BE IT(Sem) - VII E-297C (Old) Nov-Dec 2016

Sub :- CCN

Q.P. Code : 629000

(3 Hours) Total Marks : 100

Note :(1) Q. 1 is compulsory
(2) Answer any four out of remaining six questions
(3) Figure to right indicate full marks

1. a) Draw the diagram of sub layer of data link layer and the function of each sub layer. **20**
   b) Comment on CIDR notation.
   c) Compare between OSI model and TCP/IP protocol suit.
   d) Router is an intelligent device, Justify.

2. a) Explain different modes, frames in HDLC protocol **10**
   b) Differentiate between Pure ALOHA and slotted ALOHA **5**
   c) Explain carrier sense multiple access collision detection **5**

3. a) A company is granted the site address 191.256.0.0. The company needs 1024 subnets design the subnet. **10**
   b) Explain connection establishment process using 3 way handshaking of TCP. **10**

4. a) What is flow control? Compare between stop and wait, Go back N and selective repeat ARQ. **10**
   b) What is fragmentation? Explain the fields related to that process. **10**

5. a) What is delay analysis? State Erlang formulas. Explain M/M/1 queue model. **10**
   b) What is role of ICMP? Explain query messages. **10**

6. a) Explain various transmission media in details. **10**
   b) Classify the unicast routing protocol and explain BGP in brief. **10**

7. Write a short note on **[any four]** **20**
   i) UDP
   ii) Link state Vs distance vector routing
   iii) IP datagram
   iv) DHCP
   v) IPv6

B.E | sem VII | CBSGS | DC & E 21/12/16

EXTC

Dec 2016

Q.P. Code : 788901

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question **No.1** is **Compulsory.**
(2) Attempt **any three** questions out of remaining questions.
(3) Assume suitable data wherever necessary.

1. Answer in brief. **(Any Four)** **20**
   (a) Explain different redundancies in data and how they are used for data compression. Also give evaluation parameters for compression techniques.
   (b) What are the goals of cryptographic systems? Describe various attacks compromising these goals.
   (c) State Fermat's Little Theorem, Euler's Theorem in modular arithmetic. What is Euler's Totient function? Compute $\Phi(37)$, $\Phi(35)$, and $\Phi(75)$.
   (d) Give an example of each:
      - Substitution cipher
      - Transposition cipher
      - Stream cipher
      - Block cipher
   (e) Explain extended Euclid's algorithm, and compute multiplicative inverse of 7 modulo-160.

2. (a) Explain the principle of arithmetic coding. Hence generate a decimal tag for the sequence: **SWISS_ MISS.** Also decode the decimal tag. **10**

   (b) What are the advantages of minimum variance Huffman codes over normal Huffman codes? Design a minimum variance Huffman code on the sourse with alphabet A={ a1, a2, a3, a4, a5} with respective probabilities {0.25, 0.2, 0.15, 0.3, 0.1}. **10**

3. (a) Explain lossy and lossless schemes for image compression. Give an overview of JPEG-2000. **10**

   (b) Explain Frequency masking, Temporal masking with respect to audio compression. Also explain how an MP-III encoder works. **10**

TURN OVER

4. (a) Compute the encrypted and decrypted text using RSA algorithm for the plaintext 88. Public key is (n, e)=(187,7). 10

(b) Perform LZ-78 compression on the following string and find the compression ratio. 1000111101011110001111110001111 10

5. (a) Explain Triple-DES with two keys and the "Meet-in-the-middle-attack". 10

(b) Consider a Diffie-Hellman scheme with a common prime q=11 and a primitive root α =2. 10

(i) Show that 2 is primitive root of 11.
(ii) If user A has public key Y_A =9, what is A's private key X_A?
(iii) If user B has public key Y_B =3, what is the shared secret key K?

6. Write short notes on **(Any Four)**. 20

(a) Digital Signatures
(b) H.264. Video coding standard
(c) Ethical Hacking
(d) Digital Immune Systems
(e) Elliptic curves for cryptography

MARE- BE – EXTC – Sem VII – CBSGS – Dec 2016.

Sub :- MARE

Q.P. Code : 788802

(3 Hours) Total Marks : 80

Note : 1. Question **No. 1** is **compulsory.**
2. Out of remaining questions, attempt any **three** questions.
3. Assume suitable additional data if required.
4. Figures in brackets on the right hand side indicate full marks.

1. a) What is meant by RADAR range? **5**
   b) Explain the working of Hybrid ring. **5**
   c) Explain travelling wave tube as an amplifier. **5**
   d) Explain working of IMPATT. **5**

2. a) Match a load impedance ZL=60-j80 to a 50 Ω line using a double stub tuner. The stubs are open circuited and are spaced λ/8 apart. The match frequency is 2 GHz. **10**
   b) With a neat functional diagram explain the working principle of Cylindrical Magnetron. **10**

3. a) Discuss the various frequency bands and characteristics of microwaves. **10**
   b) Explain Doppler Shift and its role in pulsed and CW RADAR. **10**

4. a) Explain instrument landing system for aircraft navigation. **10**
   b) Radar operating at 1.5 GHz uses a peak pulse power of 2.5 MW and has a range of 100 nmi for objects whose radar cross section is 1 m^2 If the minimum receivable power of the receiver is $2x10^{-13}$ Watt, what is the smallest diameter of the antenna reflector could have assuming it to be a full paraboloid with η=0.65. **10**

5. a) State various modes of Gunn diode and explain any one of them in detail. **10**
   b) With block diagram explain the MTI radar system. Give its limitations. **10**

6. a) Give the working principle difference between Two Cavity Klystron and Reflex Klystron. **10**
   b) Write a short note on rectangular waveguide. **10**

FME - Rev - EXTC - Sem VII Nov-Dec 2016.

Sub :- FME

Q.P. Code : 628901

(3 Hours) Total Marks : 100

Note :1) Question **No. 1** is **compulsory.**
2) Solve **any four** questions from the remaining.
3) Assume suitable data wherever necessary and justify the assumption.
4) **Draw** suitable **diagrams** wherever required.

1. (a) Justify why waveguide does not support TEM propagation. 5
   (b) Differentiate between transit time devices and transferred Electron devices. 5
   (c) List out characteristics and hazards of Microwave. 5
   (d) Explain microwave propagation in Ferrites 5

2. (a) How matched impedance is achieved in transmission line? Explain any one method in detail. 10
   (b) The dimensions of rectangular waveguide are 2.5 cm and 1 cm. The frequency of operation is 8.6 GHz. Find (i) All possible modes (ii) Cutoff frequency and guide wavelength. 10

3 (a) Explain the working and derive S matrix for a two-hole directional coupler. 10
   (b) Describe the mechanism of velocity modulation in two cavity klystron and hence obtain an expression for the bunched beam current. Also find out condition for maximum power output. 10

4 (a) Design a low pass composite filter with cutoff frequency 2MHz and impedance of 50 ohms. Place infinite attenuation pole at 2.08 MHz. 10
   (b) Explain working and amplification process in TWT. 10

5 (a) Explain the procedure of measurement of dielectric constant at microwave frequency. 10
   (b) Explain the construction and working of microwave FET in detail. 10

6 (a) Explain different modes of oscillation of Gunn diode. 10
   (b) How is bunching activated in cavity magnetron. Explain phase focusing effect. 10

7 Write short notes on the following :- 20
   a. Impatt diode
   b. Periodic structure
   c. Microstrip transmission line
   d. Isolator and Gyrators

OCAN / BE EXTC / VII / CBGS

08-12-16

Q.P. Code : 788702

BE SEM-VII (CBGS) EXTC NOV-DEC-2016

Sub :- OCAN DEC 2016

(3 Hours) [Total Marks : 80

N.B. : (1) **Question no.1** is compulsory.
(2) **Attempt** any **three** questions from remaining questions.
(3) **Figures** to the right indicate **full** marks.

1. Attempt any **four** of the following :- 20
   a) Compare intermodal and intramodal dispersion.
   b) Explain the basic working principle of Lasers.
   c) Differentiate between the optical components isolator and circulator.
   d) Explain the concept of Bragg Grating.
   e) Define crosstalk .What are the types of crosstalk in optical transmission system?

2. a) Derive the expression for pulse spreading in intermodal dispersion. 10
   b) Draw architecture of SONET/SDH and explain in brief. 10

3. a) Explain Material attenuation in optical fiber communication. 6
   b) What do you mean by bit interleaving and packet interleaving? 7
   c) Derive the expression of Power Penalty with impairment and without impairment. 7

4. a) Explain SPM and how it is mitigated by GVD. 8
   b) Explain four waves mixing. 8
   c) Comment on need of Wavelength stabilization. 4

5. a) Explain important network management functions to the operation of the Network. 8
   b) What is micro bending loss? Explain how to minimize the these losses with neat sketch. 8
   c) How DWDM is different from WDM? 4

6. Write a short notes on :- 20
   i) Link Budget
   ii) Dispersion and OTDR
   iii) Optical Access Network
   iv) WDM network element and architecture

BE SEM-VII EXTC NOV-DEC-2016 (OLD)

Sub :- DCE

Exte / Sem 7 - DCE
OLA
11/12/16

(OLD)

Q.P. Code : 628400

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question **No.1** is **compulsory.**
(2) Answer **any four** out of remaining.
(3) Assume suitable **data** if **necessary** and **justify the same.**

1. Answer in brief (**Any Four**) : **20**
   (a) Give classification of data compression techniques. Also give evaluation parameters for these techniques.
   (b) Explain what are the disadvantages of private key cryptosystems. And how they are avoided in public key cryptosystems.
   (c) Explain predictive techniques for compression with an example.
   (d) What are the redundancies present in digital images? How are they exploited in lossy image compression?
   (e) What are hash functions? Give requirements on hash functions.

2. (a) Explain the principle of arithmetic coding with an example. Hence generate a decimal tag for the sequence : **ppqqrqr** given the probability model : **10**

Symbol	p	q	r
Count	37	38	25

   (b) Perform minimum variance Huffman coding and find code efficiency for the following model : **10**

Symbol	Probability
A	0.45
B	0.3
C	0.15
D	0.1

3. (a) Give the block diagram of a lossy JPEG encoder and decoder. Explain the encoder in detail. **10**
   (b) Explain auditory masking and temporal masking related to audio compression. Also explain the working of a MP-III encoder with a block diagram. **10**

TURN OVER

4. (a) What is the principle of video compression? Explain how motion vectors are computed and coded. **10**

   (b) Give the different techniques for dictionary compression. Explain **any one** with a suitable example. **10**

5. (a) Give the block diagram of DES encryption. Explain one round in detail. **10**

   (b) Explain "Meet-in-the-middle-attack" in triple-DES. **10**

6. (a) What are Digital Signatures? Illustrate how can you use RSA encryption-decryptions scheme for authentication? **10**

   (b) What are key - exchange algorithms? Illustrate the Diffie-Hellman key exchange algorithm with a suitable example. **10**

7. Write short notes on **any two** : **20**

   (I) A-law and μ-law for audio compression

   (b) Intrusion Detection Systems

   (c) Firewalls design principles

   (d) Viruses and worms

BE SEM-VII E&TC (CBGS) NOV-DEC-2016

MC / BE ~~OLD~~ E&TC / CBGS / VII

01-12-16

Sub :- MC

Q.P. Code : 788602

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question No.1 is **compulsory.**
(2) Solve any 3 questions from remaining questions
(3) Assume suitable data if necessary stating it clearly.

1. (a) Explain the advantages of Software Defined Radio Communication Systems. **5**
   (b) Compare between FCA and DCA channel assignment strategies. **5**
   (c) What is Soft Handoff? **5**
   (d) What are the bandwidths and chip rates used in WCDMA and how they are compare with cdmaOne? **5**

2. (a) Consider a cellular system with S/I ratio of 18 dB. The frequency reuse factor is N = 7, calculate the worst case for signal-to-co-channel interference ratio. Is the frequency reuse factor 7 still being acceptable? If not, what is it? **10**
   Assume path-loss exponent as 4 in a mobile radio environment
   (b) With respect to trunking theory describe following terms: **10**
      i. Busy Hour
      ii. Traffic Intensity A,
      iii. Average call arrival rate & Average call duration H.
      iv. Erlang-B System & Erlang-C System.
      v. Trunking efficiency & Grade of Service (GOS)

3. (a) Describe GSM frame structure. **10**
   (b) Why is power control used in cdma2000 and WCDMA? **10**

4. (a) Draw a neat diagram of UMTS system architectures with interfaces. Explain in details **10**
   (b) What is Multi path Path Signal Propagation and Rake Receiver. **10**

TURN OVER

5. (a) Draw a neat diagram of LTE Network Architecture and explain in details. 10

(b) Why LTE uses OFDMA for DL & SC-FDMA (Single Carrier FDMA) for UL? 5

(c) How do we use space-time block code (STBC) and space-time trellis code (STTC) 5

6. (a) Compare between 3GPP/LTE and Advanced LTE. 5

(b) Describe the Knife-edge Diffraction model. 5

(c) In a cellular system, if carrier frequency fc=900MHz and mobile velocity is 70km/hr. Compute the received carrier frequency if the mobile is moving 10

[i] directly towards the transmitter,

[ii] directly away from the transmitter

[iii] In a direction which is perpendicular to the direction of arrival of the transmitted signal.

Be Sem - VII (Rev) 2013 Nov Dec 16

27-11-16

@EXTC Sub:- DTSP

Q.P. Code : 628300

(3 Hours) [Total 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.

1 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 $H(z)$ by applying Impulse invariance transformation on the analog TF

$$H_a(s) = \frac{s+2}{s^2+4s+3} \quad \text{Use } f_s = 1Ksa/sec$$

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

2 a) A sequence is given as 10

x(n) = { 1+ 2j , 1+3j, 2+4j, 2+2j }

(i) Find X (k) using DIT-FFT algorithm

(ii) Using the results in (i) and not otherwise find DFT of p(n) and q(n) where

p(n) = {1,1,2,2}

q(n) = {2,3,4,2}

b) X(K) = { 36, - 4+j9.656, - 4+j4, - 4+j1.656, - 4 , - 4- j1.656, - 4- j4, -4- j9.656} 10

Find x(n) using IFFT algorithm (use DIT IFFT)

3 a) Perform circular convolution and circular crosscorrelation of 10

$$x_1(n) = cos\frac{2\pi n}{N} \quad \text{with} \quad x_2(n) = sin\frac{2\pi n}{N} \quad 0 \le n \le N-1$$

b) One of the zeros of an odd symmetric FIR filter is at $0.5\angle 60°$. 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

4 a) Consider the sequence $x[n] = 4\delta(n) + 3\delta(n-1) + 2\delta(n-2) + \delta(n-3)$. 10

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 $W(K) = Re\{X(K)\}$

b) Determine parallel and cascade form realization of 10

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

TURN OVER

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

$$H_d(\omega) = e^{-j2\omega} \quad -\frac{\pi}{4} \le \omega \le \frac{\pi}{4}$$

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

b) Determine the frequency response $H(e^{j\omega})$ for M=4 using a Rectangular window 10

A LPF has following specifications

$0.8 \le |H(\omega)| \le 1$ for $0 \le \omega \le 0.2\pi$

$|H(\omega)| \le 0.2$ for $0.6\pi \le \omega \le \pi$

Find filter order and analog cut off frequency if

(i) Bilinear transformation is used for designing

(ii) Impulse invariance is used for designing

6 a) Explain the need of a low pass filter with a decimator and mathematically prove that 10

$\omega_y = \omega_x D$

b) Explain Goertzel's Algorithm 10

7 Write notes on 20

a) Decimation process

b) Chirp Z Algorithm

c) Linear and circular convolution

d) Frequency sampling realization of FIR filters

IAVP/EXTC/CBGS/VII
24/11/16

BE REM - VII EXTC CBGS NOV-DEC-2016
Sub - IAVP

Q. P. Code : 788500

(3 Hours)

Total Marks : 80

N. B. : (1) Q.1 is compulsory.

(2) Solve any three questions from remaining 6 questions

(3) Assume suitable data if it is required.

Q.1 (a) Justify /Contradict the following statements [20]
(i) K.L. transform is also called as method of principal component analysis
(ii) Entropy of an image is maximized by histogram equalization.
(b) Compare: Dilation and Erosion
(c) Explain deferment types of frames in video signal.

Q.2 (a) For following Digital image as shown in Fig.(2), find (i) Negative of the image
(ii) Bit plane slicing (iii)Perform contrast modification as per the characteristics given in fig 1
(iv) Draw histogram of new image [10]

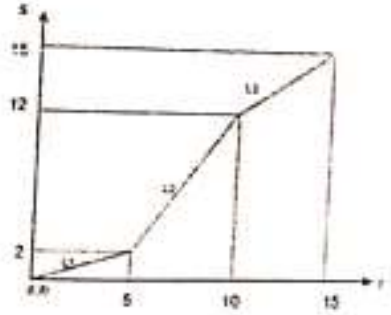


Fig.(1)

10	2	13	7
11	14	6	9
4	7	3	2
0	5	10	7

Fig.(2) Digital Image

(b)Explain dynamic range compression techinque with application . [05]
(c) Explain image deradation model in detail. [05]

Q.3 (a) Write short no on: Wiener Filter [08]

b) Find DFT of the following image [06]

0	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

(c) Given set of points use Hough transform to join these points [06]
A(1,4), B(2,3), C(3,1), D(4,1), E(5,0)

[TURN OVER]

[10]

Q.4 (a) Consider the following image

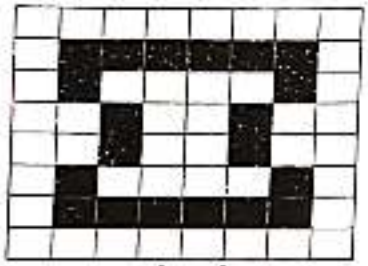
(i)Perform Low Pass Filtering
(ii) Perform Median Filtering
(iii) Find High pass filtered output.
(iv) compare result in(i) and (ii).

0	5	4
7	120	5
4	3	7

(b) What are the different motion estimation criteria for video signal.Explain Phase correlation method for motion estimation. [10]

Q. 5 (a) Explain image enhancement in frequency domain in detail [08]

(b) The input image and structuring element is as shown in the figure. Perform region filling Operation [08]



Input Image

Stucturing element

(c) Define edge in an image. Give different edge detection mask. [04]

Q.6 (a) Using Graph Theoretical approach, find the edge corresponding to the minimum cost path [06]

1	2	0
2		4
3		3

(b) Segment the following image using region split and merge technique .Draw quad tree representation for the corresponding segmentation. [06]

(c) What is unitary transform. [04]

(d) Explain in brief Hit or Miss Transform [04]
