6E7101

Roll No. _____ [Total No. of Pages : 3]

6E7101

B.Tech. VI sem. (Main) Examination, June - 2023
Computer Science & Egg.
6CS3-01 Digital Image Processing
CS,IT, AID, CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions From Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C .

Schematic diagram must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in from No. 205)

Part - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Define pixelization and false countering effect in images.
2. Explain shifting and convolution properties of 2-D discrete Fourier transform.
3. What is the difference between a box low pass filter and a gaussian low pass filter.
4. What is bit plane slicing in image thresholding?
5. Explain the model of image degradation and restoration process in brief.
6. What do you understand by inverse filtering in image processing?
7. What is wraparound error in frequency domain filtering?
8. Explain interpixel and psychovisual redundancies with a suitable example of each.
9. What is the need of image segmentation? Explain edge, point, and line detection processes in brief.
10. What is the difference between image enhancement and image restoration.

Part - B

(Analytical/Problem solving questions)

Attempt any five questions: **(5×4=20)**

1. Discuss sampling and quantization process in digital image processing. Also comment on the effect of quantization error on image quality.
2. Perform the operation of histogram matching for the given input image to achieve the distribution of given target image. Draw the resultant histogram.

Input Image								
r_k	10	25	60	115	140	165	210	250
$P(r_k)$	0.19	0.25	0.21	0.16	0.08	0.06	0.03	0.02

Target Image								
z_q	10	25	60	115	140	165	210	250
$P(z_q)$	0.00	0.00	0.00	0.15	0.20	0.30	0.20	0.15

Here r_k and Z_q are gray values, and $P(r_k)$ and $P(Z_q)$ are the corresponding probabilities of occurrence.

3. Compress the following simple 4×8, 8 bit image using Huffman coding. Also obtain:
   a) Average code length
   b) Coding redundancy and compression ratio
   c) Entropy of the source.

25	25	30	65	100	120	180	240	240
25	25	30	65	100	120	180	240	240
25	25	30	65	100	120	180	240	240
25	25	30	65	100	120	180	240	240

4. What is the need of homomorphic filter in image processing? Explain the steps used in homomorphic filtering with a suitable example.
5. What is the relation between relative data redundancy and compression ratio in data compression? Calculate average number of bits/pixel for the following encoded image:

Gray value (r_k)	Probability ($P(r_k)$)	Code Word
85	0.25	01
130	0.4	1
180	0.25	000
255	0.1	001
All other gary values	0	----

6. Explain the fundamental steps of region growing and region splitting algorithms in region-based segmentation.
7. Discuss different intensity transformation functions along with graphical representation of each transformation.

Part - C

(Analytical/Problem solving/ Questions))

Attempt any three questions. **(3×10=30)**

1. Discuss different types of noise probability density functions in detail. Explain the image restoration process in the presence of noise only. Give example of at least one linear and one non-linear filter that can be used for the restoration.
2. What are the differences between lossy and lossless compression techniques? Explain JPEG compression technique with an example.
3. Discuss the concept of Hough transformation along with its execution steps in edge detection? Use Hough transform to find out whether the following points(1,0), (2,1), (3,1), (4,1), (3,2) are collinear or not. Also mention the limitations of Hough transform.
4. Explain the HSI color model and compare it with RGB color model. Specify the expression used to convert colors from HSI to RBS and Vice Versa.
5. Explain image formation model. Discuss the different types of sensors used to acquire images digitally with suitable examples and illustrative diagrams.

6E1551

Roll No. _____ [Total No. of Pages : 4

6E1551

B.Tech.VI - Sem. (Back) Examination,July- 2023
Computer Science and Engineering
6CS3-01 Digital Image Processing
CS, IT

Time : 2 Hours **Maximum Marks : 80**
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all Five** questions from **Part A**, **Four** questions out of Six questions from **Part B** and **Two** questions out of **Three** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(5×2=10)**

1. Discuss about contrast stretching and intensity slicing.
2. What are the types of image enhancement available?
3. What are the types of edge detection operators available?
4. What is the role of Hough Transform in global processing?
5. Why noise is always considered to be additive, in images?

PART - B

(Analytical/Problem solving questions)

Attempt any Four questions. **(4×10=40)**

1. Explain the principle of sampling and quantization.
2. Consider a 1-D image f(x) =[10 10 10 10 40 40 40 20 20].Calculate the first and Second order derivatives. Locate the respective edge positions.
3. Explain HIS color model with an appropriate figure. Explain the conversion procedure from RGB color space to HSI color space.
4. Describe how homomorphic filtering is used to separate illumination and reflectance component.

S 7

5. What are the derivative operators useful in image segmentation? Explain their role in segmentation.
6. Explain any two boundary representation schemes and illustrate with example.

PART - C

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any Two questions. **(2×15=30)**

1. Describe histogram equalization. Obtain histogram equalization for the following image segment of size. Write the inference on image segment before and after equalization.

20	20	20	18	16
15	15	16	18	15
15	15	19	15	17
16	17	19	18	16
20	18	17	20	15

2. Decode the arithmetic coded message, 0.23355 for the coding model.

Symbol	*Probability*
A	0.2
E	0.3
I	0.1
O	0.2
u	0.1
!	0.1

And also Explain LZW coding with an example and Explain Redundancies and their removal methods.

3. Consider the Image'I' below and the Filters 'F' and 'L'

'I'			*'F'*			*'L'*		
1	1	1	1/8			1		
1	8	1	1/8	1/2	1/8	1	−4	1
1	1	1	1/8			1		

a. Correlate the image'I' with the filter 'F' and compute the output image
b. Apply filter 'L' to the same image 'I' to produce a 3 by 3 output image.
c. Differentiate Correlation and Convolution with example.

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6E1551

B.Tech.VI - Sem. (Back) Examination,July- 2023
Computer Science and Engineering
6CS3-01 Digital Image Processing
CS, IT

Time : 2 Hours **Maximum Marks : 80**
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all Five** questions from **Part A**, **Four** questions out of Six questions from **Part B** and **Two** questions out of **Three** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(5×2=10)**

1. Discuss about contrast stretching and intensity slicing.
2. What are the types of image enhancement available?
3. What are the types of edge detection operators available?
4. What is the role of Hough Transform in global processing?
5. Why noise is always considered to be additive, in images?

PART - B

(Analytical/Problem solving questions)

Attempt any Four questions. **(4×10=40)**

1. Explain the principle of sampling and quantization.
2. Consider a 1-D image f(x) =[10 10 10 10 40 40 40 20 20].Calculate the first and Second order derivatives. Locate the respective edge positions.
3. Explain HIS color model with an appropriate figure. Explain the conversion procedure from RGB color space to HSI color space.
4. Describe how homomorphic filtering is used to separate illumination and reflectance component.

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6E7102

Roll No. _____ [Total No. of Pages : 3

6E7102

B.Tech. VI sem. (Main) Examination, July - 2023
Computer Science and Engineering (Artificial Intelligence)
6CAI4-02 Machine Learning
CS,IT,AID, CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions From Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C .

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and states clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination (Mentioned in form No. 205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Express the Markov property mathematically.
2. Give clear difference between episodic and *continuous* tasks of Markov process.
3. Why dimensionality reduction is required for a dataset?
4. Which cost function is used in logistic regression and why?
5. Write names of different types of clustering methods.
6. What is the use of attribute selection measure in decision tree classifier.
7. Define singular value decompositions.
8. What is Deep learning?
9. What is support vector in SVM?
10. Give name of u-filter feature selection methods.

PART - B

(Analytical/Problem solving questions)

Attempt any five questions. **(5×4=20)**

1. What do you understand about "Bellman equation for value function". Give example.
2. Give merits and demerits of filter and wrapper feature selection methods.
3. Discuss about frequent pattern, support and confidence of a association rule with example.
4. Explain following with respect to multilayer network
   a) Weights and Biases
   b) Use of Activation functions.
5. What is the use of confusion matrix. Define all the related terms of a confusion matrix.
6. Discuss various types of splits of a attribute in a decision tree classification algorithm.
7. What is overfitting problem in Machine learning algorithm. Give solutions for it.

PART - C

(Descriptive/Analytical/Problem solving/Design questions))

Attempt any three questions. **(3×10=30)**

1. Explain K-nearest neighbor method. Consider a binary classification problem with two classes C1 and C2. Class lables of ten other training set instances sorted in increasing order of their distance to an instance.

   x is as follows: $\{C1, C2, C1, C2, C2, C2, C1, C2, C1, C2\}$.

   How will a $K = 3$ nearest neighbour classifier classify the instance x

2. Suppose you are given following set of training examples. Each attribute can take on one of three nominal values: $a.b, or\ c$.

A1	*A2*	*A3*	*Class*
a	*c*	*a*	*C1*
c	*a*	*c*	*C1*
a	*a*	*c*	*C2*
b	*c*	*a*	*C2*
c	*c*	*b*	*C2*

   a) How would a Naive Bayes classifier classify the example $A1 = a, A2 = c, A3 = b$? Show all steps.

   b) How would a Name Bayes classifier classify the example $A1 = c, A2 = c,\ A3 = a$? Show all steps.

3. Explain f-p Growth algorithm for frequent pattern generation. Give suitable example and all computational steps with diagrams.

4. A neural network takes two binary values inputs, $x1, x2 \in \{0,1\}$ and activation function is the binary threshold functions $\begin{pmatrix} h(z)=1 & if & z>0 \\ 0 & & otherwise \end{pmatrix}$

   Design a neural network to compute the AND Boolean function. Consider the truth table for of AND Boolean functions. weights are {2,2) and Biase is -3.

5. Write short notes on following

   a) Model based reinforcement learning.

   b) K - means clustering algorithm

   c) Single linkage and complete linkage clustering algorithm with example.

6E1552

Roll No. _____ [Total No. of Pages : 4

6E1552

B.Tech. VI Sem. (Back) Examination, July- 2023
Computer Science and Engineering
6CS4-02 Machine Learning
CS, IT

Time : 3 Hours **Maximum Marks : 120**
Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all Ten** questions from **Part A**, **Five** questions out of Seven questions from **Part B** and **Four** questions out of **Five** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given upto 25 words only)

All questions are compulsory. **(10×2=20)**

1. What is the difference between Supervised, Unsupervised and Reinforcement Machine Learning.
2. What is Logistic Regression?
3. What is Dimensionality Reduction?
4. Distinguish between Classification and Regression with a suitable example.
5. Compare the Agglomerative Clustering and Divisive Clustering Method.
6. What is Recommendation System?
7. Distinguish between Overfitting and Underfitting.
8. What is Model Selection in Machine Learning?
9. What is Deep Learning?
10. What is Random Forest Algorithm?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×8=40)**

1. What is Artificial Neural Network ? Explain different types and characteristics of Artificial Neural Network.

2.

2. The Values of independent variable 'X' and dependent variable 'Y' is given below:

X	*Y*
0	2
1	3
2	5
3	4
4	6

Find the Least Square Regression Line y = ax+b. Estimate the value of 'y' when 'x' is 10

3. Perform KNN-Classification Algorithm on following data set and predict the class for X(P1=3 and P2=7) where K=3

P1	P2	CLASS
7	7	*False*
7	4	*False*
3	4	*True*
1	4	*True*

4. Consider the given dataset, apply Naive Bays Classifier Algorithm and predict that if a Fruit has the following properties than which type of Fruit it is.

Fruit = {Yellow, Sweet, Long}

Fruit	Yellow	Sweet	Long	Total
Mango	350	450	0	650
Banana	400	300	350	400
Others	50	100	50	150
Total	800	850	400	1200

5. What is Q-Learning? Explain algorithm for Learning Q.

6. With a suitable example, explain Back Propagation in Neural Network.

7. For the following Medical Diagnosis data, create a Decision Tree. Sample data'S' is given below:

SoreThroat	Fever	Swollen Glands	Congestion	Headache	Diagnosis
Yes	*Yes*	*Yes*	*Yes*	*Yes*	*StrepThroat*
No	*No*	*No*	*Yes*	*Yes*	*Allergy*
Yes	*Yes*	*No*	*Yes*	*No*	*Cold*
Yes	*No*	*Yes*	*No*	*No*	*StrepThroat*
No	*Yes*	*No*	*Yes*	*No*	*Cold*
No	*No*	*No*	*Yes*	*No*	*Allergy*
No	*No*	*Yes*	*No*	*No*	*StrepThroat*
Yes	*No*	*No*	*Yes*	*Yes*	*Allergy*
No	*Yes*	*No*	*Yes*	*Yes*	*Cold*
Yes	*Yes*	*No*	*Yes*	*Yes*	*Cold*

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

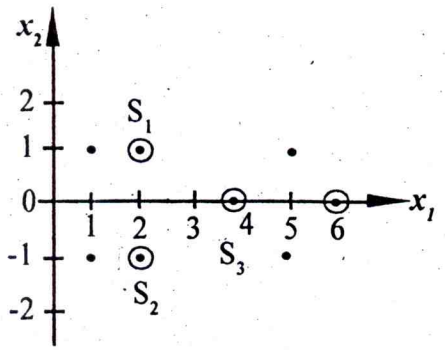
Attempt any Four questions. **(4×15=60)**

1. Find optimal Hyperplane for the set of data points:{(1,1),(2,1),(1,-1), (2,-1),(4,0),(5,1),(5,-1),(6,0)} using Support Vector Machine Algorithm and classes are:

CLASS 1:{(1,1),(2,1),(1,-1),(2,-1)}

CLASS 2:{(4,0),(5,1),(5,-1),(6,0)}

The plot of the points belonging to the two classes is shown in the below figure:



2. Devide the given sample data in two clusters using K-Means Algorithm.

S.No	HEIGHT	WEIGHT
1	185	72
2	170	56
3	168	60
4	179	68
5	182	72
6	188	77
7	180	71
8	180	70
9	183	84
10	180	88
11	180	67
12	177	76

3. Perform Agglomerative Algorithm on the following data and plot a Dendrograph using Single Link Approach.

SAMPLE NO	X	Y
*P*1	0.40	0.53
*P*2	0.22	0.38
*P*3	0.35	0.32
*P*4	0.26	0.19
*P*5	0.08	0.41
*P*6	0.45	0.30

4. Describe how Principal Component Analysis is carried out to reduce dimensionality of data set.

5. What is Perceptron? Explain Single Layer and Multi Layer perceptron.

6E7103

Roll No. _____ [Total No. of Pages : 2

6E7103

B.Tech. VI sem. (Main) Examination, July - 2023
Computer Science and Engg. (Artificial Intelligence)
6CIA4-03 Information Security Systems
CS,IT,AID, CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions From Part A, five Questions out of seven questions from Part B and three questions out of five questions from Part C .

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and state clearly. Units of quantities used/calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What are security attacks? Differentiate between active and passive attacks.
2. Write any two difference between Stream and block ciphers.
3. What is avalanche effect?
4. Write any two strengths of DES algorithm.
5. What is public key cryptography?
6. Write any two applications of public key. Cryptography.
7. What is cryptographic hash function? Write its any two properties.
8. What is message authentication code?
9. Write any four general means of authenticating a user's identity.
10. What is HTTPS?

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PART - B

(Analytical/Problem solving questions)

Attempt any five questions: **(5×4=20)**

1. Encrypt the message "Code" using the Hill cipher with the key $\begin{bmatrix} 3 & 2 \\ 8 & 5 \end{bmatrix}$ and decrypt the Cipher text to original plaintext.
2. Explain design principles of block cipher.
3. Perform encryption and decryption using RSA algorithm for the following.

   $p = 3, q = 11, e = 7, M = 5$
4. Explain cipher-based message authentication code with suitable diagrams.
5. Explain Elgamal digital signature algorithm.
6. Explain the distribution of public keys. Using public - key certificate scheme.
7. Explain SSL record protocol with suitable diagram.

PART - C

(Descriptive/Analytical/Problem solving/Design questions))

Attempt any three questions. **(3×10=30)**

1. Explain the general structure of AES algorithm. With suitable diagrams.
2. Explain block cipher modes of operations with suitable diagrams.
3. Perform encryption and decryption using Elgamal. Algorithm, for the following

   $q = 71, \alpha = 7, X_A = 3, M = 30, k = 2$
4. Explain SHA-512 algorithm with suitable diagrams.
5. Explain kerberos version 4 protocol with suitable diagram.

6E1553

Roll No. _____ [Total No. of Pages : 2

6E1553

B.Tech. VI Sem. (Back) Examination, July- 2023
Computer Sc. And Engineering
6CS4-03 : Information Security System
CS, IT

Time : 2 Hours **Maximum Marks : 80**

Min. Passing Marks : 28

Instructions to Candidates:

*Attempt all **Five** questions from **Part A**, **Four** question out of **Six** questions from **Part B** and **Two** questions out of **Three** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205).

PART - A

(Answer should be given up to 25 words only.)

All questions are compulsory. **(5×2=10)**

1. What is encryption?
2. What is Stream Cipher?
3. Define the cryptanalysis.
4. What is message authentication code (MAC)?
5. What is HTTPS and SSH?

PART - B

(Analytical/Problem solving questions.)

Attempt any Four questions. **(4×10=40)**

1. Differentiate between symmetric and asymmetric encryption algorithm.
2. Discuss rail fence transposition method.
3. Analyze the electronic code book.
4. Explain the vernam cipher in detail.
5. Describe the digital signature.
6. Explain X.509 certificates.

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PART - C

(Descriptive/Analytical/Problem Solving/Design question.)

Attempt any Two questions. **(2×15=30)**

1. Describe the data encryption standard (DES) algorithm in detail.
2. What is hash function? Explain Secure hash algorithm in detail.
3. Explain RSA algorithm with suitable example.

6E7104

Roll No. _____ [Total No. of Pages : 2

6E7104

B.Tech. VI Sem. (Main) Examination, July- 2023
Computer Science and Engg.)
6CS4-04 : Computer Architecture and Organization
CS,IT,AID,CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

*Attempt all **Ten** questions from **Part A**, **Five** question out of **Seven** from **Part B** and **Three** questions out of **Five** Questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205).

PART - A

Answer should be given up to 25 words only.

All questions are compulsory.

(10×2=20)

1. Is there any difference between microprocessor and microcontroller? Explainwith example.
2. Define (r-1)'s complement and r's complement using an example.
3. Distinguish among computer organization and computer architecture.
4. Explain RISC.
5. Explain the use of cache memory.
6. What are the different conflicts that will arise in pipeline? How do you remove the conflicts? Describe.
7. Describe subroutine.
8. Draw and explain the memory hierarchy in a digital computer.
9. Perform the 2's complement subtraction of smaller number (101011) from largernumber (111001).
10. What are the basic difference among a branch instruction, a call subroutine instruction and program interrupt?

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PART - B

Analytical/Problem solving questions.

Attempt any Five questions. **(5×4=20)**

1. Explain the Fetch Cycle with diagram.
2. Multiply (-37) x (21) using Booth multiplier algorithm and write all the steps.
3. Describe the Flynn model and explain the components.
4. Write short note on:
   1) Memory address register
   2) Program Counter
5. Explain paging and segmentation with the help of suitable example.
6. Describe the procedure for addition and subtraction for fixed-point number? Explain it by use of Flowchart.
7. Explain how virtual address is translated into real address in segmented memory system.

PART - C

Descriptive/Analytical/Problem Solving/Design questions.

Attempt any Four questions. **(3×10=30)**

1. Describe role of addressing modes used in computer architecture.Illustrate direct and indirect addressing mode with suitable example. Demonstrate arithmetic micro operation and draw diagram of 4-bit full adder.
2. a) Explain arithmetic pipeline with a suitable example. Draw diagram also. **[4]**
   b) Discuss all factor which affect the performance of pipelining processor based systems. A non- pipeline system takes 100 ns to process a task. The same task can be processed in a six- segment pipeline with a clock cycle of 20ns. Determine the speedup ratio of the pipeline for 200 tasks. What is maximum speedup that can be achieved? **[3+3]**
3. a) Explain cache coherency and why it's necessary? Explain Different approaches for cache coherency. **[6]**
   b) Construct a memory system having static 1K x 4 RAM. How many such RAMs required to **[4]**
      i) Construct 1K x RAM memory bank and 4K x 4RAM memory bank.
4. Differentiate between Hardwired control unit and Micro-Programmed Control unitwith their diagram.
5. a) Draw and explain the diagram of a DMA controller. Why read write lines of DMA are Bidirectional. **[5+1]**
   b) What is the function IOP? Explain it with block Diagram. **[4]**

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6E1554

Roll No. _____ [Total No. of Pages : 2

6E1554

B.Tech. VI Sem. (Back) Examination, July - 2023
Computer Science and Engineering
6CS4-04 Computer Architecture and Organization
CS, IT

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** questions from **Part B** and **Four** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are **compulsory.** **(10×2=20)**

1. Define register transfer language?
2. Define Micro - Operations.
3. Differentiate between machine language and assembly language.
4. Explain instruction format.
5. What is serial communication?
6. What do you mean by data transfer and manipulation?
7. What are signed magnitude numbers?
8. What is an Interrupt?
9. Define memory hierarchy.
10. Define inter process communication.

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PART - B

(Analytical/Problem solving questions)

Attempt any **Five** questions. **(5×8=40)**

1. Define and differentiate between register reference and memory reference instructions. Explain with example instructions of each class.
2. Explain assembler with the help of suitable block diagrams.
3. Compare characteristics of RISC and CISC.
4. Explain functioning of Input Out processor.
5. Describe vector processing.
6. With the help of suitable diagrams explain instruction pipeline.
7. Describe cache coherence.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any **Four** questions. **(4×15=60)**

1. a. Design a bus system for 4 registers of 4 - bit each using MUX.
   b. Enumerate and explain various arithmetic and logic micro - operations. **(7+8)**
2. a. Define micro programmed control.
   b. Explain in detail the control memory and address sequencing in micro programmed control unit. **(5+10)**
3. a. Define addressing mode. List and explain various addressing modes.
   b. What is an array processor. Explain working of array processor with the help of a neat diagram. **(7+8)**
4. a. Explain Booth multiplication algorithm with the help a suitable example.
   b. Define asynchronous data transfer. Describe strobe control and handshaking in asynchronous data transfer. **(7+8)**
5. In context of associative memory explain the following.
   a. Direct Mapping.
   b. Set - Associative mapping.
   c. Write back and write through. **(5+5+5)**

6E7105

Roll No. _____ [Total No. of Pages : 3

6E7105

B.Tech. VI-Sem. (Main) Examination, July - 2023
Computer Science and Engineering (Artificial Intelligence)
6CAI4-05 Principles of Artificial Intelligence
CS,IT,AID, CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five Questions out of seven questions from Part B and three questions out of five questions from Part C .

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

PART - A

(Answer should be given up to 25 words only)

All question are compulsory. **(10×2=20)**

1. What is the difference between intelligent agent and rational agent?
2. If a multi-agent system has 'n' agents, each of which has 'm' possible moves , the search space increases to how many possible states?
3. What is state space search for water jug problem?
4. Define heuristic function *h(n)*.
5. What is probability theory?
6. Compare forward chaining with backward chaining.
7. Write time and space complexity of BFS and DFS.
8. Define quantifiers and its types.
9. What are the three types of symbols which are used to indicate objects, relations and functions?
10. What is alpha-beta pruning?

204

PART - B

(Analytical/Problem solving questions)

Attempt any five questions. **(5×4=20)**

1. Highlight the differences between informed and uninformed search techniques.
2. What are constraint satisfaction problems? Trace the constraint satisfaction procedure solving the following cryptarithmetic problem:

$$\begin{array}{r} EAT \\ +THAT \\ \hline APPLE \end{array}$$

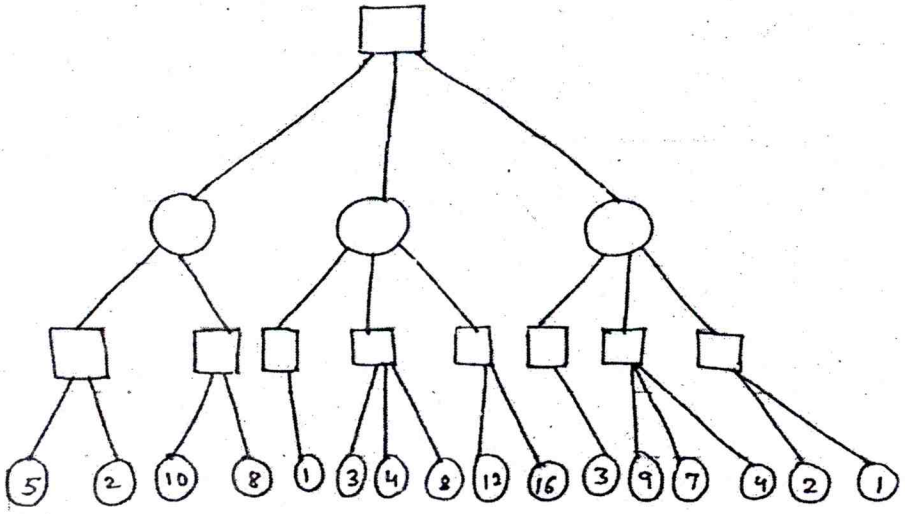
3. What reasoning deduction is more suitable heuristic in the game of chess; forward or backward? Justify your answer by refering to properties of search space.
4. Explain learning by decision trees taking an example.
5. Differentiate between propositional logic and first order logic.
6. What are neural networks? How they are used for learning in Artificial Intelligence?
7. What do you understand by the term "robotics"? How it is helpful in Artificial Intelligence?

PART - C

(Descriptive/Analytical/Problem solving/Design Questions)

Attempt any three questions. **(3×10=30)**

1. Discuss A* and AO* search algorithms taking examples. Also mention their advantage over greedy search method.
2. Explain how values are propagated in the game tree using MINIMAX and ALPHA-BETA pruning. Circle the nodes that will be pruned.



3. What is Bayesian Network? How is it used in representation of the uncertainty about knowledge. Explain the method of performing exact inference in Bayesian network.

4. Explain the supervised and unsupervised learning techniques along with examples. Also Mention their advantages and disadvantages.

5. a) Write about all the steps followed in natural language processing.

   b) Explain the architecture of expert systems.

6E1555

Total No. of Questions: Total No.of Pages:

Roll No. _____

B.Tech. VI Sem(Back) Exam 2023
Computer Sc. & Engg.
6CS4-05Artificial Intelligence
6E1555
CS,IT

Time: 2 Hours **Maximum Marks: 80**
Min. Passing Marks: 28

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1_____ 2. _____

Part A(Answer should be given up to 25 words only)
All questions are compulsory

Q.1 Write any two major differences between informed and uniformed search algorithms.
Q.2Define Heuristic function, h (n).
Q.3What Is called As Decision Theory?
Q.4What is an expert system?
Q.5 Construct a neural network which computes the XOR function of two inputs.

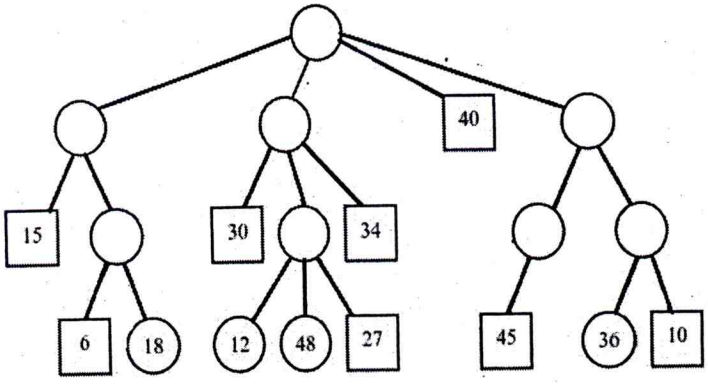
5 x 2 = 10

Part BAnalytical/Problem solving questions
Attempt any four questions

Q.1Discuss and compare breadth first search and depth first search techniques.

Q.2 (a) Evaluate and fill the heuristic values for all the empty states in the given game tree. Assume that the minimax algorithm is being used, according to the labels on the right.

(b) On the same diagram above, indicate which states will not be explored if alpha-beta pruning is used. Circle all unvisited subtrees, and indicate next to them whether alpha-pruning or beta-pruning was used by writing 'α' or 'β' next to the state. You may assume that the branches are explored from left to right. (CO2) (5 + 5 = 10 marks)



Q.3Explain Constraint satisfaction problem in detail with the help of any example.
Q.4Write short note on: Bayesian Networks and Conditional probability
Q.5What reasoning direction is a more suitable heuristic in the game of Chess: forward or backward? Justify your answer by referring to properties of the search space.
Q.6 Write all the steps in sequence and their significance followed in Natural Language Processing.

4 x 10 =40

Part C(Descriptive/Analytical/Problem Solving/Design Question)
Attempt any two questions

Q1. Explain in detail with the help of a suitable example how A* search algorithm differs from greedy best first search technique.
Q.2Explain supervised and unsupervised based learning techniques along with their advantages and disadvantages.
Q.3Enumerate classical "Water jug problem". Describe the state space for this problem. You are given two jugs, a 4-liter one and a 3-liter one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 liters of water into a 4-liter jug.Solve this problem by giving its operation sequence.

2 x 15 =30

6E7106

Roll No. _____ [Total No. of Pages : 2

6E7106

B.Tech. VI-Sem. (Main) Examination, July - 2023
Computer Science and Engineering (Artificial Intelligence)
6CAI4-06 Cloud Computing
CS,IT,AID,CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

PART - A

(Answer should be given up to 25 words only)

All questions are **compulsory.** **(10×2=20)**

1. What is Cloud Computing? Write the objectives of cloud computing.
2. What is Hypervisor in cloud computing. Write its types with definition.
3. What do you mean by Ubiquitous cloud?
4. What is IOT? Name different fields in which IOT is used.
5. List High Level Languages used for cloud computing.
6. Explain CRM in cloud.
7. Explain Trust Management and its need in cloud computing.
8. Describe all the threats in cloud computing and why risk mitigation is used?
9. What is Amazon SQS? How buffer is used to Amazon web services?
10. Explain characteristics of cloud computing.

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PART - B

(Analytical/Problem solving questions)

Attempt any **Five** questions. **(5×4=20)**

1. Write short note on a) Server Virtualization b) Virtualization of data-center.
2. Explain all the service models and types of clouds.
3. Describe Service Level Agreement(SLA) with proper diagram. Write its advantages and disadvantages.
4. What is Aneka? Describe main Characteristics of Aneka?
5. Describe cloud deployment model with proper diagram.
6. Explain Business Continuity and disaster recovery in cloud computing.
7. Explain Security Challenges and security architecture(with proper diagram) in cloud computing.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any **Three** questions. **(3×10=30)**

1. What is Virtualization? Explain implementation level of Virtualization along with the benefits of Virtualization.
2. Describe and differentiate among Amazon web services, Google App Engine and Microsoft Azure Design.
3. Illustrate the use of Hadoop in cloud computing and what is Map Reduce framework.
4. Explain cloud security service along with design principles and security challenges in detail.
5. Explain the Migration process in cloud computing. Explain all the steps for migration with proper diagram.

6E1560

Roll No. _____ [Total No. of Pages : 2

6E1560

B.Tech.VI - Sem. (Back) Examination, July - 2023
Computer Sc. & Engg.
6CS4-06 Cloud Computing
CS, IT

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory **(10×2=20)**

1. What are the languages supported by Google App Engine?
2. What is the major role of a Hypervisor?
3. What is the need for fast cloning of Virtual Machines?
4. What is cold and hot migration of Virtual Machines?
5. A VM on your laptop with LAMP stack installed on the VM is an example of IaaS, PaaS or SaaS.
6. List two advantages of Sandbox environment.
7. What are the security considerations in cloud computing?
8. What is serverless computing in the cloud?
9. What is autoscaling in the cloud?
10. What is on - demand provisioning in context with cloud computing?

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PART - B

(Analytical/Problem solving questions)

Attempt any five questions. **(5×8=40)**

1. Give the advantages of using virtual machines.
2. Explain the resource pooling characteristic of cloud.
3. Give detailed description on IaaS, PaaS and SaaS.
4. Discuss the preventive measures to be taken to prevent "Data Loss or Leakage".
5. Write and elaborate the advantages of Sandboxing Environment.
6. Diagrammatically explain Virtual Private Clouds and hybrid clouds.
7. A website experiences increased traffic during specific hours of the day, requiring additional computing resources to handle the load. The website runs on a cloud platform that charges $0.10 per hour for a single CPU core and $0.05 per hour for 1 GB of memory. During peak hours, the website requires an additional 20 CPU cores and 40 GB of memory to handle the increased traffic. The peak period lasts for 4 hours every day. Calculate the additional cost incurred during the peak hours.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Four questions. **(4×15=60)**

1. What is the difference between public, private, and hybrid clouds? Explain in detail.
2. How does the MapReduce paradigm enable parallel and distributed processing?
3. What factors should be considered when evaluating the business impact and economics of adopting cloud computing?
4. Describe in detail the key components and architecture of a typical cloud computing system.
5. Suppose you are tasked with optimizing the cost of a cloud computing infrastructure for a company. How would you approach this task and identify potential cost - saving opportunities?

6E7136

Roll No. _____ [Total No. of Pages : 2

6E7136

B.Tech. VI-Sem. (Main) Examination July - 2023
Computer Science and Engineering
6CS5-11 Distributed System (El.I)
CS, IT

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** questions from **Part B** and **Three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are **compulsory.** **(10×2=20)**

1. What are the goals of a distributed system.
2. State the difference between distributed operating system and network operating system.
3. Explain working of RPC.
4. How distributed file system is different from centralized file system.
5. Explain concept of logical clocks.
6. How concurrency is handled in distributed system.
7. What is non uniform memory access model?
8. Explain distributed mutual exclusion.
9. Explain concept of faults in distributed agreement.
10. How data is handled in Distributed databases.

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PART - B

(Analytical/Problem solving questions)

Attempt any **five** questions. **(5×4=20)**

1. Explain how micro kernels can be used to organize an operating system in a client - server fashion.
2. Explain transport level communication services for building distributed applications.
3. What is an object adapter?
4. Does using time stamping for concurrency control ensure serializability? Discuss.
5. Discuss connection less communication between client and server using sockets.
6. How state of a distributed system is recorded? Explain by suitable diagram.
7. Explain distributed shared memory with the help of suitable diagram.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Three** questions. **(3×10=30)**

1. Consider two CORBA systems, each with their own naming service. Outline how the integration may be performed.
2. a. Discuss side effects in coda's RPC2 system.
   b. Explain implementation and resolution of a coda file identifier.
3. Explain following strategies used for deadlock handling in distributed system :
   a. Deadlock prevention.
   b. Deadlock avoidance.
   c. Deadlock detection and Recovery.
4. Explain lamport's clock and vector clock with the help of suitable example.
5. With the help of suitable diagram, explain sender initiated and receiver initiated algorithms for dynamic load sharing and balancing in distributed system.

6E7107

Roll No. _____ [Total No. of Pages : 2

6E7107

B.Tech. VI-Sem. (Main) Examination, July - 2023
Computer Sc. and Engg. (Artificial Intelligence)
6CAI5 -11 Artificial Neural Network
AID, CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions From Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C .

Schematic diagram must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What is Hebbian Network?
2. What is a Perceptron Learning mode?
3. Compare the biological process versus artificial neural networks.
4. What is recurrent neural network?
5. What is competitive network?
6. List the difference between MAE and MSE.
7. Explain the Kohonen SOM.
8. What is Gradient decent.
9. Explain knowledge Representation.
10. Explain Bayes Rule.

PART - B

(Analytical/Problem solving questions)

Attempt any five questions. **(5×4=20)**

1. Implement AND gate using perceptron model using binary input.
2. Explain supervised learning techniques and discuss about the various supervised learning model.
3. What are Hopfield models, discuss the limitations and challenges of it. Also draw the structure of the model.
4. What is feature engineering , how you will find the correlation between the features.
5. How a perceptron model converges also explain how the learning of weights are performed in the network.
6. What is unsupervised learning, discuss some algorithms of it.
7. Explain Learning vector quantization.

PART - C

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any three questions. **(3×10=30)**

1. Implement XOR gate.
2. Formulate backpropagation algorithm for forward and backward pass.
3. Consider the following knowledge Base:
   - The humidity is high, or the sky is cloudy.
   - If the sky is cloudy, then it will rain.
   - If the humidity is high, then it is hot.
   - It is not hot.

   Goal: It will rain.

   Use propositional logic and apply resolution method to prove that the goal is derivable from the given knowledge base.
4. Explain the difference between hill climbing, plateau, ridge and simulated annealing approach in AI. Give examples of each.
5. Explain the A* algorithm for heuristic search. Solve 8 Puzzle using A* method.

6E1557

Roll No. _____ [Total No. of Pages : 2

6E1557

B.Tech. VI- Sem. (Back) Examination, July- 2023
Information Technology
6IT4-06 Distributed System
CS, IT

Time : 2 Hours **Maximum Marks : 80**
Min. Passing Marks :28

Instructions to Candidates:

*Attempt **all five** questions from **Part A**, **Four** questions out of **Six** questions from **Part B** and **Two** questions out of **Three** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A
(Answer should be given up to 25 words only)

All questions are compulsory. **(5×2=10)**

1. What is the main objectives of distributed system? What are the challenges.
2. Define Inter-process communication.
3. Differentiate between RMI and RPC.
4. Define Election in distributed system.
5. What are the services are done by the CORBA?

PART - B
(Analytical/Problem solving questions)

Attempt any Four questions. **(4×10=40)**

1. What is Distributed system ? What are the basic features of distributed system
2. What is RPC in distributed system? explain the Client/Server architecture. Describe the role of Client stub and Server stub while making an RPC call.
3. Describe the file service architecture. Explain the case study on coda file system.
4. Explain distributed mutual exclusion with its classification.

217

5. Explain Byzantine agreement problem and suggest a solvation to this problem.
6. Explain the characteristics of a concurrent programming language

PART - C

Attempt any Two questions. **(2×15=30)**

1. What do you understand by distributed deadlock handling? How it is different with centralized deadlock handling concept.

2. Explain distributed shared memory system in distributed environment with suitable diagram, also explain the failure in a distributed system.
3. Write short notes on the following:
   a) Distributed computing environment(DCE).
   b) Static process scheduling.
   c) Replicated Data Management.
   d) CORBA RMI.

6E1650

Roll No. _____ [Total No. of Pages : 2

6E1650

B.Tech. VI-Sem. (Back) Examination, July - 2023
Computer Science and Engineering
6CS5-11 Distributed System
CS, IT

Time : 2 Hours **Maximum Marks : 80**
Min.Passing Marks:28

Instructions to Candidates:

*Attempt **all Five** questions from **Part A**, **four** questions out of **Six** questions from **Part B** and **Two** questions out of **Three** from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(5×2=10)**

1. Define Distributed Systems.
2. What are the characteristics of Heterogeneity?
3. What is meant by address space?
4. What is the election algorithm?
5. Define Edge chasing.

PART - B

(Analytical/Problem solving questions)

Attempt any Four questions. **(4×10=40)**

1. List the features of distributed systems.
2. Describe performance in metrics in Distributed system.
3. What is Deadlock? Explain with suitable example?

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4. Define and explain the AND model. AND-OR Model.
5. Design in detail about application domains where distributed systems is applied.
6. List and explain the basic properties of Vector Time.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Two questions. **(2×15=30)**

1. Explain the various type of networks? What are the network issues for distributed system.
2. Explain the different type of cryptographic algorithm.
3. Explain the case study of X.500 directory services.

6E7138

Roll No. _____ [Total No. of Pages : 2

6E7138

B.Tech. VI-Sem. (Main) Examination, July - 2023
Computer Science and Engineering
6CS5-13 E-commerce and ERP (El - I)
CS, IT

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** questions out of **Seven** questions from **Part B** and **Three** questions out of **Five** questions from **Part C**.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What are the main components of E-commerce?
2. Write down the main difference between HTML and XML.
3. What do you understand by cookies in a website?
4. What is the basic difference between portal and a website?
5. Explain E - commerce providers and vendors in short.
6. Give a short note on ISPs.
7. Give a definition about traditional marketing.
8. What do you understand by B2C type of E-commerce?
9. Give difference between URL and URI.
10. What is the benefit of online advertising?

PART - B

(Analytical/Problem solving questions)

Attempt any five questions. **(5×4=20)**

1. What are the Traditional and E-marketing? Give detailed differences between both of them.
2. Explain strategic capabilities of internet for E-commerce.

221

3. What do you understand by Enterprise information portal (EIP)?
4. Explain the various broad goals of the E-commerce? Write down the various main components also.
5. Define the E-commerce with various main activities associated with E-commerce.
6. Explain the Internet Protocol and shopping cart.
7. Explain the various mode of operations associated with E-commerce.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. a. What are the main components of the internet?
   b. What is the role of Internet and Web in E-commerce?
2. Write down the below functions of E-commerce.
   a. Communication management
   b. Process Management.
   c. Service Management.
3. Write short notes on the following.
   a. World Wide Web.
   b. Data Marts.
   c. Operational Data Stores.
4. There is a Book Depo nearby your college. The owner of the book depo wants to digitalize his business. Write down all the necessary steps related to how he can use e - commerce to develop, design and implement his business's website and can go for E - marketing?
5. How to define the structure of an XML document? Describe the security features of XML document.
