadagoudar	3VC18EC023	A		20	100.0%	TRUE	FHIUIO-CE000020
08/11/2021 9:52:35	korimohankumar@gmail.com	Kori madhu mohan kumar	3V18EC028	A		20	100.0%	TRUE	FHIUIO-CE000021
08/11/2021 9:55:01	shineyyy3@gmail.com	Shiney	3VC18EC051	A		20	100.0%	TRUE	FHIUIO-CE000022

Timestamp	Email	Full Name	Other Identifier	Other Identifier 2	Total Score	Percent Score	Passed?	Certificate ID
08/11/2021 9:55:46	shivanih12345@gmail.com	Shivani Shivani	3vc18ec054	A	20	100.0%	TRUE	FHIUIO-CE000023
08/11/2021 9:57:48	avinashgouda21@gmail.com	Avinashgouda A Hiregoudar	3VC18EC006	A	20	100.0%	TRUE	FHIUIO-CE000024
08/11/2021 10:02:45	aejazayodhi143@gmail.com	Aejaz Ahmed	3VC17EC001	A	20	100.0%	TRUE	FHIUIO-CE000025
08/11/2021 10:03:27	saidheeraj1299@gmail.com	Sai Dheeraj	3VC17EC059	A	18	90.0%	TRUE	FHIUIO-CE000026
08/11/2021 10:04:52	bhargaviy88@gmail.com	BHARGAVI. Y	3VC18EC010	A	20	100.0%	TRUE	FHIUIO-CE000027
08/11/2021 10:07:14	kalyan.ece.rymec@gmail.com	Sai Kalyan yadav.B	3VC18EC048	A	20	100.0%	TRUE	FHIUIO-CE000028
08/11/2021 10:08:08	shreenivasagp175@gmail.com	SHREENIVASA G P	3VC16EC081	A	20	100.0%	TRUE	FHIUIO-CE000029
08/11/2021 10:09:51	navya.ece.rymec@gmail.com	Navya.G	3VC18EC037	A	20	100.0%	TRUE	FHIUIO-CE000030
08/11/2021 10:31:47	mrinalinirs09@gmail.com	Mrinalini R S	3VC18EC041	B	14	70.0%	TRUE	FHIUIO-CE000031
08/11/2021 10:33:01	sreekanthchowdary0802@gmail.com	D.Sreekanth	3VC18EC014	B	16	80.0%	TRUE	FHIUIO-CE000032
08/11/2021 10:53:10	kamamchinnaganesh619@gmail.com	Chinna Ganesh K	3VC18EC013	B	20	100.0%	TRUE	FHIUIO-CE000033
08/11/2021 10:55:24	kodi.ece.rymec@gmail.com	Kodi pooja	3vc18ec026	A	20	100.0%	TRUE	FHIUIO-CE000034
08/11/2021 10:55:34	agsuppi.ece.rymec@gmail.com	Supritha. A. G	3VC18EC059	B	20	100.0%	TRUE	FHIUIO-CE000035
08/11/2021 11:00:09	kavitakumari99.ece.rymec@gmail.com	KAVITA KUMARI	3VC18EC025	B	20	100.0%	TRUE	FHIUIO-CE000036
08/11/2021 11:17:38	dharanigudiputi@gmail.com	Gudiputi Dharani	3VC18EC020	A	20	100.0%	TRUE	FHIUIO-CE000037
08/11/2021 11:21:20	navya.ece.rymec@gmail.com	Navya.G	3VC18EC037	A	20	100.0%	TRUE	FHIUIO-CE000038
08/11/2021 11:22:04	sahanak9296@gmail.com	Sahana Kembhavi	3VC18EC047	A	20	100.0%	TRUE	FHIUIO-CE000039
08/11/2021 11:24:37	bshirisha926@gmail.com	B.SHIRISHA	3VC18EC009	B	20	100.0%	TRUE	FHIUIO-CE000040
08/11/2021 11:46:48	mehtajbanu999@gmail.com	Mehtaj Banu	3VC18EC032	A	20	100.0%	TRUE	FHIUIO-CE000041
08/11/2021 11:58:11	panduranga58969@gmail.com	B PANDU RANGA	3VC18EC008	B	20	100.0%	TRUE	FHIUIO-CE000042
08/11/2021 12:42:31	kareeshmabegum050@gmai.com	Kareeshmabegum	3VC18EC024	A	20	100.0%	TRUE	FHIUIO-CE000043
08/11/2021 12:47:24	elluruvaishnavi2001@gmail.com	E VAISHNAVI	3VC18EC017	A	20	100.0%	TRUE	FHIUIO-CE000044
08/11/2021 12:56:49	shaikshafufta.ece.rymec@gmail.com	Shaik Shaguftha	3vc16ec076	B	20	100.0%	TRUE	FHIUIO-CE000045

Timestamp	Email	Full Name	Other Identifier	Other Identifier 2	Total Score	Percent Score	Passed?	Certificate ID
08/11/2021 14:53:33	shivuck2000@gmail.com	Shivakumar c k	3vc18ec053	A	6	30.0%	FALSE	
08/11/2021 21:15:41	manjuchiru186@gmail.com	Manjunatha B	3vc18ec030	B	18	90.0%	TRUE	FHIUIO-CE000046
08/11/2021 22:27:39	vidhya8861994822@gmail.com	S.Vidhya Shree	3VC18EC044	B	20	100.0%	TRUE	FHIUIO-CE000047
08/12/2021 7:40:47	bumesh8123@gmail.com	UMESH B	3VC18EC061	B	20	100.0%	TRUE	FHIUIO-CE000048
08/12/2021 7:53:16	jayanthkondeti@gmail.com	K. Jayanth chowdary	3vc18ec027	B	20	100.0%	TRUE	FHIUIO-CE000049
08/12/2021 14:47:43	manjuhh.17@gmail.com	MANJUNATH HIREMATH	3VC19EC404	B	18	90.0%	TRUE	FHIUIO-CE000050
08/12/2021 15:05:13	kareeshmabegum050@gmai.com	Kareeshma begum	3VC18EC024	A	20	100.0%	TRUE	FHIUIO-CE000051
08/12/2021 17:55:15	dikshithavn@gmail.com	Dikshitha VN	3VC18EC015	B	20	100.0%	TRUE	FHIUIO-CE000052
08/12/2021 19:14:37	maheshct24@gmail.com	Mahesh C T	3VC19EC403	B	20	100.0%	TRUE	FHIUIO-CE000053
08/12/2021 20:01:08	gowriajay.77@gmail.com	Gouramma. T	3VC18EC019	B	20	100.0%	TRUE	FHIUIO-CE000054
08/12/2021 23:07:58	sadiqhanaaz092@gmail.com	Sadiqha naaz	3VC18EC046	B	20	100.0%	TRUE	FHIUIO-CE000055
08/19/2021 10:21:49	khajamainuddin479ec10@gmail.com	Khaja Mainuddin	3VC19EC402	A	20	100.0%	TRUE	FHIUIO-CE000056
08/19/2021 10:21:49	shiva.angadi9999@gmail.com	Shiva A	3VC18EC052	B	20	100.0%	TRUE	FHIUIO-CE000057
08/21/2021 12:27:11	narasammasaraswati40@gmail.com	Narasamma	3VC18EC036	B	20	100.0%	TRUE	FHIUIO-CE000058
08/21/2021 12:38:36	durgabhavani9244@gmail.com	Durga bhavani	3VC18EC016	B	20	100.0%	TRUE	FHIUIO-CE000059
08/21/2021 17:04:59	rumanaanjum092@gmail.com	Rumana Anjum	3VC18EC042	A	20	100.0%	TRUE	FHIUIO-CE000060
08/28/2021 15:02:24	maimudamaimuda3@gmail.com	Maimuda	3VC18EC029	B	18	90.0%	TRUE	FHIUIO-CE000061

V.V. Sangha's

RAO BAHADUR Y.MAHABALESWARAPPA ENGINEERING COLLEGE

Cantonment, Ballari - 583 104 (Karnataka)

Organized by

Department of Electronics & Communication Engineering

Certificate of Appreciation

This is to certify that {{Full Name}} USN {{Other Identifier}} of {{Other Identifier2}} section has secured {{percent}} in online Quiz on *"DIGITAL COMMUNICATION"* on 11-07-2021

Dr. Savita Soppin
Vice Principal & HOD

Manasa K.Chigalur
Mrs Manasa K C
Course Co-ordinator

Mrs.Anitha.A
Course Co-ordinator

Rao Bahadur Y Mahabaleswarappa Engineering College,Ballari

Department of Electronics & Communication Engineering

Lab Evaluation Sheet for the EVEN Semester 2020-21 (Covid Lock Down Period)

Semester :6A **Subject with Code: Communication Lab (18ECL67)** **Max Marks:40**

Sl. No	USN	Name of the Student	Exp/Programs (each experiment carries 30 M)										Average	LAB CIE(10M)	Total
			1	2	3	4	5	6	7	8	9	10			
A-1	3VC18EC002	AKASH H	30	30	30	30	30	30	30	30	30	30	30	10	40
A-2	3VC18EC003	AKASH SHASHIDHAR RAMDURG	30	30	30	30	30	30	30	30	30	30	30	10	40
A-3	3VC18EC004	ANKITHA N G	30	30	30	30	30	30	30	30	30	30	30	10	40
A-4	3VC18EC006	AVINASHGOUDA A HIREGOUDAR	30	30	30	30	30	30	30	30	30	30	30	10	40
A-5	3VC18EC010	BHARGAVI Y	30	30	30	30	30	30	30	30	30	30	30	10	40
A-6	3VC18EC012	CHANDHANA ND	30	30	30	30	30	30	30	30	30	30	30	9	39
A-7	3VC18EC017	E VAISHNAVI	30	30	30	30	30	30	30	30	30	30	30	10	40
A-8	3VC18EC020	GUDIPUTI DHARANI	30	30	30	30	30	30	30	30	30	30	30	10	40
A-9	3VC18EC022	HAFSA AFREEN	30	30	30	30	30	30	30	30	30	30	30	10	40
A-10	3VC18EC023	KADAPPA KADAGOUDAR	30	30	30	30	30	30	30	30	30	30	30	10	40
A-11	3VC18EC024	KAREESHMA BEGUM	30	30	30	30	30	30	30	30	30	30	30	10	40
A-12	3VC18EC026	KODI POOJA	30	30	30	30	30	30	30	30	30	30	30	10	40
A-13	3VC18EC028	KORI MADHUMOHANKUMAR	30	30	30	30	30	30	30	30	30	30	30	10	40
A-14	3VC18EC031	MANU NAIKODI	30	30	30	30	30	30	30	30	30	30	30	10	40
A-15	3VC18EC032	MEHTAJ BANU	30	30	30	30	30	30	30	30	30	30	30	10	40
A-16	3VC18EC033	N KEERTHI	30	30	30	30	30	30	30	30	30	30	30	10	40
A-17	3VC18EC037	NAVYA G	30	30	30	30	30	30	30	30	30	30	30	9	39
A-18	3VC18EC039	NITHYA SANTHOSHI H	30	30	30	30	30	30	30	30	30	30	30	10	40
A-19	3VC18EC040	PRAJWAL K S	30	30	30	30	30	30	30	30	30	30	30	9	39
A-20	3VC18EC042	RUMANA ANJUM	30	30	30	30	30	30	30	30	30	30	30	8	38
A-21	3VC18EC045	SACHIN DHAYAPULE	30	30	30	30	30	30	30	30	30	30	30	9	39
A-22	3VC18EC047	SAHANA P KEMBHAVI	30	30	30	30	30	30	30	30	30	30	30	10	40
A-23	3VC18EC048	SAI KALYAN YADAV B	30	30	30	30	30	30	30	30	30	30	30	10	40
A-24	3VC18EC049	SANDHYA P	30	30	30	30	30	30	30	30	30	30	30	10	40
A-25	3VC18EC051	SHINEY	30	30	30	30	30	30	30	30	30	30	30	10	40
A-26	3VC18EC053	SHIVAKUMAR C K	30	30	30	30	30	30	30	30	30	30	30	10	40

Sl. No.	USN	Name of the Student	Marks for individual experiment (out of 30 M)												
			1	2	3	4	5	6	7	8	9	10	11	12	13
A-27	3VC18EC054	SHIVANI H	30	30	30	30	30	30	30	30	30	30	30	10	40
A-28	3VC18EC064	VAISHNAVI A	30	30	30	30	30	30	30	30	30	30	30	10	40
A-29	3VC18EC065	VASUDEV T M	30	30	30	30	30	30	30	30	30	30	30	10	40
A-30	3VC18EC067	VINAY JANGADI	30	30	30	30	30	30	30	30	30	30	30	10	40
A-31	3VC17EC001	AEJAZ AHMED	30	30	30	30	30	30	30	30	30	30	30	10	40
A-32	3VC17EC040	NITISH KUMAR M R	30	30	30	30	30	30	30	30	30	30	30	10	40
A-33	3VC17EC059	SAI DHEERAJ	30	30	30	30	30	30	30	30	30	30	30	10	40
A-34	3VC18EC021	H SHIVARAM REDDY	30	30	30	30	30	30	30	30	30	30	30	10	40
A-35	3VC18EC058	SUMALATHA	30	30	30	30	30	30	30	30	30	30	30	10	40
A-36	3VC16EC081	SHREENIVASA G P	30	30	30	30	30	30	30	30	30	30	30	9	39

Staff Incharge

1 Manasa K J Chaitra

2

3

Department of
Electronics & Communication Engg.
R.Y.M. Engineering College,
(Formerly Vijayanagar Engg. College)
BELLARY-583 104.

RAO BAHADUR Y MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI DEPARTMENT OF ELECTRONICS COMMUNICATION ENGNEERING

DIRECT & INDIRECT ATTAINMENT 2020-21

Mr.Srikanth N / Mrs. Manasa K C				
Course Name: COMMUNICATION LAB				
Course Code: 18ECL67	Sem	6	Sec	A

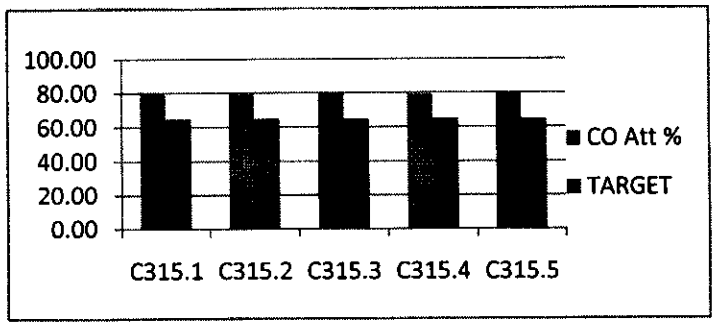
C315.1	Demonstrate the characteristics and response of microwave waveguide.(L2)
C315.2	Demonstrate and measure the wave propagation characteristics in micro strip antennas and micro strip
C315.3	Construct and test the analog and digital modulation circuits and display thewaveforms.(L3)
C315.4	Illustrate the digital modulation systems.(L2)
C315.5	Experiment with error performance of basic digital modulation schemes.(L3)

CO-PO/PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C315.1	2		2										2	
C315.2	3	2	2	3									1	
C315.3	2	2	2										1	
C315.4	2	2	2	2									3	
C315.5	2	2	2	2	2								2	
AVG	2.2	2	2	2.33	2								1.8	

CO DIRECT & INDIRECT ATTAINMENT

	CO Att %	TARGET
C315.1	79.00	65
C315.2	79.00	65
C315.3	79.00	65
C315.4	79.00	65
C315.5	79.00	65

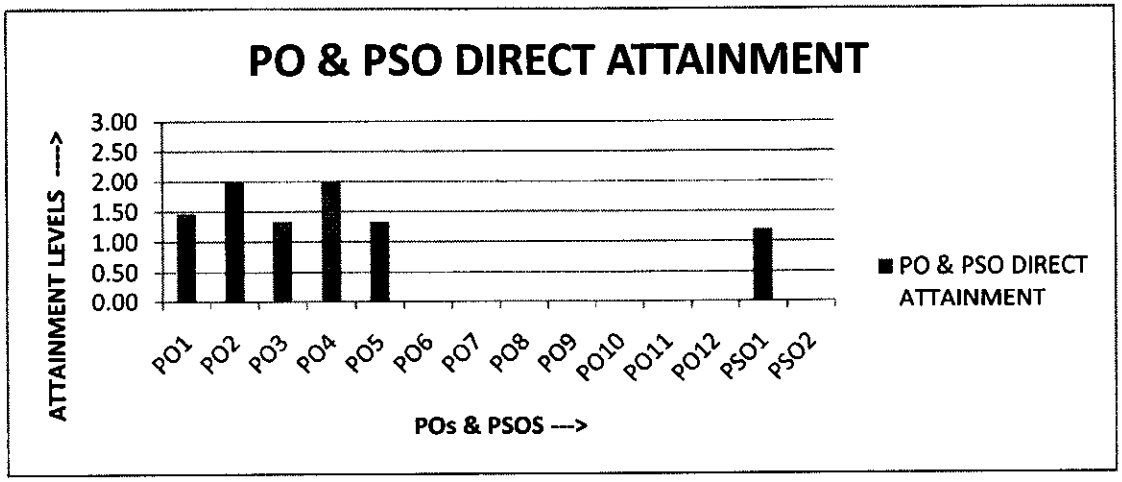


PO & PSO DIRECT ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PO ATT	1.47	2.00	1.33	2.00	1.33								1.20	

PO & PSO INDIRECT ATTAINMENT

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
PO ATT	2.20	2.00	2.00	2.33	2.00								1.80	



CO ATTAINMENT GAP ANALYSIS (LAB)

Course Outcomes	CO Attainment	CO Target	CO Attainment Gap
C315.1	79.00	65	NIL
C315.2	79.00	65	NIL
C315.3	79.00	65	NIL
C315.4	79.00	65	NIL
C315.5	79.00	65	NIL

ACTION REPORT ON GAP ANALYSIS

Course Outcomes	Action proposed to bridge the gap	Modification of target if achieved
C315.1	*-NIL-*	*-NIL-*
C315.2	*-NIL-*	*-NIL-*
C315.3	*-NIL-*	*-NIL-*
C315.4	*-NIL-*	*-NIL-*
C315.5	*-NIL-*	*-NIL-*

Note: 1.Suitable action to be initiated to fill the gap at the course coordinator level and the same has to be documented

2. If the targets are achieved then higher targets may be set.

3. If the targets are not achieved then planning must be done with respect to

Improvements in teaching /learning process so as to meet the target

CBCS SCHEME

15EC61

USN

Sixth Semester B.E. Degree Examination, Aug./Sept.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. Mention its applications. (05 Marks)

b. What is line coding? For binary stream 101001 sketch the following line codes:
(i) Polar RZ (ii) Polar NRZ (iii) Bipolar NRZ (iv) Manchester (05 Marks)

c. Derive the expression for the complex low pass representation of band pass systems. (06 Marks)

OR

2 a. Derive the expression for power spectral density of Manchester format and draw the spectrum. (06 Marks)

b. Define pre-envelope and complex envelope of a real values signal. Given a band pass signal S(t), sketch the spectral representation of signal S(t), pre-envelope and complex envelope. (06 Marks)

c. Code the binary pattern (i) 11100001011010000000000010 using HDB3 and bipolar NRZ (ii) 011000011 using B3ZS. Draw B3ZS waveform. (04 Marks)

Module-2

3 a. Use Gram-Schmidt orthoganalization procedure and find the set of orthonormal basis functions to represent the four signals $S_1(t)$, $S_2(t)$, $S_3(t)$ and $S_4(t)$ shown in Fig.Q3(a). Also express each of these signals in terms of the set of basis functions.

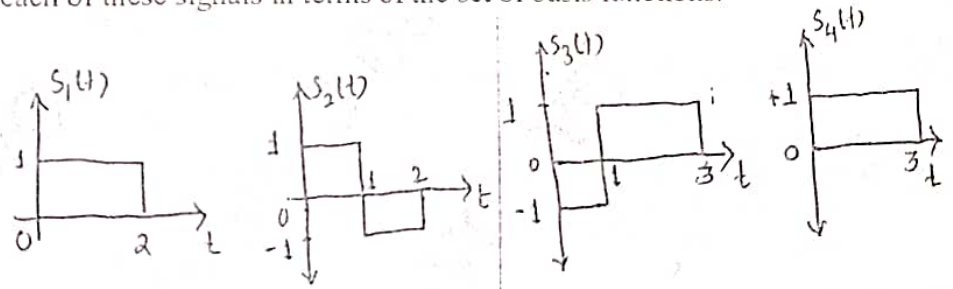


Fig.Q3(a) (08 Marks)

b. Explain the matched filter receiver with the relevant mathematical theory. (08 Marks)

OR

4 a. Explain the geometric representation of signals and express energy of the signal in terms of the signal vector. (08 Marks)

b. Explain the operation of correlation receiver with relevant diagrams. (04 Marks)

c. Explain how to convert continuous AWGN channel into a vector channel. (04 Marks)

Module-3

5 a. Explain the BPSK signal with its signal space characterization. With a neat block diagram, explain the generation and detection of BPSK signal. (10 Marks)

b. What is difference between BPSK and DPSK? Illustrate the operation of DPSK for the binary sequence 11010101. Assume reference bit as '1'. (06 Marks)

OR

6 a. Derive an expression for probability of error of BFSK. (06 Marks)

b. What is an advantage of M-ary QAM over M-ary PSK system? Obtain the constellation of QAM for M = 4 and draw the signal space diagram. (04 Marks)

c. With a neat diagram, explain the generation and detection of QPSK signals. (06 Marks)

Module-4

7 a. With a neat block diagram, explain the digital PAM transmission through band limited baseband channels and obtain the expression for ISI. (06 Marks)

b. State the Nyquist criterion for zero ISI. (02 Marks)

c. What are adaptive equalizers? Explain linear adaptive equalizer based on MSE criterion. (08 Marks)

OR

8 a. For the binary data sequence 11101001 given as input to the pre-coder. The output of the pre-coder is used to modulate a duo binary transmitting filter. Obtain the :

(i) Pre-coded sequence (ii) Transmitted amplitude levels

(iii) The received signal levels (iv) Decoded sequence (04 Marks)

b. Explain the design of band limited signals with controlled ISI. Describe the time domain and frequency domain characteristics of a duo binary signal. (07 Marks)

c. What is channel equalization? With a neat diagram, explain the concept of equalization using a linear transversal filter. (05 Marks)

Module-5

9 a. Explain the model of a spread spectrum digital communication system. (05 Marks)

b. With a neat block diagram, explain the CDMA system based on IS-95. (08 Marks)

c. Write a short note on application of spread spectrum in wireless LAN. (03 Marks)

OR

10 a. With a neat block diagram, explain frequency hopped spread spectrum technique. Explain the terms chip rate, jamming margin and processing gain. Also mention its applications. (08 Marks)

b. Explain the effect of dispreading on a narrow band interference in DSSS systems. A DSSS is designed to have the power ratio P_R/P_N at the intended receiver is 10^{-2}. If the desired $E_b/N_o = 10$ for acceptable performance, determine the minimum value of processing gain. (04 Marks)

c. Mention the applications of DSSS and explain any one in detail. (04 Marks)

* * * * *

CBCS SCHEME

15EC61

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.

Module-1

1 a. Define Hilbert transform. What are its applications. Prove that a signal g(t) and its Hilbert transform $\hat{g}(t)$ 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 "1010000011000011000000" 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)

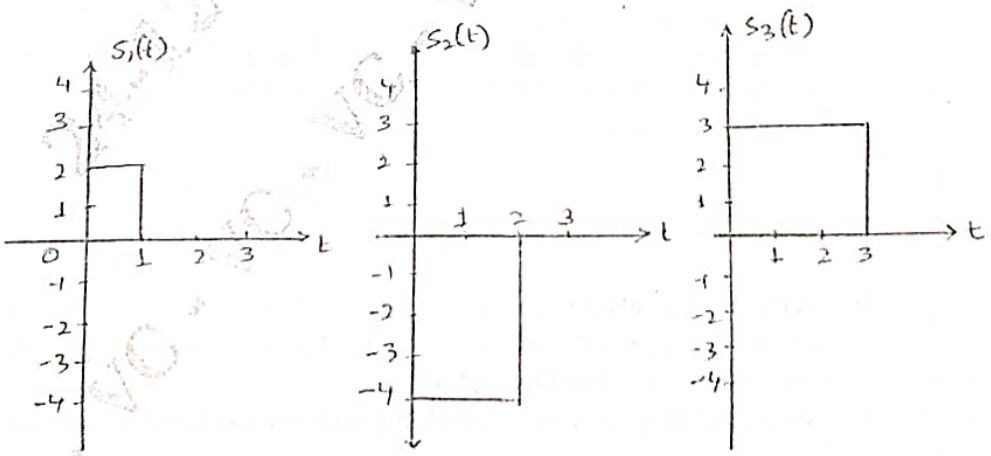


Fig.Q3(b)

OR

4 a. Explain the correlation receiver with neat diagrams and explanation of detector and the maximum –linklihood decoder blocks. (08 Marks)

b. Explain the matched filter receiver. Obtain the expression for the impulse response of the matched filter. (08 Marks)

Module-3

5 a. Derive the expression for error probability of binary PSK using coherent detection. (06 Marks)

b. Binary data are transmitted over a microwave link at the rate of 10^6 bits/sec and the power spectral density of the noise at the receiver input is 10^{-10} ω/Hz. find the average carrier power required to maintain an average probability of error $Pe \leq 10^{-4}$ for the following cases.
Binary PSK using coherent detection
DPSK
Note : take $erfc(2.63) = 2 \times 10^{-4}$, $Q(3.7) = 10^{-4}$. (06 Marks)

c. Define bandwidth efficiency. Tabulate and comment on the bandwidth efficiency of M-ary PSK signals for different values of M. (04 Marks)

OR

6 a. With neat diagram and expressions, explain binary FSK generation and non-coherent detection scheme. (06 Marks)

b. Explain the generation and optimum detection of differential phase – shift keying with neat block diagram. (06 Marks)

c. What is the advantage of M-ary QAM over M-ary PSK system? Obtain the constellation of QAM for M = 4 and draw signal space diagram. (04 Marks)

Module-4

7 a. With a neat block diagram, explain the digital PAM transmission through band limited baseband channels. Also obtain the expression for inter symbol interference. (06 Marks)

b. Explain the modified duo-binary signaling scheme, with pre-coding. Illustrate the encoding for the binary sequence "011100101". Assume previous pre-coder outputs as 1. (07 Marks)
With neat diagram, explain the timing features pertaining to eye diagram and it interpretation for baseband binary data transmission system. (03 Marks)

OR

8 a. With neat sketches and expressions, explain raised cosine spectrum solution to reduce ISI. (06 Marks)

b. What is the advantage of controlled ISI partial response signaling scheme? With block diagram, explain the duo-binary encoder with pre-coder. Mention the frequency response, impulse response and its features. (06 Marks)

c. With neat diagram and relevant expressions, explain the concept of adaptive equalization. (04 Marks)

15EC61

Module-5

9 a. Explain the working of Direct Sequence Spread Spectrum transmitter and receiver with neat diagram, waveform and expressions. (08 Marks)

b. A slow frequency Hopped/MFSK system has the following parameters,
   i) The number of bits/MFSK symbol = 4
   ii) The number of MFSK symbols per hop = 5
   iii) Calculate the processing gain of the system in decibels. (03 Marks)

c. List and briefly explain any 3 applications of direct sequence spread spectrum. (05 Marks)

OR

10 a. With a neat block diagram, explain frequency Hopped spread spectrum technique. Explain the terms chip rate, Jamming Margin and processing gain. (08 Marks)

b. What is a PN sequence? Explain the generation of maximum-length sequences (ML-sequence). What are the properties of ML sequences? (04 Marks)

c. In a DS/BPSK system, the feedback shift register used to generate the PN sequence has length m = 19. The system is required to have an average probability of symbol error due to externally generated interfering signals that does not exceed 10^{-5}. Calculate the following system parameters in decibels :
   i) Processing gain
   ii) Antijam margin
   (Assume Q(4.25) = 10 –5 or erfc(3) = 2×10^{-5}). (04 Marks)

* * * * *

CBCS Scheme

15EC61

USN | | | | | | | | | |

Sixth Semester B.E. Degree Examination, June/July 2018

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. List the properties of the Hilbert transform. (04 Marks)

b. Obtain the canonical representation of band pass signals. (06 Marks)

c. What is line coding? For the binary stream 011010 sketch the following line codes:
i) Unipolar NRZ
ii) Polar NRZ
iii) Unipolar RZ
iv) Bipolar RZ
v) Manchester (06 Marks)

OR

2 a. Define pre-envelope of a real valued signal. Given a band pass signal s(t), sketch the amplitude spectra of signal s(t), pre-envelope $s_+(t)$ and complex envelope $\tilde{s}(t)$. (04 Marks)

b. Derive the expression for the complex low pass representation of band pass systems. (08 Marks)

c. Write a note on HDBN signaling. (04 Marks)

Module-2

3 a. Explain the geometric representation of signals. Show that energy of the signal is equal to the squared length of the vector representing it. (08 Marks)

b. Derive the expressions for mean and variance of the correlator outputs. Also show that the correlator outputs are statistically independent. (08 Marks)

OR

4 a. Explain the Gram-Schmidt orthogonalization procedure. (06 Marks)

b. Obtain the maximum likelihood decision rule for the signal detection problem. (10 Marks)

Module-3

5 a. Explain the signal space representation for binary phase shift keying modulation. Also derive the expression for the probability of error for the binary phase shift keying. (10 Marks)

b. With a neat block diagram, explain the generation and coherent detection of QPSK signals. (06 Marks)

OR

6 a. With a neat block diagram, explain the non-coherent detection of binary frequency shift keying technique. (04 Marks)

b. Derive an expression for probability of error of binary frequency shift keying technique. Also draw the block diagrams of BFSK transmitter and coherent receiver. (10 Marks)

c. For the binary sequence given by 10010011, illustrate the operation of DPSK. (02 Marks)

Module-4

7 a. With a neat block diagram of digital PAM system obtain the expression for inter symbol interference (ISI). **(06 Marks)**

b. State and prove Nyquist condition for zero ISI. **(06 Marks)**

c. For the binary data sequence $\{d_n\}$ given by 11101001. Determine the precoded sequence, transmitted sequence, received sequence and the decoded sequence. **(04 Marks)**

OR

8 a. Explain the design of band limited signals with controlled ISI. **(10 Marks)**

b. What is a zero forcing equalizer? With a neat block diagram, explain the operation of linear transversal filter. **(06 Marks)**

Module-5

9 a. Explain the model of a spread spectrum digital communication system. **(06 Marks)**

b. Explain the generation and demodulation of direct sequence spread spectrum signals with necessary equation and block diagram. **(07 Marks)**

c. Write a note on low detectability signal transmission as an application of direct sequence spread spectrum. **(03 Marks)**

OR

10 a. With a neat block diagram, explain the frequency hopped spread spectrum. **(07 Marks)**

b. Explain the effect of despreading on a Narrow band interference in direct sequence spread spectrum systems. A direct sequence spread spectrum signal is designed to have the power ratio P_R/P_N at the intended receiver is 10^{-2}. If the desired $E_b/N_o = 10$ for acceptable performance, determine the minimum value of processing gain. **(06 Marks)**

c. Write a note on code division multiple access as an application of direct sequence spread spectrum. **(03 Marks)**

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CBCS SCHEME

USN

Sixth Semester B.E. Degree Examination, June/July 2019
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. Determine the Hilbert transform of the signal $g(t) = \sin c(t)$. (04 Marks)

b. Determine the pre-envelope and complex envelope of the signal shown in Fig.Q1(b). (06 Marks)

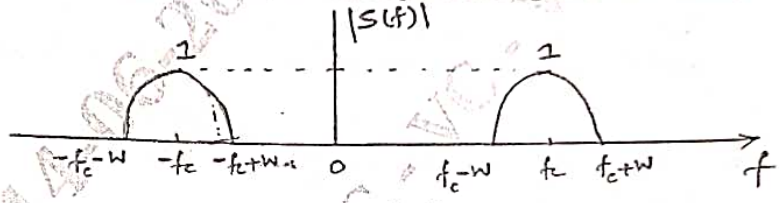

Fig.Q1(b)

c. Explain the time–domain procedure for the complex representation of band pass signals and systems. (06 Marks)

OR

2 a. For a binary sequence 0100000001011 construct i) RZBipolar format ii) Manchester format iii) B3Zs format iv) B6ZS format v) HDB3 format.
Also mention the application of B3ZS and B6Zs formats. (07 Marks)

b. Draw the power spectra of : i) RZAMI signal ii) NRZ polar signal. (03 Marks)

c. Consider a bandpass signal S(t) which is represented in terms of in-phase and quadrature components. Suggest a suitable scheme for :
i) extracting the in-phase and quadrature components from the band pass signal
ii) reconstructing the band pass signal from in-phase and quadrature components. (06 Marks)

Module-2

3 a. For the signals $s_1(t)$, $s_2(t)$, $s_3(t)$ and $s_4(t)$ shown in Fig.3(a), find a set of orthonormal basis functions using gram–Schmidt orthogonalization procedure. (09 Marks)

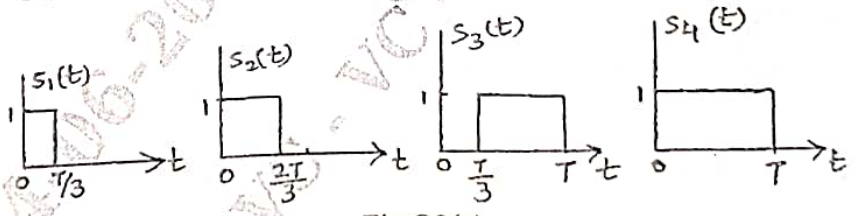

Fig.Q3(a)

b. Explain with neat diagram and necessary equations the matched filter receiver. (07 Marks)

OR

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

b. Show that for a noisy input, the mean value of the j^{th} correlator output X_j depends only on S_{ij} and all the correlators outputs X_j, j = 1, 2, - - - - , N, have a variance equal to the PSD No/2 of the additive noise process w(t). (08 Marks)

Module-3

5 a. Sketch the QPSK wave form for the sequence 01101000. (06 Marks)

b. Obtain the expression for average probability of symbol error for BPSK using coherent detection. (06 Marks)

c. Obtain the constcleation of QAM for M = 16 and draw the signal space diagram. (04 Marks)

OR

6 a. Explain the generation and coherent detection of BFSK system. (06 Marks)

b. The binary sequence 1100100010 is applied to the DPSK transmitter
   i) Sketch the resulting wave from at the transmitter output.
   ii) Applying this waveform to the DPSK receiver, show that in the absence of noise, the original binary sequence is reconstructed at the receiver output. (06 Marks)

c. An FSK system transmits binary data at the rate of 2×10^6 bps. During the source of transmission, AWGN of zero mean and two sided PSD 10^{-20} Watts/Hz is added to the signal. The amplitude of the received sinusoidal wave for digit 1 or 0 is 1μv. Determine the average probability of symbol error assuming non-coherent detection. (04 Marks)

Module-4

7 a. Explain the following terms with related equations and diagram with respect to base band transmission.
   i) ISI and Nyquist condition for zero ISI
   ii) Duobinary signal pulse
   iii) Modified duobinary signal pulse
   iv) Partial response signals
   v) Raised cosine spectrum. (10 Marks)

b. Explain the need for precoder in a duobinary signaling. The binary sequence 1110100100001101 is the input to the precoder whose output is used to modulate a duobinary transmitting filter. Obtain the precoded sequence, transmitted amplitude levels, the received signal levels and the decoded sequence. (06 Marks)

OR

8 a. With a neat diagram, explain the concept of linear traversal filter. (06 Marks)

b. Consider a channel distorted pulse x(t), at the input to the equalizer, given by $x(t) = \frac{1}{1+\left(\frac{2t}{T}\right)^2}$ where 1/T is the symbol rate. The pulse is sampled at the rate 2/T and equalized by a zero-forcing equalizer. Determine the coefficients of a five-tap zero-forcing equalizer. (06 Marks)

c. Write a note on eye diagram. (04 Marks)

Module-5

9 a. With a neat diagram explain the generation of PN sequences and state its properties. (06 Marks)

b. A DS spread–spectrum signal is designed so that the power ratio P_R/P_N at the intended receiver is 10^{-2}. If the desired $E_b/N_0 = 10$ for acceptable performance, determine the minimum value of the processing gain. (04 Marks)

c. Explain with neat block diagram FH spread –spectrum system. (06 Marks

OR

10 a. Explain the generation and demodulation of DS spread spectrum signal. (06 Marks)

b. Write a note on application of spread spectrum in wireless LANs. (04 Marks)

c. With a neat block diagram, explain the IS–95 reverse link. (06 Marks)

CBCS SCHEME

USN | | | | | | | | | | |

15EC61

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)

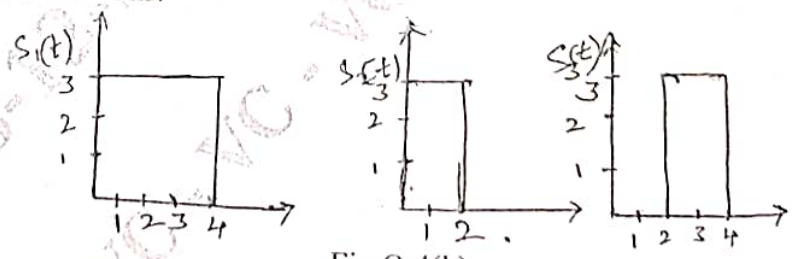

Fig.Q.4(b)

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)

OR

6 a. Derive the expression for error probability of BFSK. (08 Marks)
b. With block diagram explain generation and detection of DPSK. (08 Marks)

Module-4

7 a. What is ISI? Obtain the expression of output of a filter with intersymbol interference. (08 Marks)
b. Explain the Nyquist criterion for distortionless baseband binary transmission and obtain the ideal solution for zero ISI. (08 Marks)

OR

8 a. Draw and explain the time-domain and frequency domain of duobinary and modified duobinary signal. (08 Marks)
b. What is channel equalization? With a neat diagram, explain the concept of equalization using a linear transversal filter. (08 Marks)

Module-5

9 a. Draw the 4 stage linear feedback shift register with 1st and 4th state is connected to Modulo-2 adder. Output of Modulo-2 is connected to 1st stage input. Find the output PN sequence and write the autocorrelation function with initial state 1000. (06 Marks)
b. Explain the generation of direct sequence spread spectrum with relevant waveforms and spectrums. (07 Marks)
c. Write a short note on application of spread spectrum in wireless LAN's. (03 Marks)

OR

10 a. With necessary block diagram, explain the transmitter and receiver of frequency hop spread spectrum. (08 Marks)
b. With a neat block diagram, explain the CDMA system based on IS-95. (08 Marks)

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CO ATTAINMENT GAP ANALYSIS 2010-11

Course Outcomes	CO Attainment	CO Target	CO Attainment Gap
CO309.1	100	65	NIL
CO309.2	100	65	NIL
CO309.3	100	65	NIL
CO309.4	100	65	NIL
CO309.5	100	65	NIL

ACTION REPORT ON GAP ANALYSIS

Course Outcomes	Action proposed to bridge the gap	Modification of target if achieved
CO309.1	---	---
CO309.2	---	---
CO309.3	---	---
CO309.4	---	---
CO309.5		

Note: 1.Suitable action to be initiated to fill the gap at the course coordinator level and the same has to be documented

2. If the targets are achieved then higher targets may be set.

3. If the targets are not achieved then planning must be done with respect to