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VACHANA PITAMAHA DR.P.G.HALAKATTI

COLLEGE OF ENGINEERING AND TECHNOLOGY, VIJAYAPUR

LIBRARY AND INFORMATION CENTER

QUESTION PAPERS

1^{st} ,2^{nd},3^{rd} & 4^{th} .SEMESTER

M.TECH

ELECTRONICS & COMMUNICATION

DEC.2019/JAN.2020

INDEX

CBCS SCHEME

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

16/17ECS14

First Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Advanced 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. Explain M-ary PAM scheme. Derive an expression for average bit energy and d_{min} for a M-ary PAM system. **(08 Marks)**

b. Describe M-QAM modulator with relevant block diagram and mathematical representations. **(08 Marks)**

OR

2 a. What is multidimensional signaling? Explain Hadamard signaling and simplex signaling in brief. **(08 Marks)**

b. How is CPFSK different from FSK? Explain MSK with all mathematical representations and waveforms. **(08 Marks)**

Module-2

3 a. Describe optional detection for vector AWGN channel. **(08 Marks)**

b. Describe matched filter receiver. **(08 Marks)**

OR

4 a. Derive an expression for symbol error probability of M-ary PSK signaling. What is the equivalent bit error probability? **(08 Marks)**

b. Explain noncoherent detection of FSK modulated signals. **(08 Marks)**

Module-3

5 a. Give the model of a multichannel digital communication system. Explain coherent detection for the same. **(08 Marks)**

b. Describe the multicarrier system employing fast Fourier transform. Give the mathematical representations and block diagram. **(08 Marks)**

OR

6 a. What is the importance of carrier recovery and symbol synchronization in signal demodulation? Describe M-QAM receiver in this context. **(08 Marks)**

b. Describe the process of carrier recovery of M-PSK using decision feedback PLL. **(08 Marks)**

Module-4

7 a. Develop a discrete time model for intersymbol interference channel with AWGN. **(08 Marks)**

b. Distinguish between baseband and passband linear equalizers for PSK signaling scheme. **(08 Marks)**

OR

8 a. Describe LMS algorithm. How does it minimize MSE? **(08 Marks)**

b. Explain adaptive decision feedback equalizer. **(08 Marks)**

Module-5

9 a. What is the principle of direct sequence spread spectrum communication? Derive an expression for the codeword error probability of a LBC coded DSSS signal. **(08 Marks)**

b. With the help of block diagram, explain the forward link of IS-95 system. **(08 Marks)**

OR

10 a. Explain the slow frequency hopped spread spectrum system with block diagram and frequency hop diagram. **(08 Marks)**

b. Explain the steps of acquisition and tracking for timing synchronization of the receiver to the received spread spectrum signal. How does delay locked loop help in tracking? **(08 Marks)**

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CBCS SCHEME

USN

16/17ESP/ECS151

First Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Advanced Computer Networks

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. With a neat diagram, explain in detail the ISDN telephone network and list the four principles that are responsible for the growth of communication network services. **(08 Marks)**

b. What is multiplexing? Explain the different types of multiplexing, briefly with neat sketches. **(08 Marks)**

OR

2 a. Explain briefly OSI reference model. **(08 Marks)**

b. List and explain performance metrics of a multiple-access scheme. **(08 Marks)**

Module-2

3 a. Explain FDDI dual ring network with neat diagram. **(10 Marks)**

b. Explain a generic switch with a neat block diagram. **(06 Marks)**

OR

4 a. Explain the requirement of scheduling. **(06 Marks)**

b. Discuss the addressing on the internet with the format of addressing for IPV6. Explain subnetting in the internet. **(10 Marks)**

Module-3

5 a. Discuss the SONET/SDH in detail with SONET Frame structure, SONET payload envelope and SONET justification. **(10 Marks)**

b. Explain Internet protocol header format. **(06 Marks)**

OR

6 a. Explain the ATM Adaptation layer functionality with a neat diagram. **(08 Marks)**

b. Draw the TCP header format and explain. **(08 Marks)**

Module-4

7 a. Explain telephone traffic model and internet traffic model in brief. **(10 Marks)**

b. What is signaling? Explain signaling in ATM networks. **(06 Marks)**

OR

8 a. Explain the different control action for Virtual circuit network based on Time Scales. **(06 Marks)**

b. Discuss Datagram networks in detail. **(10 Marks)**

Module-5

9 a. Explain Window Congestion controls in detail. **(08 Marks)**

b. Explain the important properties of traffic descriptor. **(08 Marks)**

OR

10 a. Explain Rate Congestion control in detail. **(08 Marks)**

b. Explain how Leaky Bucket regulator shapes incoming traffic with the help of a neat diagram. **(08 Marks)**

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CBCS SCHEME

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

18EEE/ESE/EPS/EPE/ECD/EMS11

First Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Mathematical Methods in Control

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Define vector spaces. Show that the S = (1, 1, 1)(1, 0, 1)(0, 1, 1) is a basis of the vector space $V_3(R)$. **(10 Marks)**

b. Define subspace, A non-empty subset W of a vector space V over a field F is a subspace of V if and only if (i) $\forall\ \alpha, \beta \in w \Rightarrow \alpha + \beta \in w$

(ii) $c \in F, \alpha \in w \Rightarrow c\alpha \in w$ **(10 Marks)**

OR

2 a. Define linear transformation. If f: $V_3(R) \to V_2(R)$ is defined by f(x, y, z) = (x + y, y + z) show that f is a linear transformation. **(10 Marks)**

b. Find the linear transformation T : $R^2 \to R^3$ such that T(–1, 1) = (–1, 0, 2), T(2, 1) = (1, 2, 1). **(10 Marks)**

Module-2

3 a. Solve the system of equations

$x + y + z = 1$; $3x + y - 3z = 5$; $x - 2y - 5z = 10$

by using the Crout's method. **(07 Marks)**

b. Find inverse of the matrix using partition method

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 4 & 3 & -1 \\ 3 & 5 & 3 \end{bmatrix}$$ **(07 Marks)**

c. Solve the system of equations

$12x_1 + x_2 + x_3 = 31$; $2x_1 + 8x_2 - x_3 = 24$; $3x_1 + 4x_2 + 10x_3 = 58$

by using Relaxation method. **(06 Marks)**

OR

4 a. Using the Jacobi method find all the eigen values and the corresponding eigen vectors of the matrix $A = \begin{bmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{bmatrix}$ **(10 Marks)**

b. Use the Given's method to find the eigen values of the tridiagonal matrix

$$A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$ **(10 Marks)**

Module-3

5 a. Define orthogonal vectors. Two vectors u and v in an inner product space are orthogonal iff $\|u + v\|^2 = \|u\|^2 + \|v\|^2$ **(08 Marks)**

b. Let S be the set of vectors $v_1 = (1, 2, 1)$, $v_2 = (2, 1, -2)$ and $v_3 = (3, -2, 1)$ in the inner product space R^3 with standard inner product (i) Show that S is orthogonal and is the basis of R^3 (ii) Find the coordinates of vectors (7, 1, 9) relative to the basis S. **(12 Marks)**

OR

6 a. Find the singular values decomposition of the matrix

$$A = \begin{bmatrix} 1 & -1 \\ -2 & 2 \\ 2 & -2 \end{bmatrix}$$ **(10 Marks)**

b. Apply Gram Schmidt orthogonalization process to the basis B = {(1, 0, 1)(1, 0, –1)(0, 3, 4)} of the inner product space R^3 to find an orthogonal basis of R^3. **(10 Marks)**

Module-4

7 a. A random variable x has the following probability function

x	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

i) Find the value of k.

ii) Evaluate (1) $P(x > 6)$ (2) $P(x \geq 6)$ (3) $P(3 < x \leq 6)$ **(07 Marks)**

b. Derive mean and variance of the binomial distribution. **(07 Marks)**

c. Find the value of the constant c such that

$$H(x,y) = \begin{cases} c(2x+y) & 0 \leq x \leq 2 \quad 0 \leq y \leq 3 \\ 0 & \text{otherwise} \end{cases}$$

is a Joint probability density function of x and y. Hence evaluate $P(x \leq 1, y \leq 2)$ **(06 Marks)**

OR

8 a. Derive Mean and variance of the Poisson distribution. **(07 Marks)**

b. The joint distribution of two random variables x and y is as follows:

x \ y	– 4	2	7
1	1/8	1/4	1/8
5	1/4	1/8	1/8

Compute the following :

(i) E(x) and E(y) (ii) E(xy) (iii) COV(xy) (iv) $\rho(x, y)$ **(07 Marks)**

c. The probability that a pen manufactured by a company be defective is 1/10. If 12 such pen are manufactured what is the probability that (i) Exactly 2 are detective (ii) at least 2 are detective (iii) none of them are defective. **(06 Marks)**

Module-5

9 a. Find the moment generating function of the exponential distribution $f(x) = \frac{1}{c}e^{-x/c}$, $0 \leq x \leq \infty$, $c > 0$. Hence find the mean and standard deviation. **(07 Marks)**

b. If x is a random variable with probability generating function $P_x(t)$, find the probability generating function of (i) x + 2 (ii) 2x. **(07 Marks)**

c. If the random variable x has the probability density function $f(x) = \frac{1}{2}e^{-|x|}$ for $-\infty < x < \infty$ find the characteristic function of x. **(06 Marks)**

OR

10 a. In a certain city the daily consumption of electric power in millions of kilowatt hours can be treated as a random variable having an Erlang distribution with parameters $\lambda = \frac{1}{2}$ and $k = 3$. If the power plant of this city has a daily capacity of 12 million Kilowatt hours. What is the probability that this power supply will be inadequate as any given day. **(07 Marks)**

b. Each of the 6 tubes of a radio set has a life length (in years) which may be considered as a random variable that follows a Weibull distribution with parameter $\alpha = 25$ and $\beta = 2$. If the tubes function independently of one another, what is the probability that no tube will have to be replaced during the first 2 months of service? **(07 Marks)**

c. In a test on 2000 electric bulbs, it was found that the life of a particular male, was a Gaussian distribution with an average life of 2040 hours and standard deviation of 60 hours. Estimate the number of bulbs likely to burn.
(i) more than 2150 hours $P(1.833) = 0.4664$
(ii) less than 1950 hours and $P(1.5) = 0.4332$
(iii) more than 1920 hours but less than 2160 hours $P(2) = 0.4772$. **(06 Marks)**

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CBCS SCHEME

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18ECS12

First Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Advanced Digital Signal Processing

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. What is the need for multirate signal processing? Explain decimation and interpolation process, with examples. **(04 Marks)**

b. Derive the expression for the spectrum of a down sampler. **(10 Marks)**

c. If $H(z) = 1 + 2z^{-1} + 3z^{-2} + 4z^{-3}$ implement H(z) using polyphase filter structure. **(06 Marks)**

OR

2 a. Discuss the two noble identities used for interchanging of filters. **(10 Marks)**

b. Discuss uniform DFT filter bank and IDFT filter bank with relevant equations. **(10 Marks)**

Module-2

3 a. Write a short note on the following :

(i) Random process.
(ii) Power density spectrum.
(iii) Mean Ergodic process.
(iv) Statistical average for joint random process. **(10 Marks)**

b. Derive the expression for forward linear predictor using relevant equations. **(10 Marks)**

OR

4 a. For a given linear system with a rational system function H(z), if the output x(n) is related to the input w(n) by a difference equation,

$$x(n) + \sum_{K=1}^{P} a_K x(n-K) = \sum_{K=0}^{N} b_K W(n-K),$$

Define autoregress process, moving average process and autoregressive, moving average process (ARMA) with relevant difference equations. **(06 Marks)**

b. If $y(n) = x(n) + \frac{2}{3}x(n-1) + \frac{2}{5}x(n-2)$

find K_1 and K_2 in the lattice structure of a FIR filter. **(04 Marks)**

c. Derive the expression for backward linear filter. **(10 Marks)**

Module-3

5 a. Explain the principles of adaptive channel equalization with a neat block diagram. **(10 Marks)**

b. Explain the steps involved in Levinson Durbin Algorithm for deriving the expression for Normal equations. **(10 Marks)**

OR

6 a. What is minimum mean square criteria? Hence derive Wiener Hopf equation. **(10 Marks)**

b. Explain least mean square (LMS) algorithm with necessary steps. **(10 Marks)**

Module-4

7 a. How is power spectrum estimated? Classify power spectrum estimation methods. **(04 Marks)**

b. Define Periodogram and express the steps involved in computing the periodogram. **(06 Marks)**

c. Explain Bartlett method for computing the average periodogram. **(10 Marks)**

OR

8 a. Explain the Burg method for computing the AR model parameters. **(10 Marks)**

b. Explain the ARMA model for power spectrum estimation. **(10 Marks)**

Module-5

9 a. Discuss the history of wavelets. Also mention the applications of wavelets in signal processing. **(04 Marks)**

b. What is wavelet transform? List out the mathematical preliminaries to obtain the wavelet transform. **(10 Marks)**

c. List out the properties of wavelets. **(06 Marks)**

OR

10 a. What is Haar wavelet transform? Explain the steps involved in finding the norm of Haar wavelet function. **(10 Marks)**

b. Explain the importance of Daubechies wavelets with relevant equations. **(10 Marks)**

First Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Advanced Embedded Systems

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. What is an embedded system? Explain the different applications of embedded systems. **(10 Marks)**

b. Explain the different classifications of embedded systems. Give an example for each. **(10 Marks)**

OR

2 a. What is the difference between RISC and CISC processors? Give an example for each. **(08 Marks)**

b. Explain the role of reset circuit in embedded system. **(08 Marks)**

c. Explain the quality attribute response and throughout in the embedded system design. **(04 Marks)**

Module-2

3 a. What is hardware software co-design? Explain the fundamental issues in hardware software co-design. **(08 Marks)**

b. Explain the drawbacks of Assembly language based embedded firmware development. **(06 Marks)**

c. Explain in High level language based embedded firmware development **(06 Marks)**

OR

4 a. What is the difference between Data Flow Graph (DFG) and Control Data Flow Graph (CDFG) model? **(08 Marks)**

b. List the advantages of simulator based firmware debugging technique and explain. **(08 Marks)**

c. What is 'NULL' Pointer? Explain its significance in embedded C programming. **(04 Marks)**

Module-3

5 a. With a neat diagram, explain the architecture of ARM cortex M3 microcontroller. **(08 Marks)**

b. Explain the built in rested vectored interrupt controller in ARM cortex M3. **(08 Marks)**

c. Write a note on special registers and their functions in ARM cortex M3. **(04 Marks)**

OR

6 a. What is Stack? Explain the operation of stack push and POP. **(08 Marks)**

b. Write a note on reset sequence in ARM cortex M3. **(04 Marks)**

c. Explain link register and program counter in ARM cortex M3 **(08 Marks)**

Module-4

7 a. Write the syntax for UBFX and SBFX instructions and explain with an example. **(06 Marks)**

b. Explain saturation operations in assembly language of ARM Cortex M3. **(08 Marks)**

c. Write a note on MSR and MRS instruction in ARM Cortex M3. **(06 Marks)**

OR

8 a. Explain memory attributes in the Cortex M3 processor. (08 Marks)

b. Describe Bit – Band operations in ARM Cortex M3. (08 Marks)

9 a. What can cause ARM error responses? (04 Marks)

b. Explain Interrupt enable and clear enable in ARM Cortex M3. (08 Marks)

c. Explain procedure to set up an interrupt in ARM Cortex with an example? (08 Marks)

OR

8	a.	Explain memory attributes in the Cortex M3 processor.	**(08 Marks)**
	b.	Describe Bit – Band operations in ARM Cortex M3.	**(08 Marks)**
	c.	Explain the 3 stage pipeline in the Cortex M3.	**(04 Marks)**

Module-5

9	a.	What can cause AHB error responses?	**(04 Marks)**
	b.	Explain Interrupt enable and clear enable in ARM Cortex M3.	**(08 Marks)**
	c.	What is the procedure to set up an interrupt in ARM Cortex with an example?	**(08 Marks)**

OR

10	a.	With an example, explain a typical Development flow using ARM development tools	**(08 Marks)**
	b.	Write a C program to toggle an Light Emitting Diode (LED).	**(06 Marks)**
	c.	Explain using exclusive access for semaphore operations with flow chart.	**(06 Marks)**

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CBCS SCHEME

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18ECS14

First Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Advanced Communication Systems – I

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Assume that m(t) is a real baseband signal with bandwidth 'w', and $x(t) = m(t)\cos(2\pi f_0 t)$ and $y(t) = m(t)\sin(2\pi f_0 t)$, where, $f_0 > w$. Show that x(t) and y(t) are orthogonal but their low-pass equivalent are not orthogonal. **(06 Marks)**

b. With the aid of relevant spectra and equations illustrate the low-pass equivalent representation of band-pass signals. **(08 Marks)**

c. Explain continuous phase frequency shift keying with relevant equations. **(06 Marks)**

OR

2 a. Explain offset QPSK with the aid of relevant equations, phase transition and in-phase and quadrature – phase of the bit sequence. **(10 Marks)**

b. List the memoryless modulation methods. Explain PAM with the aid of constellation and equations. **(10 Marks)**

Module-2

3 a. Explain the structure of a matched filter receiver with N – correlators. **(10 Marks)**

b. Derive error probability for PSK signaling. **(10 Marks)**

OR

4 a. Write the block diagram of DPSK receiver. Comment on the performance of binary DPSK. **(08 Marks)**

b. Derive error probability of PAM signaling. **(06 Marks)**

c. State and explain the dimensionality theorem. **(06 Marks)**

Module-3

5 a. What are the impairments that the signals transmitted through telephone channels are subjected to? Explain them briefly. **(06 Marks)**

b. The binary sequence 1 1 1 0 1 0 0 1 0 0 0 1 1 0 1 is input to a precoder whose output is used to modulate a duobinary transmitting filter. Construct a table showing the precoded sequence, the transmitted sequence, received sequence and the decoded sequence. **(06 Marks)**

c. Explain optimum maximum likelihood receiver for an AWGN channel with ISI. **(08 Marks)**

OR

6 a. What is an whitened matched filter? With the aid of a diagram, explain equivalent discrete time model of channel with ISI. **(10 Marks)**

b. What is peak distortion criterion? Explain the block diagram of channel with equivalent zero-forcing equalizer. **(10 Marks)**

Module-4

7 a. Explain predictive decision –feedback equalizer with the aid of a diagram and relevant equations. (08 Marks)
b. Explain adaptive equalization based on decisions from viterbi decoder. (06 Marks)
c. Write a note on convergence properties of LMS algorithm. (06 Marks)

OR

8 a. Explain adaptive zero forcing algorithm with the aid of block diagram. (10 Marks)
b. With the aid of relevant equations and block diagram, explain LMS algorithm which minimizes the MSE. (10 Marks)

Module-5

9 a. List some applications of direct sequence spread spectrum signals. Also explain transmission of low-detectability signal and digital cellular CDMA system based on DS spread spectrum. (10 Marks)
b. What are the two phases in time synchronization of the receiver to the received spread spectrum signal? Explain delay locked loop for PN code tracking. (10 Marks)

OR

10 a. Explain the model of spread spectrum digital communication system. (06 Marks)
b. Explain gold sequence in terms of generation, and auto-correlation function. (07 Marks)
c. With the aid of a block diagram explain time-hopping spread spectrum system. (07 Marks)

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CBCS SCHEME

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

18ECS15

First Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Advanced Computer Communication Network

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. With the help of neat diagram explain networking are resource sharing. **(10 Marks)**

b. What is multiplexing? Give the broad classification of multiplexing techniques. **(10 Marks)**

OR

2 a. Describe briefly the layers of OSI model with the help of diagram. **(10 Marks)**

b. Discuss on the features of ATM (Asynchronous Transfer Mode Networks). **(10 Marks)**

Module-2

3 a. With the help of block diagram explain the simple binary modulation and detection. **(10 Marks)**

b. Derive an expression for maximum throughput in S – ALOHA. **(10 Marks)**

OR

4 a. Investigate on trade–off by WANET and obtain a bound on spatial reuse. **(10 Marks)**

b. Give an overview of wireless sensor networks. Mention the tasks for which it can be used. **(10 Marks)**

Module-3

5 a. Explain the two solution mechanisms that are proposed for implementation in hardware. **(10 Marks)**

b. Describe the various techniques in addressing in IP networks. **(10 Marks)**

OR

6 a. Explain the Psudocode for Dijkstra algorithm and Bell-mans ford algorithm. **(10 Marks)**

b. Mention the engineering issues in routing. **(10 Marks)**

Module-4

7 a. State the three economic principles of traffic management. Give an economic framework for traffic management. **(10 Marks)**

b. Define signaling. Discuss signaling in telephone networks and signaling in ATM networks. **(10 Marks)**

OR

8 a. Write a short note on static and dynamic routing. **(10 Marks)**

b. Show how packets of different length are transported in a store and forward manner in a datagram network. **(10 Marks)**

Module-5

9 a. List the control problems in ATM networks. **(10 Marks)**

b. Describe briefly window cognition control and rate congestion control. **(10 Marks)**

OR

10 a. Differentiate between open loop and closed loop control. **(10 Marks)**

b. Elaborate on :

i) Mishra/Kanahia hop by hop scheme

ii) Stop and wait protocol. **(10 Marks)**

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CBCS SCHEME

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18ECS31

Third Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
LTE 4G Broadband

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Discuss 3GPP structure with suitable diagram. **(06 Marks)**
b. List the main functions of E–UTRAN NodeB. **(06 Marks)**
c. Identify different domains in basic system architectures configuration, explain any two. **(08 Marks)**

OR

2 a. With neat diagram, explain the functions of serving–gateway. **(10 Marks)**
b. Discuss in detail roaming mechanism in basic system architecture configuration. **(06 Marks)**
c. Explain any important four QoS parameters used to optimize SAE. **(04 Marks)**

Module-2

3 a. Mention the motivational properties and challenges in OFDMA. **(08 Marks)**
b. Discuss OFDMA transmitter with windowing with suitable. **(06 Marks)**
c. Describe resource mapping in SCFDMA with suitable diagram. **(06 Marks)**

OR

4 a. Discuss channel coding for uplink user data transmission. **(06 Marks)**
b. Describe physical HARQ indicator channel. **(04 Marks)**
c. Explain different downlink transmission modes. **(10 Marks)**

Module-3

5 a. Compare periodic and aperiodic channel information feedback reporting. **(08 Marks)**
b. Name and describe main CQI compression. **(08 Marks)**
c. Define cell search procedure and mention the steps involved in cell search. **(04 Marks)**

OR

6 a. Explain different RLC modes of operation. **(06 Marks)**
b. Describe how MAC layer maps logical channel to transport channel and also other task of MAC layer. **(06 Marks)**
c. With suitable diagram explain Packet Data Convergence Protocol (PDCP) layer operation. **(08 Marks)**

Module-4

7 a. List the different function provided by RRC protocol. **(06 Marks)**
b. Explain with suitable diagram CSFB architecture. **(10 Marks)**
c. Discuss the measurement configuration parameters of RRC connection reconfiguration procedure. **(04 Marks)**

OR

8 a. Discuss important parameter used to control idle mode mobility. **(06 Marks)**
b. Illustrate intra frequency handover procedure. **(10 Marks)**
c. Describe handover frequency. **(04 Marks)**

Module-5

9 a. Explain different phases of LTE buffer status reposting mechanism. **(10 Marks)**
b. Explain downlink transmit power setting with suitable example. **(10 Marks)**

OR

10 a. Discuss mechanism LTE Reforming and Dimensioning. **(10 Marks)**
b. Explain the following : i) Uplink system performance ii) High order sectorization. **(10 Marks)**

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CBCS SCHEME

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

18ECS321

Third Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Advances in Image Processing

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain briefly the metric properties of digital images. **(10 Marks)**

b. What is meant by the term color? Explain in detail color perceived by humans. **(10 Marks)**

OR

2 a. Explain the concept of Sampling and Quantization of an Image and explain how images are digitally represented. **(10 Marks)**

b. What is a color space? Explain any two color space classification in detail. **(10 Marks)**

Module-2

3 a. Briefly describe the two classes of pixel brightness transformations. **(10 Marks)**

b. Explain the principles of nearest-neighbor interpolation, linear interpolation and bicubic interpolation. **(10 Marks)**

OR

4 a. Name smoothing methods that try to avoid image blurring. Explain their main principles. **(10 Marks)**

b. What are LOG and DOG? How do you compute them? How are they used? **(10 Marks)**

Module-3

5 a. Briefly describe the different thresholding concept of image segmentation process. **(10 Marks)**

b. Explain the algorithm that provides Inner boundary tracing in both 4-connectivity and 8-connectivity. **(10 Marks)**

OR

6 a. Explain the principles of and differences among the three basic approaches to region growing-merging, splitting and split and merge. **(10 Marks)**

b. What are the main difference between A – algorithm graph searching and dynamic programming? Explain why dynamic programming is often faster than the A – algorithm. **(10 Marks)**

Module-4

7 a. Briefly explain any five Scalar Region Shape descriptors. **(10 Marks)**

b. Explain the concept of B - spline curve Interpolation. **(10 Marks)**

OR

8 a. Define any four biometric border based region descriptors. **(10 Marks)**

b. An object is described by the following chain code in 4 – connective 300301121232.

(i) Determine the normalized version of the chain code.

(ii) Determine the derivative of the original chain code.

(iii) Define Freeman's code. **(10 Marks)**

Module-5

9 a. Explain four morphological principles with necessary equation. **(10 Marks)**

b. Give the definition of erosion and dilation for binary images and mention the differences between erosion and dilation by illustrating the properties. **(10 Marks)**

OR

10 a. What is geodesic distance? How it is used in mathematical morphology? Explain in detail with necessary equation. **(10 Marks)**

b. Explain the role of Markers in morphological segmentation. Why would an attempt to perform watershed segmentation without markers lead to over segmentation? **(10 Marks)**

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CBCS SCHEME

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

18ECS333

Third Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
IoT

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Briefly explain the various 'evolutionary phases' of the internet. **(08 Marks)**

b. Highlight a few of the most significant challenges and problems that IoT is currently facing (IoT challenges). **(06 Marks)**

c. Illustrate the impact of IoT in the smart connected building space. **(06 Marks)**

OR

2 a. Discuss each of the seven layers of IoTwF reference model. **(08 Marks)**

b. Write the structure of 'Simplified IoT Architecture'. **(06 Marks)**

c. What are the current challenges being addressed by 'connected roadways'? **(06 Marks)**

Module-2

3 a. Discuss with relevant examples, the classification of 'things' with respect to power. Mobility, reporting frequency, quantity of data, report range and object density per cell. **(09 Marks)**

b. With figure give the comparison of last mile technologies in terms of range, cost, power and bandwidth. **(05 Marks)**

c. Describe the features of Gateways and backhaul sublayer. **(06 Marks)**

OR

4 a. With relevant examples, differentiate:
(i) Analytics applications and data application
(ii) Data analytics and network analytics. **(10 Marks)**

b. Highlight the features of each layer (cloud, fog and edge) of the IoT data management and compute stack. **(10 Marks)**

Module-3

5 a. Based on the type of measured physical phenomenon, give the categorization of the sensors. **(08 Marks)**

b. Discuss briefly the various 'communications criteria' to be considered during selection and connection of smart objects (from range to constrained-node-networks). **(12 Marks)**

OR

6 a. Bring out the features of MEMS and SANET. **(06 Marks)**

b. State the features, applications and disadvantages of IEEE 802.15.4. **(05 Marks)**

c. Highlight the main features of LTE CAT O, LTE-M and NB-IoT. **(09 Marks)**

Module-4

7 a. What are the key advantages of the IP suite for the IOT? **(07 Marks)**

b. Discuss the factors determining the suitability of the IP adaptation/Adoption model for last-mile connectivity. **(07 Marks)**

c. List the characteristics of constrained networks. **(06 Marks)**

OR

8 a. Compare and contrast TCP with UDP. **(06 Marks)**

b. List and explain very briefly the important Generic web based protocols and the IoT Application Layer Protocols. **(06 Marks)**

c. Provide an overview of the IoT Data Analytics. **(08 Marks)**

Module-5

9 a. Discuss the IoT strategy for connected manufacturing. **(08 Marks)**

b. Explain the IT/OT divide in utilities. **(06 Marks)**

c. Explain the Siloed IoT strategy for smarter cities. **(06 Marks)**

OR

10 a. Describe the IACS reference model for the connected factory. **(06 Marks)**

b. Explain the CISCO grid blocks architecture of the power delivery supply chain. **(06 Marks)**

c. Describe briefly the four layers of the smart city IoT Architecture. **(08 Marks)**

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CBCS SCHEME

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16/17ECS423

Fourth Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Communication System Design using DSP Algorithm

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Explain the discrete time convolution and frequency responses. **(08 Marks)**
b. Write a C- program segment of an FIR filter with circular buffer. **(08 Marks)**

OR

2 a. Discuss the realization and implementation of IIR filters. **(08 Marks)**
b. Explain the implementation of power spectrum using FFT. **(08 Marks)**

Module-2

3 a. Discuss the generation of amplitude modulation. **(08 Marks)**
b. Discuss the spectrum of AM signal. **(08 Marks)**

OR

4 a. Discuss the generation of SSB modulator. **(08 Marks)**
b. Calculate the percentage of power saving when carrier and one of the side bands are suppressed in an AM wave modulated to depth of 85. **(08 Marks)**

Module-3

5 a. Explain the FM modulation using PLL. **(08 Marks)**
b. The carrier swing 07 frequency modulated signal is 70 KHz and modulating signal is 7KHz sine wave. Determine the modulation index and B and width 07 FM signal. **(08 Marks)**

OR

6 a. Discuss the generation of PRBS. **(08 Marks)**
b. Derive the bit error rate probability for binary signaling on the AWGN. **(08 Marks)**

Module-4

7 a. Discuss the base band PAM with block diagram. **(08 Marks)**
b. Discuss the implementing the transmit filter by an interpolation filter bank. **(08 Marks)**

OR

8 a. Discuss the basic QAM transmitter. **(08 Marks)**
b. Discuss the method for QAM demodulation. **(08 Marks)**

Module-5

9 a. Discuss the need of multicarrier modulation. **(08 Marks)**
b. Explain the components of a simplified ADSL transmitter. **(08 Marks)**

OR

10 a. Discuss near end far end eacho canceler. **(08 Marks)**
b. Explain the need of phase splitting fraction any spaced equalizer. **(08 Marks)**

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