

B.E (EXTC) Sem VII I & VP CBGS

- May - June - 16

May 2016

Be sem-VII 13/05/2016

EXTC

Sub: - I & VP

QP Code : 31268

(3 Hours)

[Total Marks : 80

- N.B. : (1) Q.1 is compulsory.
 (2) Solve any 3 questions from remaining 6 questions.
 (3) Assume suitable data if it is required.



1. Justify/Contradict the following statements.

20

- (1) K.L. Transform is called PCA.
- (2) Continuous image histogram can be perfectly equalized but it may not be so for digital image.
- (3) Laplacian is good edge detector.
- (4) Mixed Adjacency is introduced to eliminate the ambiguities that often arise when 8 adjacency is used.

2. (a) Write difference between : Histogram Equalization and Contrast stretching. 6
- (b) Discuss RGB and HSI color models. 6
- (c) Given histogram A and B. Modify histogram of A as given by histogram of B 8

Image A	Grey Level	0	1	2	3	4	5	6	7
	No of Pixels	750	1023	850	650	329	245	122	81

Image B	Grey Level	0	1	2	3	4	5	6	7
	No of Pixels	0	0	0	614	819	1230	819	614

3. (a) Using Graph Theoretical approach, find the edge corresponding to the minimum cost path 10

5 6 7

3 4 2

0 1 7

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FW-Con. 9949-16.



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(b) Find DCT of the following image

10

2	4	4	2
4	6	8	3
2	8	10	4
3	8	6	2

4. (a) Given different edge detection masks along with the values.

5

(b) Explain bit plane Slicing with application.

5

(c) Given a following image segment, use the hit or miss transform to find the top edge of the square.

10

0	0	0	0	0	0	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	0	0	0	0	0	0

Use two structuring elements shown below:

B1 =

0	0	0
0	1	0
0	1	0

B2 =

0	1	0
0	0	0
0	0	0

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5. (a) Show that : Original image - LPF image = HPF image 6
(b) Explain Image Restoration model. 7
(c) Perform opening and closing operation on the following image. Use 7
structuring.

Element

1	1	1
---	---	---

1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
0	0	0	0	1

6. Write short note on 20
(a) Image Enhancement in Frequency domain
(b) Wiener Filter
(c) Exhaustive block matching Algorithm

B.E (EXTC) Sem VII (Rev)

May - June - 16



Be sem-VII ~~2015~~ DTSP

13/05/2016

QP Code : 29718

EXTC

Sub:- DTSP.

Time: 3 hrs

Marks: 100

- NOTE:**
- 1) Question No. 1 is compulsory.
 - 2) Attempt any four questions from the remaining six questions
 - 3) Assumptions made should be clearly stated.
 - 4) Assume any suitable data wherever required but justify the same.

Q1

- a) Find $y(n)$ using frequency domain analysis if $x(n) = \{1, 2, -1\}$ and $h(n) = \{3, 2\}$ 20
- b) Identify the following filters based on their passband by sketching their frequency response $h(n) = \{1, -0.5\}$
- c) Obtain a digital filter transfer function $H(\omega)$ by applying impulse invariance transformation on the analog TF

$$H_a(s) = \frac{s+2}{s^2+4s+3}$$
 Use $f_s = 1\text{Ksa/sec}$
- d) Find convolution of $x_1(n) = \{1, 2, 3, 4\}$ with $x_2(n) = \{5, 6, 7, 8\}$ when both the signals are periodic

Q2

- a) Determine 8 point FFT for a continuous time signal using DIT FFT algorithm
 $x[n] = \{1, 2, 1, 2, 0, 2, 1, 2\}$ 10
- b) $x(n) = \{1 + 5j, 2 + 6j, 3 + 7j, 4 + 8j\}$. 10
 - i. Find DFT $X(K)$
 - ii. Using the results above and not otherwise find DFT of $x_1(n) = \{1, 2, 3, 4\}$

Q3

- a) Perform circular convolution and circular crosscorrelation of
 $x_1(n) = \cos \frac{2\pi n}{N}$ with $x_2(n) = \sin \frac{2\pi n}{N}$ $0 \leq n \leq N-1$ 10
- b) One of the zeros of an anti symmetric FIR filter is at $0.5 \angle 60^\circ$. Show the locations of other zeros. What is the minimum order of this filter? Also find the transfer function and impulse response of this filter 10

Q4

- a) Consider the sequence $x[n] = 4\delta(n) + 3\delta(n-1) + 2\delta(n-2) + \delta(n-3)$.
Let $X(K)$ be the six point DFT of $x(n)$. Find the sequence $w(n)$ that has six point DFT $W(K)$ such that $W(K) = \text{Re}\{X(K)\}$ 10
- b) Determine parallel and cascade form realization of

$$H(Z) = 0.7 \frac{1 - 0.36z^{-2}}{(1 + 0.1z^{-1} - 0.72z^{-2})}$$
 10

Q5

- a) The desired response of a low pass filter is 10

$$H_d(\omega) = e^{-j3\omega} \quad -\frac{3\pi}{4} \leq \omega \leq \frac{3\pi}{4}$$

$$= 0 \quad \frac{3\pi}{4} \leq |\omega| \leq \pi$$

Determine the frequency response $H(e^{j\omega})$ for $M=7$ using a Hamming window

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b) Find poles of a low pass Butterworth filter for $N=3$. Sketch location of poles in s plane. Also find normalized transfer function. 10

Q 6

- a) Explain the need of a low pass filter with a decimator and mathematically prove that $\omega_y = \omega_x D$ 10
- b) Explain Goertzel's Algorithm 10

Q7

- Write notes on 20
- a) Interpolation process
 - b) Chirp Z Algorithm
 - c) Adaptive echo cancellation
 - d) Frequency sampling realization of FIR filters

EXTC

Sub: - DCE
(3 Hours)

May-16

QP Code : 29786
[Total Marks : 100]

N.B 1. Question No. 1 is compulsory.

2. Attempt any four questions out of the remaining six questions

- 1 a What are the various models used for data compression? 05
- b What are active and passive attacks? 05
- c What is Biometric authentication? Explain with examples. 05
- d What is the need for data compression? 05
- 2 a A source emits letter from an alphabet $A = \{a_1, a_2, a_3, a_4, a_5\}$ with probabilities $P(a_1) = 0.15$, $P(a_2) = 0.04$, $P(a_3) = 0.26$, $P(a_4) = 0.05$ and $P(a_5) = 0.50$. 10
- a) Calculate the entropy of this source
- b) Find the Huffman code for this source.
- c) Find the average length of the code in and its redundancy
- b Explain the working of DES. 10
- 3 a Show the difference in the encoding procedure of LZ78 and LZW with an example. 10
- b How are keys distributed in conventional encryption systems? 10
- 4 a Discuss the various lossless techniques for image compression. 10
- b Explain Chinese Remainder Theorem with an example. 10
- 5 a How is motion compensation used in video compression? 10
- b What are the various aspects of Firewall design? 10
- 6 a Discuss the differences in compression schemes of JPEG and JPEG 2000. 10
- b What are digital signatures and how are they implemented? 10
7. Write notes on [Any TWO] 20
- a Elliptic Curve Cryptography
- b MPEG Audio System
- c ADPCM Encoder and Decoder

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OCN - EXTC - CBGS

BE sem VII

25/05/16

May-16

EXTC

Sub: OCN

Q.P. Code : 31346

(3 Hours)

[Total Marks : 80]

- N.B. :** (1) Question No. 1 is compulsory.
(2) Solve any three questions out of remaining five questions.
(3) Figures to the right indicates full marks.
(4) Assume suitable data wherever necessary and justify the same.

1. Solve following. 20
 - (a) Compare between intermodal and intramodal dispersion.
 - (b) What is the concept of bit interleaving and packet interleaving.
 - (c) What are the elements of SONET/SDH infrastructure.
 - (d) Explain the working principle of optical switches.
2. (a) Derive the expression for cut off wavelength for single mode transmission. 10
(b) Explain OTDR with neat sketch. 10
3. (a) Give the details of network management in a typical optical Network. 10
(b) Explain the sources of loss at a fiber joint. 10
4. (a) What are the sources of micro bending loss ? How it can be overcome ? 5
(b) Differentiate between Circulator and Isolator. 5
(c) Explain SONET architecture in detail. 10
5. (a) What is WDM ? Explain the architecture of WDM with network component. 10
(b) Comment on optical access networks. 5
(c) Comment on optical safety in communication Network. 5
6. (a) Highlight need of link budget what are the strategies of link budget in optical communication Network. 10
(b) A silica optical fiber has core refractive index of 1.5 and cladding refractive index 1.47 Determine. 10
 - (i) The critical angle.
 - (ii) Numerical aperture.
 - (iii) The acceptance angle.



FW-Con. 11273-16.

EXTC Sub: - MARE



QP Code : 31407

(3 Hours)

Total Marks : 80

- N. B. : (1) Question no. 1 is compulsory.
 (2) Answer any three questions from remaining five questions.
 (3) Use Smith chart wherever necessary.
 (4) Figures to the right indicate full marks.

1. (a) What are slow wave structures. Draw various structures and give their significance. 5
- (b) Explain any two modes of operation Gunn diodes with schematics. 5
- (c) What is mode jumping in magnetron. How is it taken care of? 5
- (d) Explain the factors which govern the pulse repetition frequency in RADAR. 5
2. (a) The terminating impedance $Z_L = 60 - j80 \Omega$. Design two single stub (short circuited) tuning network to match this load to a 50Ω line. 10
- (b) What is need of termination in microwave systems? Explain any two types of terminations. 10
3. (a) What is Faraday rotation in ferrites. Explain working of isolator using Faraday rotation. 10
- (b) How does gyrotron tube differ from klystron and magnetron tubes. Explain the principle of operation of gyro TWT amplifier. 10
4. (a) Explain the working of a parametric amplifier and explain its application. 10
- (b) What do you understand by the term clutter. Explain the different types of RADAR clutter. Enumerate the properties of land and sea clutter. 10
5. (a) Derive an expression for RADAR range. Discuss effect of radar cross section on range determination. 10
- (b) Explain the construction and working of TRAPATT diode. 10
6. (a) Design two lumped element L-section matching network at 1 GHz to transform $Z_L = 10 - j10 \Omega$ to a 50Ω transmission line. 10
- (b) Write a short note on microwave FET. 5
- (c) A radar operating at a wavelength of 0.03 m has a maximum range of 50 km . Its antenna gain is 2000 and the transmitter power is 250 kW . Its minimum detectable signal is 10 pW , then find the RCS of the target. 5

FME

EXTC 3rd Sem VII (Rev.) 31/5/16

May-16

Sub:- FME

QP Code : 29920

EXTC

(3 Hours)

[Total Marks : 100

- N.B. : (1) Question No.1 is compulsory.
(2) Answer any four out of remaining six questions.
(3) Illustrate answers with sketches.
(4) Use of smith chart is compulsory.



1. (a) Explain amplification process in TWT. 5
(b) Differentiate between waveguides and transmission lines. 5
(c) With a neat diagram explain the working of a PIN diode. 5
(d) List out different characteristics of microwaves. 5
2. (a) Mention different types of electron flow. Explain Brillouin Law and derive an expression for Brillouin magnetic field B_r . 10
(b) Describe operation of O-type and M-type devices in brief. 10
3. (a) Describe the mechanism of velocity modulation in a two cavity klystron and hence obtain an expression for the bunched beam current. Also find out condition for maximum power output. 10
(b) Explain the procedure of measurement of dielectric constant at microwave frequency. 10
4. (a) What are the steps to solve a double stub matching problem? 10
(b) Using the multiple reflection viewpoint explain the principle of working of a quarter wave transformer. 10
5. (a) Describe different modes of oscillation of Gunn Diode. 10
(b) Explain the working of a negative resistance parametric amplifier. 10
6. (a) With neat diagrams explain the working of a Gunn Diode. 10
(b) Explain the working of magic Tee. Design a circulator using Magic Tees. 10
7. Write short notes on the following:
(a) Hybrid junctions 5
(b) Power dividers 5
(c) Microwave filters 5
(d) Compare klystron with magnetron. 5

EXTC

(3 Hours)

[Total Marks :80

- N.B. : (1) Question No.1 is compulsory
 (2) Solve any three questions from remaining five questions.
 (3) Assume suitable data wherever necessary with proper justification.

1. Answer the following (Any five)

- (a) What are the measures of performances for lossy and lossless compression techniques? 4
- (b) Illustrate the worst case in LZ-77 dictionary compression technique. 4
- (c) What is "frequency/auditory masking" temporal masking" ? 4
- (d) Which redundancies are exploited in JPEG lossy standard? Which are the processes using these redundancies? 4
- (e) State Fermat's little theorem (FLT) and Euler's theorem. Illustrate with an example how FLT can be used to find modular inverse. 4
- (f) Using modular arithmetic and theorems, prove that decrypted text is same as plain text in the RSA algorithm. 4
- (g) What do you mean by "confusion" and "diffusion" ? Which components are used in ciphers to introduce confusion and diffusion? 4

2. (a) Generate a binary tag using arithmetic coding technique for the sequence : 10
 a b a c a b b

symbol	count
a	37
b	38
c	25



(b) Perform LZW dictionary compression on the following text string : wabba-wabba-wabba-wabba-woo-woo-woo Initial dictionary:- 10

Index	1	2	3	4	5
Entry	-	a	b	o	w

- 3. (a) Explain MP-III audio compression standard with a neat block diagram. 10
- (b) What are different approaches for compressing an image? Explain JPEG-LS standard. 10

4. (a) Explain double DES and the need for it. Also explain the "meet-in-the-middle" attack. 10

(b) Explain any one digital signature algorithm in detail. 10

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QP Code : 31586

2

5. (a) Encrypt the plain text 63 using RSA algorithm which uses prime numbers $p = 7$ and $q = 11$. The public key $e = 13$. Verify that the decrypted text is same as the plain text. 10
- (b) Alice chooses her private key $x = 3$ and Bob chooses $y = 6$. If both of them use the primitive root $g = 7$ for prime $p = 23$, what is the key exchanged between Alice and Bob using diffie. Hellman key exchange? 10
6. Write short notes on two. 20
- (a) Adaptive Huffman coding
 - (b) H.264 encoder-decoder
 - (c) Elliptic curve cryptography
 - (d) Intrusion detection system

FW-Con. 12306-16.

EXTC

Sub: CCN

QP Code : 30096

(3 Hours)

Total Marks : 100

- N.B. : (1) Question no.1 is compulsory
(2) Attempt any four questions out of remaining six questions
(3) Illustrate answers with sketches wherever required

1. Answer the following questions (any four): 20
- (a) Compare between connection oriented and connectionless.
 - (b) What do you mean by bit stuffing and destuffing.
 - (c) IP is the best effort delivery service justify
 - (d) What is the use of subnet mask in IP addressing.
2. (a) What is IP addressing? State different classes of IP addressing with Netid and hostid. 10
- (b) Explain each field in the TCP header format. 10
3. (a) Compare between HDLC and PPP and Explain different modes of HDLC. 10
- (b) Compare between OSI model and TCP/IP protocol suit. 10
4. (a) What is exterior routing protocol? Explain in brief. 10
- (b) Explain need of fragmentation and related field in IPV4 datagram. 10
5. (a) Explain how sliding window protocol is used for error control. 10
- (b) Explain in brief IEEE 802.3 standard in detail. 10
6. (a) Define ALOHA? What are its types? Compare between the ALOHA types. 10
- (b) What is congestion? Explain any one technique for congestion control. 10
7. (a) Write a short note on (any two): 20
- (i) DHCP
 - (ii) Transmission media
 - (iii) The M/G/I mode
 - (iv) Networking Topologies

