

6E7101

Total No. of Questions : 22

Total No. of Pages : 04

Roll No. :

6E7101

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

COMPUTER SCIENCE & ENGG.

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

Use of following supporting material is permitted during examination. (As mentioned in Form No. 205)

1.

2.

PART-A

[10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Discuss about contrast stretching and intensity slicing.

Q.2. How are color images represented digitally?

- Q.3. What is unsharp masking?
- Q.4. What are intensity transform functions?
- Q.5. What are the performance metrics for evaluating image compression?
- Q.6. What is directional derivative? Where it is used?
- Q.7. Differentiate between lossy and lossless compression techniques.
- Q.8. State the conditions for Region Splitting and Merging Processes.
- Q.9. What is spatial filtering?
- Q.10. How do frequency domain filters work.?

PART-B

[5x4=20]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1. Explain what you would expect the result of Sampling and Quantization operations on image.



Fig.1

- Q.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.
- Q.3. Explain HIS color model with an appropriate figure. Explain the conversion procedure from RGB color space to HSI color space.
- Q.4. Explain the image restoration technique to remove the blur caused by uniform linear motion.
- Q.5. What are the derivative operators useful in image segmentation? Explain their role in segmentation.

- Q.6. Explain any two boundary representation schemes and illustrate with example.
- Q.7. How do you link edge pixels through global processing? Also explain Hough Transforms.

PART-C

[3x10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1. Consider the image shown in Fig. 2. Explain what you would expect the result to be in each of the following four filtering operations :
- Horizontal gradient operation
 - Vertical gradient operation
 - Horizontal Sobel operator
 - Vertical Sobel operator

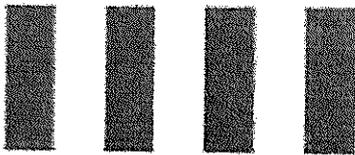


Fig.2

- Q.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.

Q.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.
- Q.4. (a) Differentiate Correlation and Convolution with example.
- (b) What are the derivative operators useful in image segmentation?
- Q.5. With a neat block diagram, explain transform based image compression scheme. Also give two valid reasons for the choice of "Discrete Cosine Transform" in JPEG image compression standard.

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6E7102

Total No. of Questions : 22

Total No. of Pages : 04

Roll No. :

6E7102

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

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 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. Nil

2. Nil

PART-A

[10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q. 1. What do you mean by Maximum Marginal Hyperplane (MMH in SVM)?

6E7102/5540

Page 1 of 3

[P.T.O.]

- Q. 2. Differentiate between 2-layer neural network and 3-layer neural network.
- Q. 3. Give advantages of content based filtering.
- Q. 4. Differentiate between feature extraction and selection.
- Q. 5. What do you understand by false negative in confusion matrix?
- Q. 6. Define attribute selection measure in classification.
- Q. 7. Write any four requirement of Clustering Algorithm.
- Q. 8. How you compute support for a transactional database? Give example.
- Q. 9. What is Markov Property? Express it mathematically.
- Q. 10. Give your intuition about following :
 - (a) Markov Reward Process (MRP)
 - (b) Bellman Equation

PART-B

{5×4=20}

(Analytical/Problem solving questions)

Attempt any five questions

- Q. 1. List the important steps of policy evaluation using Monte Carlo.
- Q. 2. Differentiate between following for reinforcement learning :
 - (a) Value iteration and policy iteration
 - (b) On-policy and off-policy
- Q. 3. What do you mean by optimal policy in an MDP environment? How we find an optimal policy? Give example.
- Q. 4. How distance be computed for attributes that are not numeric, but are categorical in k-nearest neighbor classifier? Give example.
- Q. 5. How to define inter-cluster similarity in Hierarchical clustering? Give example of each approach.
- Q. 6. What are advantages of 'Navie' Bayesian classifier? Briefly outline major steps of the algorithm.
- Q. 7. What is the use of PCA in Machine Learning? Give the steps of PCA algorithm.

PART-C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q. 1. Consider following eight points (with (x,y) represents location) $A_1(2,10)$, $A_2(2,5)$, $A_3(8,4)$, $B_1(5,8)$, $B_2(7,5)$, $B_3(6,4)$, $C_1(1,2)$, $C_2(4,9)$. The distance function is Euclidean distance cluster these eight points into three clusters using k-means algorithm with showing all necessary steps.
- Q. 2. What is multilayer neural network? Explain Back propagation Learning Algorithm.
- Q. 3. Explain the following with example :
 - (a) Decision-Tree Algorithm
 - (b) Linear Regression
- Q. 4. Write short notes on the following :
 - (a) Collaborative filtering
 - (b) Evaluating machine learning algorithms and model selection
- Q. 5. Consider following transactional database with min-sup = 60% and min-conf = 80%.

TID	Item Bought
T ₁	{M, O, N, K, E, Y}
T ₂	{D, O, N, K, E, Y}
T ₃	{M, A, K, E}
T ₄	{M, U, C, K, Y}
T ₅	{C, O, O, K, I, E}

and construct the following using FP Growth algorithm :

- (a) FP - Tree
- (b) Conditional Pattern base
- (c) Conditional FP-tree

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6E7103

Total No. of Questions : 22

Total No. of Pages : 04

Roll No. :

6E7103

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

**COMPUTER SC. AND ENGG. (ARTIFICIAL
INTELLIGENCE)**

6CAI4-03 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 may 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

[10x2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Differentiate between active and passive attacks.

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- Q.2. Differentiate between stream and block ciphers.
- Q.3. What is avalanche effect ?
- Q.4. Write advantages of multiple encryption and triple DES.
- Q.5. Differentiate between private key and public key cryptography.
- Q.6. Write disadvantages of public key cryptography.
- Q.7. What is cryptographic hash function ?
- Q.8. What is message authentication code ?
- Q.9. Write four general means of authenticating an user's identity.
- Q.10. What is HTTPS ?

PART-B

[5x4=20]

(Analytical/Problem Solving questions)

Attempt any five questions

- Q.1. Construct a Play fair matrix with the key "occurrence" and encrypt the message "Jaipur".
- Q.2. Explain AES key expansion algorithm with suitable diagram.
- Q.3. Explain the design principles of block cipher.
- Q.4. Perform encryption and decryption using the ElGamal algorithm, for the following :

$$q = 71; \alpha = 7; X_A = 3; M = 30; k = 2$$

- Q.5. Explain the security requirements for cryptographic hash functions.
- Q.6. Explain Cipher-based Message Authentication Code (CMAC).
- Q.7. Explain the public-key certificate technique for the distribution of public keys.

PART-C

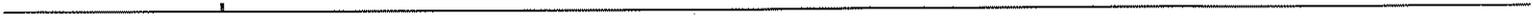
[3x10=30]

(Descriptive/Analytical/Problem Solving Design/Questions)

Attempt any three questions

- Q.1. Explain the Data Encryption Standard (DES) algorithm with suitable diagrams.
- Q.2. Explain the Electronic Code Book (ECB) and Cipher Block Chaining (CBC) modes of block cipher operations.
- Q.3. Explain the SHA-512 algorithm using suitable diagrams.
- Q.4. Explain the digital signature algorithm.
- Q.5. Explain the SSL architecture and protocols with suitable diagrams.

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6E7104

Total No. of Questions : 22

Total No. of Pages : 04

Roll No. :

6E7104

B.Tech. VI-Sem. (Main/Back) Exam.- 2024

Computer Science and Engineering (Artificial Intelligence)

6CAI4-04 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 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)

1. Nil

2. Nil

PART-A

[10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1 What is meant by RISC?

Q.2: What do you mean by ALU?

6E7104/5520

Page 1 of 3

[P.T.O.]

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- Q.3 What is a control memory?
- Q.4 What is an instruction cycle?
- Q.5 Define a bus.
- Q.6 What is a micro-operation?
- Q.7 What do you mean by multicomputer ?
- Q.8 What is parallel processing?
- Q.9 What is a register?
- Q.10 What is auxiliary memory?

PART-B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1 Design a 4×3 RAM.
- Q.2 Explain set-associative mapping with a suitable example.
- Q.3 Design a 4×3 ROM for a table of contents of your choice.
- Q.4 Write 4 logic micro-operations.
- Q.5 Explain memory hierarchy.
- Q.6 Explain serial communication with an example.
- Q.7 Explain arithmetic pipeline with an example.

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1 Explain DMA with suitable example.
- Q.2 Show the steps of Booth's algorithm for $8 \times (-8)$.
- Q.3 Describe Flynn's taxonomy.
- Q.4 Explain the design of a vector processor.
- Q.5 Explain cache coherence with a suitable example.

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6E7105

Total No. of Questions : 22

Total No. of Pages : 04

Roll No. :

6E7105

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

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)

1.

2.

PART-A

[10×2=20]

Answer should be given up to 25 words only

All questions are compulsory

Q. 1. Define atomic sentence and complex sentence.

6E7105/5400

Page 1 of 3

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- Q. 2. Define the terms 'syntax' and semantics'.
 - Q. 3. What are the different types of machine learning?
 - Q. 4. What is an expert system?
 - Q. 5. What is the need for probability theory in uncertainty?
 - Q. 6. Define Modus Ponens rule in propositional logic.
 - Q. 7. What is heuristic function?
 - Q. 8. Define supervised and unsupervised learning.
 - Q. 9. What is the main condition required for alpha-beta pruning?
 - Q. 10. Define Neural Networks.

PART-B

[5×4=20]

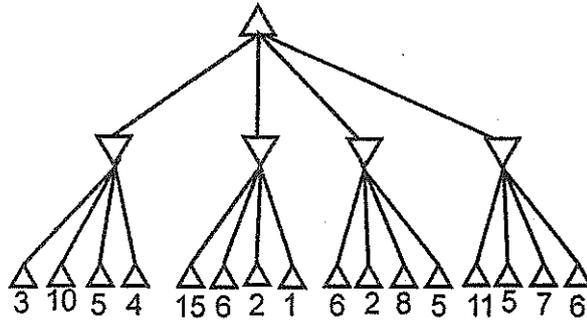
Analytical/Problem solving questions

Attempt any five questions

- Q. 1. What are Quantifiers? Discuss about different types of quantifiers.
- Q. 2. Differentiate propositional logic from first-order logic.
- Q. 3. What reasoning direction is a more suitable heuristic in the game of chess : forward or backward? Justify your answer by referring to the properties of the search space.
- Q. 4. Explain Bayesian networks with examples.
- Q. 5. Write short note on artificial neural networks.
- Q. 6. Explain Bayesian network and conditional independence with example.

Q. 7. Consider the following game tree :

(a) Write down the minimax value of every non-terminal node next to that node :



(b) Cross out the branches that do not need to be examined by alpha-beta search in order to find the minimax value of the top node.

PART-C

[3×10=30]

Descriptive/Analytical/Problem Solving/Design questions

Attempt any three questions

- Q. 1. Explain the A* search algorithm and give the proof of optimality of A*.
- Q. 2. Define the constraint satisfaction problem. Describe the elements in the definition of CSP. Use an example to define the map coloring problem as constraint satisfaction problem.
- Q. 3. Enumerate classical water Jug problem. Describe the state space for this problem. Solve this problem by giving its operation sequence.
- Q. 4. What is Natural Language Processing? Explain the various steps followed in NLP. Also discuss the different issues in NLP.
- Q. 5. Explain in detail the differences between supervised and unsupervised learning with the help of examples.

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6E7106

Total No. of Questions : 22

Total No. of Pages : 04

Roll No. :

6E7106

B.Tech. VI-Sem. (Main/Back) Exam. 2024

COMPUTER SCIENCE AND ENGINEERING

(Artificial Intelligence)

6CA14-06 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)

1.

2.

PART-A

[10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. What is Cloud Computing? Mention the objectives as well.

-
- Q.2. Explain the different components of Cloud Computing.
 - Q.3. Explain the Parallel and Distributed Cloud Paradigm.
 - Q.4. Explain the Fractures of Cloud Computing.
 - Q.5. Explain CRM in Cloud.
 - Q.6. Explain the Hypervisor VMware.
 - Q.7. What are the fundamental principles of cloud security design?
 - Q.8. Describe the working of Hadoop.
 - Q.9. What is AWS? What types of services does it provide?
 - Q.10. Discuss the cloud federation stack.

PART-B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1. Explain in depth about Ubiquitous Cloud and the Internet of Things.
- Q.2. Explain the Storage Services of Cloud Platform.
- Q.3. What is Business Continuity and Disaster Recovery in Cloud Computing?
- Q.4. Explain the different layers and types of Clouds and Service Models.
- Q.5. Describe the core components of Google App Engine.
- Q.6. Explain the (SLA) with a neat diagram and also state its advantages and disadvantages.
- Q.7. What is Data Intensive Computing? List eight open challenges of Data Intensive Computing.

(Descriptive/Analytical/Problem Solving/ questions)

Attempt any three questions

- Q.1. With a neat diagram, explain the Cloud Computing Reference Model.
- Q.2. Explain the following Deployment Mode Platform for the following Aneka Cloud:
- (a) Private Cloud
 - (b) Public Cloud
 - (c) Hybrid Cloud
- Q.3. What is Virtualization? Explain the implementation level along with the benefits.
- Q.4. Design and implement an Application for Log Parsing, Mapper and Reducer with Aneka Map Reduce.
- Q.5. Explain the Windows Azure platform architecture.

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6E7138

Total No. of Questions : 22

Total No. of Pages : 04

Roll No. :

6E7138

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

INFORMATION TECHNOLOGY

6IT5-13 E-commerce & 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)

1.

2.

PART-A

[10x2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

- Q.1. What is E-Commerce?
- Q.2. What are the benefits of E-Commerce?
- Q.3. Name four E-Commerce Activities.
- Q.4. What is Uniform Resource Locator?
- Q.5. Define Internet Protocol.
- Q.6. Define Cookies.
- Q.7. What is Internet Service Provider?
- Q.8. Define XML.
- Q.9. What is Data Warehousing?
- Q.10. Define E-marketing

PART-B

[5x4=20]

(Analytical/Problem-solving questions)

Attempt any five questions

- Q.1. What are the main components of E-Commerce? Explain.
- Q.2. What is the role of Internet and Web in E-Commerce?
- Q.3. Explain various modes of operation associated with E-Commerce.
- Q.4. Explain various elements and resources impacting E-Commerce and changes.

- Q.5. Write a short note on strategic capabilities of Internet.
- Q.6. What is Enterprise Information Portal? Explain.
- Q.7. Give comparison between HTML and XML.

PART-C

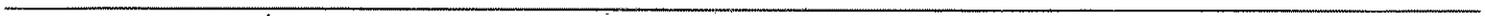
[3x10=30]

(Descriptive/Analytical/Problem-Solving/Design questions)

Attempt any three questions

- Q.1. Explain various functions of Electronic Commerce in detail.
- Q.2. Explain various components and factors for the development of the Business Case.
- Q.3. Explain the steps to design and develop an E-Commerce website.
- Q.4. What is online publishing? Explain various strategies and approaches of online publishing and advertising.
- Q.5. What is Traditional marketing and how it is different from E-marketing? Explain various advantages of online marketing in detail.

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