B.E. COMP. Sem - VII (Rev) Dec - 2012

Rev

13 : 2nd half-12-(h) JP

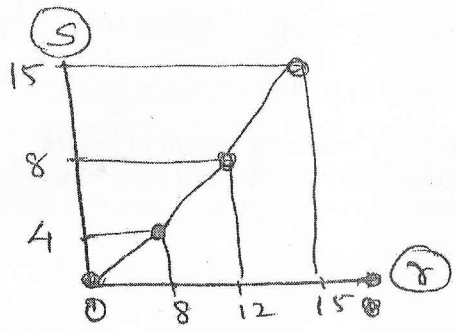
Con. 8383-12. **KR–1041**

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

N.B.: (1) Question No. 1 is **compulsory.** Digital Signal & Image processing
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data wherever **required** and clearly specify it.

1. (a) Prove that two Dimensional Fourier Transform Matrix is an unitary matrix. **20**
   (b) Derive 8 Directional Laplacian filter mask (3 × 3).
   (c) Derive matrix representation of one Dimensional Walsh transform for N = 4 from forward Walsh transformation function.
   (d) State fidelity objective and subjective criteria of Image evaluation.

2. (a) Let X (k) = {1, –2, 1–j, 2j, 0, □ □ □} is the 8 point DFT of a real valued sequence x(n). **6**
   (i) What is 8 point DFT P(k) such that $P(n) = (-1)^n x(n)$?
   (ii) What is 8 point DFT Q(k) such that $q(n) = (-1)^{n-4} x(n-4)$?
   (b) Derive the equation of contrast stretching transformation function as given in **figure** below. Apply the contrast stretching transformation function on the input image F and obtain the output image R. **6**



$$F = \begin{bmatrix} 7 & 12 & 2 & 3 & 4 \\ 10 & 15 & 1 & 6 & 7 \\ 12 & 4 & 6 & 15 & 12 \\ 8 & 2 & 7 & 15 & 2 \\ 11 & 13 & 3 & 3 & 5 \end{bmatrix}$$

   (c) Given $F = \begin{bmatrix} 13 & 54 & 12 \\ 13 & 11 & 57 \\ 11 & 10 & 12 \end{bmatrix}$. **8**
   (i) Find 3 bit IGS coded image and calculate compression factor and bits per pixel (BPP).
   (ii) Find decoded image and calculate MSK and PSNR.

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3. (a) Given h(n) = { $\underset{\uparrow}{1}$, 2 } find the response of the system to the input x(n) = { $\underset{\uparrow}{1}$, 2, 3 } 6

using FFT – IFFT.

(b) Given $F = \begin{bmatrix} 2 & 3 & 5 & 10 \\ 4 & 6 & 4 & 10 \\ 7 & 1 & 3 & 3 \end{bmatrix}$ 6

Determine the output image using power law transformation $s = (r)^2$.

(c) Segment the following given image such that the difference between the maximum intensity value and minimum intensity value in the segmented region is less than 18 using split and merge technique. 8

$$R = \begin{bmatrix} 10 & 9 & 30 & 4 \\ 7 & 6 & 33 & 37 \\ 54 & 52 & 54 & 53 \\ 55 & 57 & 56 & 58 \end{bmatrix}.$$

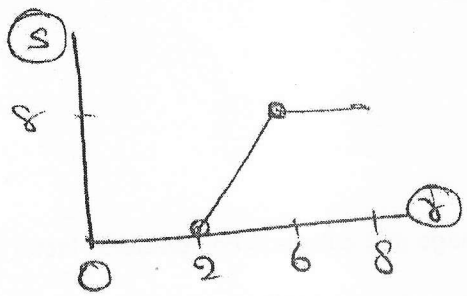
4. (a) Let x(n) be Four point sequence with X(k) = {1, 2, 3, 4}. Find the DFT of the following sequence using X(k). 6

(i) P(n) = x(n) cos (n π/2)

(ii) q(n) = 2δ (n) + 3 { Four point u (n)} + 4 x(n).

(b) Given $F = \begin{bmatrix} 2 & 5 & 3 & 5 \\ 3 & 6 & 5 & 3 \\ 3 & 5 & 2 & 4 \\ 2 & 5 & 4 & 5 \end{bmatrix}$ 8

(i) If the gray level intensity changes are to be made as shown in **figure** below, derive the necessary expression for obtaining the new pixel value using slope.



(ii) Obtain the new image by applying the above mentioned transformation function.

(iii) Plot the Histogram of Input and Output image.

(iv) Compare the Histogram of input and output image.

(c) Given $F = \begin{bmatrix} 6 & 5 & 7 \\ 2 & 8 & 4 \\ 6 & 3 & 7 \end{bmatrix}$ 6

Apply the following filter mask W_1, W_2 and W_3 on the input image F and obtain the output image.

5. (a) Given $h(n) = \left(\frac{1}{2}\right)^n u(n)$. Find the response of the system to the input 6

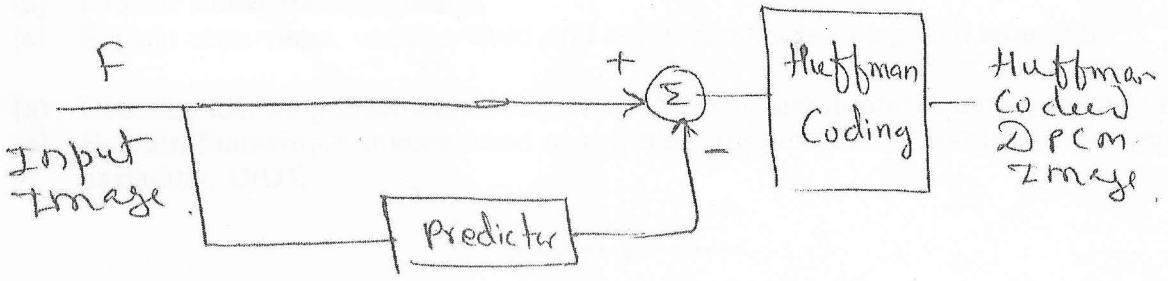
$x(n) = \left(\frac{1}{4}\right)^n u(n)$ using Z-transform method.

(b) Explain Trimmed average filter find the Trimmed average value of the input image F at the center position for R=2 and S=1 where R is the number of consecutive pixels to be trimmed from the minimum extreme and S is the number of consecutive pixels to be trimmed from maximum extreme. 6

$$F = \begin{bmatrix} 12 & 70 & 25 \\ 60 & 65 & 55 \\ 90 & 120 & 200 \end{bmatrix}.$$

(c) Given $F = \begin{bmatrix} 10 & 10 & 40 & 40 \\ 20 & 20 & 20 & 30 \\ 30 & 30 & 40 & 40 \\ 50 & 50 & 60 & 80 \end{bmatrix}$. 8

(i) Find the Huffman coded image of the following encoder.



(ii) Calculate Bits per pixel (BPP) and percentage of compression of compressed image. Do not consider the payload of Huffman Table.

6. (a) $x(t) = \sin(480\ \pi t) + 3 \sin(720\ \pi t)$ is sampled with Fs = 600 Hz. 6

(i) What are the frequencies in radians in the resulting DT signal x(n).

(ii) If x(n) is passed through an ideal interpolator, what is the reconstructed signal.

(b) Applying Horizontal and Vertical line detection mask on the following image F. Use appropriate threshold value. Assume virtual Rows and Column by repeating border pixel values. 6

$$F = \begin{bmatrix} 6 & 5 & 10 \\ 100 & 100 & 100 \\ 4 & 20 & 10 \end{bmatrix}$$

(c) Assume that edge in the gray level image starts in the first row and ends in the last row. Find the cost of all possible edges using the following cost function. 8

$$\text{Cost}(p, q) = I_{max} \left| f(p) - f(q) \right|$$

Where I_{max} is the maximum Intensity value in the image and f(p) and f(q) are pixel values at point p and q respectively. Find the edge with minimum value of cost.

Plot the graph $F = \begin{bmatrix} 5 & 6 & 1 \\ 6 & 7 & 0 \\ 7 & 1 & 3 \end{bmatrix}$.

7. (a) How to find Inverse one dimensional DFT using forward DITFFT flowgraph. 20

(b) Derive High Boost filter mask (3 × 3).

(c) Bit reversal technique in FFT.

(d) Image Enhancement using LOG Transformation and power law transformation.

BE- comp III & Rov. Robot & AI Dec-12 1/1

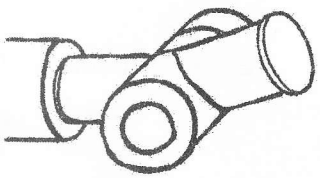
Con. 8367-12. **KR-1161**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question No. **2** to Question No. **7**.
(3) Assume **suitable** data if **necessary**.

1. Answer following question in brief :— 20
   (a) Briefly explain the role of Robotics in Industries.
   (b) Explain in brief the forward and inverse Kinematics.
   (c) Explain Heuristic function with example.
   (d) List sensors used for reactive robot.

2. (a) Describe DH parameters with suitable sketch. 6
   (b) Find the Kinematic transformation matrix using DH Method for following robot. 14



3. (a) Explain how you will formulate search problem. Formulate 8-puzzle problem. 6
   (b) Describe Depth-first search using suitable example. 4
   (c) What do you mean an admissible hearistics function ? Discuss with suitable example. 5
   (d) Describe IDA* search algorithm giving suitable example. 5

4. (a) Describe backward-chaining algorithms for propositional logic. 6
   (b) Represent the following sentences in first-order logic, using a consistent vocabulary. 4
      (i) Every person who buys a policy is smart.
      (ii) No person buys an expensive policy.
      (iii) There is an agent who sells policies only to people who are not insured.
      (iv) There is a barber who shaves all men in town who do not shave temselves.
   (c) Describe backward chaining algorithm with example. 10

5. (a) You have two neighbors, John and Mary, who have promissed to call you at work when they hear the alarm. John always calls when he hear the alarm, but sometimes confuses the telephone ringing with the alarm and calls then, too. Mary on the other hand, likes rather loud music and sometimes misses the alarm altogether. Given the evidence of who has or has not called, we would like to estimate the probability of a burglary. Draw a Bayesian network for this domain with suitable probability tables. 10
   (b) Give steps in designing the Reactive Behavioral system. 10

6. (a) What is planning problem ? How it differs from search problem ? 5
   (b) Explain screw Transformation. 5
   (c) Explain supervised, unsupervised and reinforcement learning with example. 10

7. (a) Describe following electrical actuators : DC motor, sunchronous motor, stepper motor. 10
   (b) Explain following sensors used in robotics application : Potentiometer, inductor, capacitor, LVDT. 10

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Comp - VII Mob. comp. Dec - 12 1/1

AGJ–2nd half (i)–12–2

KR-1278

Con. 8408–12.

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data if **necessary**.

1. (a) What are benefits of Spread Spectrum systems ? **5**
   (b) What do you mean by Hidden terminal and Exposed terminal problems ? **5**
   (c) What is SDMA ? How does it suit to mobile cellular systems ? **5**
   (d) List and explain GSM services. **5**

2. (a) Draw and explain Bluetooth protocol stack in detail. **10**
   (b) Compare between IEEE 802·11 and HIPERLAN2. **10**

3. (a) What is Mobile IP ? Describe it in detail. **10**
   (b) Discuss Mobile Transport Layer. **10**

4. (a) Draw a neat diagram of GSM system architecture and explain with different types of interfaces. **10**
   (b) Describe the Mobile Satellite systems (LEO and MEO). **10**

5. (a) List the MANET routing protocols. Describe any two protocols in detail. **10**
   (b) What is IMT-2000 ? **10**

6. (a) Draw a neat diagram of WAP architecture and explain in detail. **10**
   (b) What is WATM ? Describe the WATM reference Model and Services. **10**

7. Write short notes on following any **four** :–
   (a) WCDMA Vs CDMA 2000 **5**
   (b) Mobile OS **5**
   (c) WiMax **5**
   (d) GPRS **5**
   (e) WML. **5**

AGJ–2nd half (i)–12–33 B.E (comp) Sem VII (Rev) – Nov 2012 12/12/12

Con. 8447–12. **KR-1494**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume data if **required** and state it **clearly**.

1. (a) Explain different security mechanisms. **5**
   (b) Explain the steps used to construct knapsack cryptosystem. **5**
   (c) What is Personal Firewalls ? **5**
   (d) Explain different Targeted Malicious code. **5**

2. (a) What is the difference between Substitution Cipher and Transposition Cipher ? Explain Additive Cipher and Double Transposition Cipher with example. **10**
   (b) What are different types of vulnerability, threat and control ? Give example of each. **10**

3. (a) What is denial of service attack ? What are the way in which on attack can mount a DOS/DDOS attack on the system ? **10**
   (b) Write short note on Access Control Lists (ACL) and capabilities. **10**

4. (a) Explain different authentication methods and protocols. **10**
   (b) Explain cryptographic hash function criteria and compare MO5 and SHA-1. **10**

5. (a) Explain different types of data link layer vulnerability. **10**
   (b) Explain various types of port scan. **10**

6. (a) Explain methods used to commit session hijack. What is SQL Injection ? Give example. **10**
   (b) What are the network level threats to web server ? Explain. **10**

7. Write short note on the following :– **20**
   (a) Digital signature
   (b) Multilateral security
   (c) Digital Rights Management
   (d) Various ways of memory and address protection.

VT-S.H.Exam. Nov.-12- 68

Con. 8457–12. Comp. VII Sem E Commerce **KR–1878**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from remaining **six** questions.
(3) Assume **suitable** data, if **necessary**.

1. (a) Company wants to host E-commerce website, IT officer of the company has given three choice :– **20**
   (i) In-House hosting with dedicated IT infrastructure
   (ii) Cloud based Hosting
   (iii) Hosting on web hosting company's server
   Compare with respect to following parameters :–
   (i) Cost
   (ii) Security of E-commerce website
   (iii) User's experience
   (iv) Storage
   (v) Data privacy.

2. (a) Explain various techniques of session management in E-commerce website. **10**
   (b) Describe web 1·0, web 2·0 with respect to technology, features and their characteristics. **10**

3. (a) Explain any three types of Business models used in E-Business. **10**
   (b) Explain SET protocol in detail. **10**

4. (a) Explain in detail working of Search Engine. **10**
   (b) Write a detailed note on Enterprise Application Integration. **10**

5. (a) What is web Mashup architecture ? How will you used it in developing following E-commerce application :– **10**
   (i) Movie Ticket Booking
   (ii) Travel site portal ?
   (b) Define CRM and Explain its architecture. **10**

6. (a) Explain virtualization techniques and how it is used in cloud computing. **10**
   (b) Explain different type of web based Auction. **10**

7. Write short notes on following (any **two**) :– **20**
   (a) REST
   (b) Semantic web
   (c) Digital certificate.

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