

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

2) Attempt any three out of remaining five questions.

3) Figures to the right indicate full marks.

4) Make suitable assumptions wherever necessary and justify them

- | | | |
|------|---|----|
| Q.1. | a) Write a note on dynamic range compression. | 4 |
| | b) Find DTFT of $x(n) = \{1,2,3,4\}$ | 4 |
| | c) Explain energy and power signal with examples. | 4 |
| | d) Write a note on distance measures. | 4 |
| | e) Explain Image segmentation. | 4 |
| Q.2. | a) Explain any 5 properties of Discrete Fourier Transform | 10 |
| | b) (i) Find the 4 point DFT of $x(n) = \{1,-1,2,-2\}$ | 10 |
| | (ii) Find the IDFT of $X(k) = \{1,0,1,0\}$ | 10 |
| Q.3. | a) For $x(n) = \{1,3,-1,2,0,4\}$, plot the following discrete time signals | 10 |
| | (i) $x(n+2)$ | |
| | (ii) $x(-n-1)$ | |
| | (iii) $2x(n)$ | |
| | (iv) $x(n-1) \cdot \delta(n-3)$ | |
| | (v) $x(n)u(n-2)$ | |
| | b) (i) Find the cross correlation of the causal sequences
$x(n) = \{1,4,7,8\}$ and $y(n) = \{2,0,1,3\}$ | 10 |
| | (ii) Determine whether the following system is linear or non linear
$y(n) = 4x(n) + 2$ | |
| Q.4. | a) Determine radix 2 DIT-FFT Flow graph for
$x(n) = \{2,2,3,1\}$ | 10 |
| | b) Justify or Contradict
(i) Point processing techniques are called as Zero memory operations
(ii) To remove salt and pepper noise median filter is better than low pass filter | 10 |

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- Q 5. (a) Apply Horizontal and vertical line detection mask on the following 8 bits per pixel image F. Use appropriate threshold value. Assume virtual rows and Column by repeating border pixel values. 10

F =	10	15	10
	200	200	200
	5	20	10

- (b) Explain Contrast stretching. Perform Contrast stretching on the following 4 bpp images 10

r1=4, r2= 9, s1= 2, s2 = 13

4 BPP IMAGE			
7	8	5	1
7	8	8	2
5	9	7	7
8	7	12	15

- Q 6. a) Write Short note on edge detection in detail 10
 b) What is a Histogram and what is histogram equalization. Perform Histogram Equalization on the following 3 bpp image. Calculate the new histogram. Plot the original and new histogram and show the new image. 10

5	0	7	7	1	4	5	2	0	1
7	5	6	2	5	3	4	3	2	5
4	3	6	2	7	3	2	4	3	5
7	4	4	1	6	4	3	7	7	4
3	2	5	1	1	1	1	5	4	0

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Time: 3 Hours

Marks: 80

Note:- Q 1 is compulsory

Solve any three from remaining

Each question carries 20 marks

Q1] Solve any four

- A] Explain different application of mobile computing.
- B] Explain concept of frequency reuse with clustering.
- C] Explain IP mobility.
- D] Explain characteristics of GSM standards.
- E] Explain in short voice over LTE.

Q2] a] Explain in detail GSM architecture.

b] Explain in short different algorithm used for authentication and privacy in GSM.

Q3] a] Explain hidden station and exposed station problem with solution in WLAN.

b] How is packet delivery achieved to and from mobile node?

Q4] a] Explain DSDV routing protocol used in ad-hoc network.

b] Explain protocol architecture of IEEE 802.11.

Q5] a] Explain Bluetooth protocol stack in detail.

b] Explain different security threats in WLAN and discuss the available solutions.

Q6] A] Explain different components used in LTE architecture with diagram.

B] Explain various nodes present in E-UTRAN architecture.

(3 Hours)

(Total Marks : 80)

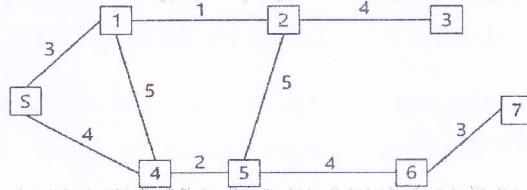
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- Note:**
1. Question 1 is compulsory.
 2. Attempt any 3 from Q2 to Q6.
 3. Indicate your answer with various sketches whenever necessary.

Q1 Attempt any four. [20]

- (a) State PEAS Description for online English tutor.
- (b) Differentiate between Soft and Hard computing.
- (c) Give Local and Global heuristic function for block world problem.
- (d) Give different membership functions of fuzzy logic.
- (e) Determine (α) α -level sets and strong α -level sets for the following fuzzy sets. $A=\{(1,0.2), (2,0.5), (3, 0.8), (4,1), (5, 0.7), (6,0.3)\}$

Q2 (a) Consider the graph given in Figure 1 below. Assume that the initial state is S and the goal state is 7. Find a path from the initial state to the goal state using A* Search. Also report the solution cost. The straight line distance heuristic estimates for the nodes are as follows: $h(1)=14$, $h(2)=10$, $h(3)=8$, $h(4)=12$, $h(5)=10$, $h(6)=10$, $h(S)=15$. [10]



- (b) The law says that it is a crime for an American to sell weapons to hostile nations. The country Nono, an enemy of America, has some missiles, and all of its missiles were sold to it by Colonel West, who is American. Prove that Col. West is a criminal using resolution technique. [10]

Q3 (a) Implement AND function using perceptron networks for bipolar inputs and targets. [10]

- (b) Explain fuzzy controller system for a tipping example. Consider service and food quality rated between 0 and 10. Use this to leave a tip of 25%. [10]

Q4 (a) Design a McCulloch Pitts model for XOR Gate. [10]

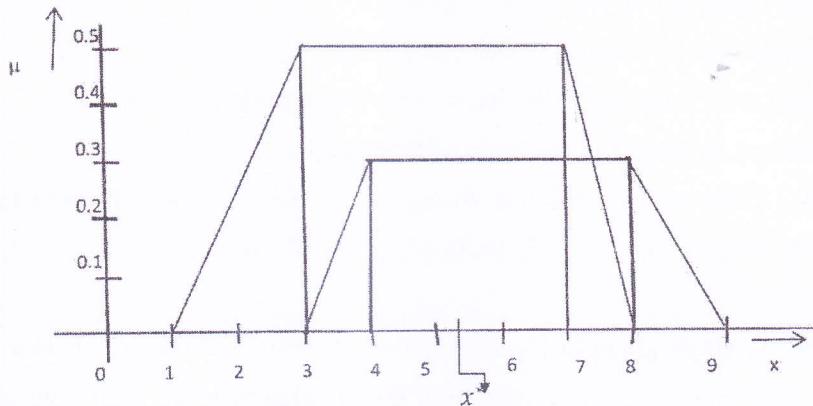
- (b) Construct Kohonen Self-organizing map to cluster the four given vectors. [10]

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[0 0 11], [1 0 0 0], [0 11 0] and [0 0 0 1]. The number of cluster formed is two.

Assume an initial learning rate of 0.5.

- Q5 (a) Explain defuzzification techniques. Apply defuzzification by using Center of Gravity (CoG) method on the following: [10]



- (b) Explain planning problem in AI. What are different types of planning? Consider problem of changing a flat tire. The goal is to have a good spare tire properly mounted on to the car's axle, where the initial state has a flat tire on the axle and a good spare tire in the trunk. Give the ADL description for the problem. [10]

- Q6 Write Short notes on following (Any Four) [20]

- (a) Genetic algorithm
 - (b) ANFIS
 - (c) Hill Climbing algorithm
 - (d) Wumpus world knowledge base
 - (e) Different types of Neural Networks
-

- N.B: 1) Q.1 is compulsory.
2) Attempt any THREE questions from the remaining questions.
3) Assume suitable data if necessary.

Q.1 Attempt any four :

- a) Compare active attacks vs Passive attacks. [5]
- b) Explain various types of key-loggers in brief. [5]
- c) Classify the cybercrimes and explain any one briefly. [5]
- d) Explain how the appeals can be made under The IT ACT 2000. [5]
- e) Write brief note on : Cyber-terrorism. [5]

Q.2 a) How criminals plan the attack? Discuss various steps involved [10]

b) Explain how Intellectual property laws protect the rights of the owner of the intellectual Property. [10]

Q.3 a) Compare Vishing, Phishing and Smishing in cyber security. [10]

b) What is E-commerce? Explain different types of e-commerce with suitable examples. [10]

Q.4 a) What is Bluetooth hacking? Explain Bluetooth hacking tools in brief. [10]

b) How the Indian penal code IPC 1860 addresses cybercrime? [10]

Q.5 a) Discuss basic security precautions to be taken to safeguard Laptops and wireless devices. [10]

b) What is E-contract? Discuss E-contract Act 1872. [10]

Q.6 Write short note on (Any 2) : [20]

- 1) Computer Sabotage.
 - 2) Indian Information Technology Act 2000
 - 3) Write key IT requirements for SOX and HIPAA.
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B.E SEM-VII Computer choice Based

(3 Hours)

[Total Marks 80]

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N.B:

1. Question No. 1 is Compulsory.
2. Solve any THREE from Question No. 2 to 6.
3. Draw neat well labeled diagram wherever necessary

- Q. 1 a)** Explain access control policies in detail. (05)
b) Describe the concepts of covert channel in detail. (05)
c) What is the concept of cross site scripting? Describe with example. (05)
d) Explain the cybercrimes in detail. (05)
- Q. 2 a)** Describe session hijacking in detail. (10)
b) Explain salami attack and linearization attack. (10)
- Q. 3 a)** What is phishing and pharming? Explain it with example. (10)
b) Explain bell-La Padula model with neat diagram. (10)
- Q. 4 a)** Explain possible attacks on wireless LAN in detail. (10)
b) Describe copyrights and intellectual property in details. (10)
- Q. 5 a)** Explain in details wireless security offered by 802.11 with neat diagram. (10)
b) Describe incident response methodology with diagram. (10)
- Q. 6** Write short note on: (20)
1. Windows vulnerabilities
2. Operating system security
3. Federated Identity Management
4. Forensic duplication

Op Code 76013

B.E (comp) - sem vii - CBCS - 22/11/19

(3 hours)

Total Marks: 80

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- N.B. 1. Question No. 1 is compulsory
 2. Attempt any three out of remaining
 3. Assume suitable data if necessary and justify the assumptions
 4. Figures to the right indicate full marks

- Q1 Answer the following 20
- [a] Every image has unique histogram but vice-versa is not true. Justify the statement.
 - [b] List various steps in Digital Image Processing.
 - [c] Explain unitary matrix by giving example.
 - [d] Give any two objective fidelity criteria.
- Q2 A For the given 4 bpp image apply 10
- [i] Digital Negative operation
 - [ii] Contrast stretching operation with $r_1 = 4$, $r_2=12$, $s_1=8$ and $s_2 = 12$
- | | | | |
|---|---|----|----|
| 4 | 5 | 9 | 14 |
| 4 | 6 | 11 | 14 |
| 3 | 6 | 5 | 11 |
| 3 | 8 | 8 | 9 |
- B What is segmentation explain (i) Region Growing (ii) Region Splitting and (iii) Thresholding 10
- Q3 A Explain Chain code with example and show that how first difference makes chain code rotation invariant. 10
- B Find the DFT of the following image. 10
- | | | | |
|---|---|---|---|
| 5 | 4 | 3 | 2 |
| 5 | 4 | 3 | 2 |
| 5 | 4 | 3 | 2 |
| 5 | 4 | 3 | 2 |
- Q4 A Explain Thickening along with example. 10
- B Explain with example graph theoretic technique used for image segmentation. 10
- Q5 A Write 8x8 Hadamard transform matrix and its signal flow graph. Using butterfly diagram, compute Hadamard transform for $x(n)=\{1, 2, 3, 4, 1, 2, 3, 4\}$. 10
- B Explain Arithmetic coding with example. 10
- Q6 Write a short note on 20
- [a] Hough Transform
 - [b] Vector-Quantization
 - [c] Differential PCM
 - [d] Morphological Boundary Extraction Method

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B.E. Sem VII - Computer - CBSGS.

Time: 3 Hours

Total Marks: 80

Note:

- (i) Each question carries 20 marks
- (ii) Question 1 is compulsory
- (iii) Attempt any three (3) from the remaining questions
- (iv) Assume suitable data wherever required

Q1. Attempt any four (4) questions from the following [20]

- (a) Give PEAS description for a Personal Assistant in Smartphone. Characterize its environment.
- (b) Give the initial state, goal test, successor function, and cost function for an "N Queens problem".
- (c) Draw and explain architecture of Utility Based Agent.
- (d) Define Turing test and explain its significance in AI.
- (e) What are universal and existential quantifiers? Illustrate its usage in predicate logic with a suitable example

Q2 (a) Explain termination conditions in a decision tree learning algorithm with an example for each condition. What are decision rules? How to use it for classifying new samples? [6+2+2]

- (b) Consider the following sentences:

Anyone passing his history exams and winning a lottery is happy. But anyone who studies or is lucky can pass all his exams. John did not study but he is lucky. Anyone who is lucky wins the lottery.

Answer "Is John happy?" using proof by resolution

Q3 (a) Design a suitable planning agent for cleaning the kitchen. Give any 2 STRIPS style operators that might be used. When designing the operators take into account considerations such as --- Cleaning the stove or refrigerator will get the floor dirty. [10]

- (b) Explain the Bayesian Belief Networks (BBN) with a suitable example. What types of inferences can be drawn from such networks?

Q4 (a) Define heuristics. Give a suitable heuristic function to solve a tic-tac-toe problem in AI. Illustrate its application to any state of a tic-tac-toe problem [6]

Q4 (b) Write a pseudo code for alpha-beta algorithm. Consider a section of min-max tree shown in Figure 1. Is there any Beta Cut Off possible? If possible, Where and Why? [4+2+4]

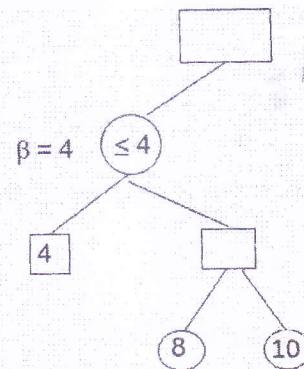
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Figure 1

- (c) What are the frustrations that occur in hill climbing algorithm? [4]

- Q5 (a) Explain how Genetic algorithms work with a suitable example? Define the terms chromosome, fitness function, crossover and mutation for the same example. [10]
- (b) Consider the graph given in Figure 2 below. Assume that the initial state is S and the goal state is G. Show how **A* Search** would create a search tree to find a path from the initial state to the goal state [10]

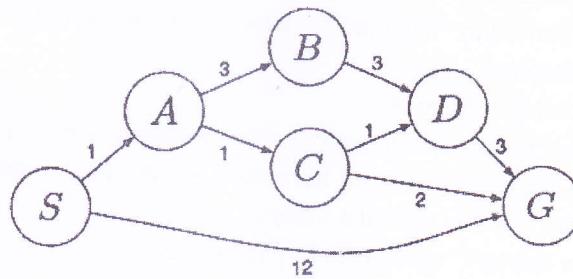


Figure 2

Assuming the straight-line distance as the heuristics function: $h(S)=4$, $h(A)=2$, $h(B)=6$, $h(C)=2$, $h(D)=3$ and $h(G)=0$.

- Q6 Answer any two (2) of the following [20]
- (a) How would you differentiate between Expert System and just an AI program? Draw and illustrate expert systems architecture. Use an example to support your claims.
- (b) What are steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence. Briefly explain any one application of NLP
- (c) Write a short note on simulated annealing.

B-E - Computer - Sem VII - CBS95.

(Time: 3hrs)

(Total Marks 80)

18/11/19.

1. Question No 1 is compulsory.
2. Attempt any three out of the remaining five questions.

Q1. Solve any four: (5 marks for each)

- (a) Why is padding done in MD5 and SHA?
- (b) What are the properties of cryptographic hash functions?
- (c) Explain with examples, poly-alphabetic & mono-alphabetic ciphers.
- (d) What are the different types of viruses? Explain in brief.
- (e) With examples explain Denial of service attack.

05
05
05
05
05

Q2. (a) Justify why DES is a feistel cipher. Explain the different operations in DES.

How are the subkeys generated in each round different from each other?

12
08

- (b) Design a double transposition cipher and use it to encrypt "Enemy attacks tonight".
Column Key to be used is [5,2,4,3,1].

Q3. (a) What is a digital certificate? Explain the significance of X.509 certificate in

10

PKI. How is a digital certificate verified by the receiver during a communication?

Q3. (b) How is single sign-on achieved in Kerberos? What is the role of each server in
the protocol?

10

Q4 (a) A and B use RSA to communicate securely. B chooses public key (e,n) as
(7,221). Calculate p,q and Φn . Compute the private key, d. A chooses public key as
(Ea,Na). A wishes to send message m=5 to B such that confidentiality is maintained.
With what key will A encrypt the message?

10

Q4. (b) What is session hijacking? What are the different ways to prevent session
hijack attacks?

10

Q5. (a) What are the different types of firewalls? Differentiate between working of the
statefull and stateless inspection firewalls.

10

Q5. (b) Discuss how authentication and integrity is achieved in SET payment protocol?

10

Q6. (a) Write in brief about (any two):

10

- i) Database Security.
- ii) Key generation in IDEA
- iii) SSL record protocol.

Q6. (b) How does the IPSec protocol help in achieving authentication and integrity?

10