

G 5054

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Eighth Semester

Branch : Computer Science and Engineering

CS 010 801—HIGH PERFORMANCE COMPUTING

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Write two approaches to achieve parallelism in uniprocessor systems.
2. Illustrate the overlapped operations in a linear pipeline processor using a space time diagram.
3. What are the connection issues in using SIMD interconnection networks ?
4. Compare the different multiprocessor hardware organizations.
5. List the interesting features of data flow model.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Draw the functional structure of a modern pipeline computer with scalar and vector capabilities and explain the functions of each components.
7. Explain the classification schemes for pipeline processors according to handler.
8. How can sorting be performed using comparators on array processors ?
9. Demonstrate the use of semaphores in process synchronization.
10. List the advantages and disadvantages of data flow computing.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each full question carries 12 marks.

11. Discuss the trends towards parallel processing with necessary illustrations.

Or

12. Describe Flynn's and Feng's architectural classification schemes with examples.

Turn over

13. Consider a 4 segment normalized floating point adder with a 10 ns delay for each segment which equals the pipeline clock period :
- Name the appropriate functions to be performed by the four segments. (6 marks)
 - Find the minimum number of periods required to add 100 floating-point numbers using this pipeline adder. (6 marks)

Or

14. What is meant by internal forwarding ? Explain its types with examples.
15. Describe multistage cube interconnection networks with $N = 8$. State the assumptions made.

Or

16. Draw an associative memory array and its registers and explain its working.
17. Discuss loosely coupled multiprocessors with a diagram and highlight its advantages over tightly coupled multiprocessors.

Or

18. Explain the functions of multiport memories for multiprocessors.
19. Demonstrate data flow computer architectures with neat diagram.

Or

20. Elaborate on dependence driver approach to multilevel event-driven approach.

[5 × 12 = 60 marks]

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Eighth Semester

Branch : Computer Science and Engineering / Information Technology

IT 010 803 / CS 010 802 – ARTIFICIAL INTELLIGENCE (CS, IT)

(New Scheme – 2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. How heuristic search algorithms work ?
2. State the constraint satisfaction problem.
3. Why knowledge representations an important issue in artificial intelligence ?
4. Explain learning by advice.
5. What are discrete fuzzy sets ? Explain with example.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each full question carries 5 marks.

6. For the monkey and bananas problem presented below, formally define the problem as a space of all possible configurations where each configurations called a state (initial state, goal state, and actions) :

A hungry monkey is in a room. Suspended from the roof, just out of his reach, is a bunch of bananas. In the corner of the room is a box. The monkey desperately wants the bananas but he can't reach them. What shall he do ? After several unsuccessful attempts to reach the bananas, the monkey walks to the box, pushes it under the bananas, claims on the box, picks the bananas and eats them. The hungry monkey is now a happy monkey.

7. What is an AND-OR graph ? Explain with an example and diagrammatic illustration.

Turn over

8. Explain resolution propositional logic with example.
9. Discuss supervised and unsupervised learning with example.
10. What is knowledge acquisition ? Discuss.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each full question carries 12 marks.

11. Explain with example problem solving using production systems.
Or
12. Present a Python implementation of the hill climbing algorithm and discuss the same with an example.
13. Explain the A* search algorithm with example. Illustrate each step of the algorithm with diagrammatic illustration.
Or
14. Explain with example and diagrammatic illustration game as search problem with the following sequence of steps: initial state, successor function, terminal test, and utility function.
15. Translate the following English sentences into predicate logic formula :

(i) John likes Susan.	(ii) John has a cat.
(iii) A whale is mammal.	(iv) Barking dogs don't bite.
(v) Every student is happy.	(vi) Some students are happy.

Or
16. Explain with example inference in rule-based systems using forward chaining and backward chaining.
17. (a) What are rote learning systems ? List and discuss the issues in the design of rote learning systems.
(b) What is learning by parameter adjustment ? Discuss with a simple example.
Or
18. What is a decision tree ? Explain with an example ID3 decision tree induction algorithm.
19. What is a fuzzy set ? List and explain the operations on fuzzy set with example and diagrammatic illustration.
Or
20. What are the capabilities of expert systems ? When to use an expert system ? What are its components ? Discuss.

(5 × 12 = 60 marks)

G 5080

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Eighth Semester

Branch : Computer Science and Engineering

CS 010 803—SECURITY IN COMPUTING (CS)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Bring out the differences between Mono and Poly alphabetic ciphers.
2. List few requirements for public key cryptography.
3. Define weak collision property of a hash function.
4. Identify the design goals of firewalls.
5. How can hashed passwords authenticate users ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Explain the different types of active and passive attacks.
7. State and prove Euler's theorem.
8. Discuss the objectives of HMAC and its security features.
9. Draw the header format for an ISAKMP message and explain its components.
10. What are the threats caused by virus to security ? Present them along with the counter measures taken ?

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each full question carries 12 marks.

11. (a) Describe the rules to perform encryption and decryption using playfair cipher. (6 marks)
(b) Apply the playfair cipher to encrypt the message 'meet me tomorrow' using the keyword 'University' I/J count as one letter.

(6 marks)

Or

12. Present the simplicity and complexity of transposition ciphers.
13. Discuss DES encryption with a neat diagram and also highlight its strength.

Or

14. Explain encryption and decryption using RSA algorithm and apply the same to encrypt $M = 8$ with $p = 7$, $q = 11$ and $e = 17$.
15. Elaborate on the steps used by MD5 algorithm to generate message digest.

Or

16. Explain the authentication service provided by X.509.
17. How does PGP provide confidentiality and authentication service for e-mail and file storage applications? Explain in detail.

Or

18. Discuss the operation of SSL record protocol with necessary diagram.
19. Explain the different security models with necessary examples.

Or

20. Explain the types of intrusion detection mechanisms in detail.

[5 × 12 = 60 marks]

G 5105

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Eighth Semester

Branch : Computer Science and Engineering

CS 010 804 L01 – E-COMMERCE (Elective – III) [CS]

(New Scheme – 2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. What is just-in-time manufacturing ?
2. List the factors contributing to the rise in electronic commerce security breaches.
3. What are smart cards ?
4. List the benefits of electronic data interchange.
5. What is video conferencing ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. How the World Wide Web can be used to promote marketing ?
7. Explain data encryption and decryption with an example.
8. How are credit card transactions authenticated and authorized ?
9. What is supply chain management ? Give example.
10. Discuss the impact of mobile computing on electronic commerce.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each full question carries 12 marks.

11. Explain with diagrammatic illustration the elements of electronic commerce applications.

Or

Turn over

12. (a) Who are the potential electronic commerce supply chain members ? Discuss.
(b) Why a market driven approach is essential to allow electronic commerce to flourish and to stimulate innovation, better services and lower prices ? Discuss.
13. List and discuss the major issues that represent significant threats to the continued growth of electronic commerce.

Or

14. (a) How does electronic commerce make a difference to businesses and consumers ? Discuss.
(b) Present a mercantile process model of your choice and discuss the same.
15. What is an electronic payment system ? List and discuss the types of electronic payment systems.

Or

16. List and discuss the issues to be considered while designing electronic payment systems.
17. What is electronic data interchange ? Explain with diagrammatic illustration the architecture of electronic data interchange.

Or

18. (a) What are the managerial issues related to electronic data interchange ? Discuss.
(b) Classify digital documents and discuss the same.
19. Explain with example why information and communications technology infrastructure is a key enabler for electronic commerce.

Or

20. Discuss the following :
- (a) Switched multi-megabit data service (SMDS).
(b) Asynchronous transfer mode (ATM).

(6 + 6 = 12 marks]

[5 × 12 = 60 marks]

G 5243

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Eighth Semester

Branch : Computer Science and Engineering/Information Technology

SECURITY IN COMPUTING (RT)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. Brief the security attacks threatening confidentiality.
2. What is a worm ? Give example.
3. Why is it desirable to have one-way functions to ensure security ? Reason out using an example.
4. Write a note on the challenge response authentication scheme with an example.
5. Brief the types of attacks on encrypted messages.
6. Summarise the strengths and weaknesses of data encryption standard (DES).
7. Give the format of IP security authentication header and present the importance of each field.
8. List the design principles of firewalls.
9. What does mandatory access control mean ? Give an example.
10. What are the ways to enforce discretionary access control in a database ?

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each full question carries 12 marks.

11. List the five categories of security services and specific services according to X 800. Explain each service with a suitable example.

Or

12. (a) Discuss how audit records are used to detect intrusion in a system. (4 marks)
- (b) Explain the metrics and the tests that are useful for profile based intrusion detection.

(8 marks)

Turn over

13. Explain which implementation of the protection matrix is more suitable for the following operations : (i) Granting read access to a file for all users ; (ii) Revoking write access to a file from all users ; (iii) Revoking execute access to a file from users A, B, C and D.

(4 + 4 + 4 = 12 marks)

Or

14. Discuss about authentication using passwords highlighting the necessity, advantages and disadvantages of one-time passwords.
15. (a) Explain the working principle of Data Encryption Standard (DES) algorithm with necessary block diagrams.

(8 marks)

- (b) Summarise the steps to exchange keys using Diffie Hellman key exchange. (4 marks)

Or

16. (a) Describe RSA cryptosystem and demonstrate the same with an example. (8 marks)
- (b) Write the security features of HMAC hashed message authentication code protocol.

(4 marks)

17. What problem was Kerberos designed to address ? Explain how Kerberos ensured it. Summarise the sequence of steps involved in a basic Kerberos.

Or

18. (a) Identify the participants in a secure electronic transaction and explain their roles and responsibilities.

(6 marks)

- (b) State and discuss the importance of dual signature used in secure electronic transaction.

(6 marks)

19. Describe the different vulnerabilities that can tamper data in a database.

Or

20. Why are multilevel secure system important ? Discuss how Bell-LaPadula security policy model ensures multilevel security in databases.

[5 × 12 = 60 marks]

G 5147

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Reg. No.....

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B.TECH. DEGREE EXAMINATION, MAY 2017

Eighth Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 805 G02/IT 010 805 G05—NEURAL NETWORKS—Elective—IV [CS, IT]

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. State the significance of perceptron convergence theorem.
2. What is the significance of momentum term in backpropagation learning ?
3. Define a radial basis function network.
4. What are self-organizing neural networks ?
5. Define synchronous and asynchronous update in bidirectional associative memory.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Explain Hebbian learning.
7. How 'pattern' mode and 'batch' mode of training affect the result of backpropagation learning ?
8. Distinguish between clamped and free running conditions in a Boltzmann machine during learning.
9. What is Hamming Net ? Discuss.
10. Explain the 'gain control' mechanism in adaptive resonance theory.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each question carries 12 marks.

11. Explain McCulloch-Pitts model of a neuron and Rosenblatt's perceptron model of a neuron with diagrammatic illustration.

Or

12. Explain with an example and diagrammatic illustration linearly separable and linearly inseparable classification problems.

13. What is pattern classification ? How to design a classifier using the perceptron learning law ? Discuss with an example.

Or

14. Explain the backpropagation learning algorithm with a simple example.

15. Explain with diagrammatic illustration the architecture of a radial basis function network

Or

16. Explain the Boltzmann learning law.

17. Explain with an example how MAXNET, a neural net based on competition works.

Or

18. Explain with an example unsupervised clustering of binary input vectors using adaptive resonance theory 1 (ART1).

19. Explain with diagrammatic illustration architecture of Hopfield network.

Or

20. Prove that bidirectional associative memory is unconditionally stable for any binary units.

(5 × 12 = 60 marks)

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Eighth Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 805 G04/IT 010 805 G01—SOFTWARE ARCHITECTURE—(Elective IV) [CS, IT]

(New Scheme—2010 Admission onwards—Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. What is software design ?
2. List the advantages of graphical user interface.
3. What are pipes and filters ?
4. Define implicit invocation Give example.
5. What is type checking ? Give example.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Explain the use of patterns in software design.
7. List the general design principles for user interface design.
8. Why architectural formalism is important ? Discuss.
9. Highlight the requirements for architectural description languages.
10. Explain data encapsulation with an example.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each full question carries 12 marks.

11. Explain with an example the process of mapping requirements into software architecture.

Or

12. What is an architectural style? Discuss object-oriented architectural style with an example.

13. List and discuss the design rules that relate the functional and structural dimensions of the design space for user interface systems.

Or

14. What is quality function deployment (QFD)? What does QFD focus on? Discuss with an example.

15. How a formal model of the architecture of a specific system can also be used as a basis for verification of an implementation? Explain with an example.

Or

16. What is pipe-and-filter architectural style? Explain formalizing pipe-and-filter architectural style with an example.

17. What are the basic elements that can be modeled using an architectural description language? How are they modeled? How static and dynamic aspects can be modeled? Discuss with an example.

Or

18. Using an architectural description language of your choice to develop a model for a banking system. State the functional requirements you are considering.

19. Discuss the features of UniCon, a language for universal connector support.

Or

20. Propose an architectural design for a library management system. State the functional requirements you are considering.

(5 × 12 = 60 marks)

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Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Eighth Semester

Branch : Computer Science and Engineering

CS 010 805 G01—MULTIMEDIA TECHNIQUES (Elective IV) [CS]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Mention any three Animation Rendering Multimedia software tools.
2. Suppose the sampling frequency is 1.5 times the true frequency, what is the alias frequency ?
3. How to use wavelet-based compression in ordinary JPEG ?
4. Define SMDS.
5. What are gR Trees ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. What is the advantage of interlaced video ? What are some of its problems ?
7. Explain briefly about DCT.
8. Write Three-Level Hierarchical JPEG Decoder algorithm.
9. Differentiate transformation model and metric model.
10. What is heterogeneous multimedia query.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each full question carries 12 marks.

11. Explain any five popular file formats for information exchange.

Or

12. The signals for television are combined into fewer than all the parts required for TV transmission.

- Altogether, what signals and how many signals are used for studio broadcast TV?
- How many and what signals are used in S-video? What does S-video stand for?
- How many signals are actually broadcast for standard analog TV reception?

What kind of video is that called?

13. (a) What is the entropy (η) of the image below, where numbers (0, 20, 50, 99) denote the gray-level intensities?

99 99 99 99 99 99 99 99

20 20 20 20 20 20 20 20

0 0 0 0 0 0 0 0

0 0 50 50 50 50 0 0

0 0 50 50 50 50 0 0

0 0 50 50 50 50 0 0

0 0 50 50 50 50 0 0

0 0 0 0 0 0 0 0

- (b) Show step by step how to construct the Huffman tree to encode the above four intensity values in this image. Show the resulting code for each intensity value.

- (c) What is the average number of bits needed for each pixel, using the Huffman code which you have considered? Justify by comparing it to η ?

Or

14. (a) What are the advantages and disadvantages of Arithmetic Coding as compared to Huffman Coding?

- (b) Suppose the alphabet is [A, B, e], and the known probability distribution is $P_A = 0.5$, $P_B = 0.4$, $P_e = 0.1$. For simplicity, let's also assume that both encoder and decoder know that the length of the messages is always 3, so there is no need for a terminator.

(i) How many bits are needed to encode the message BBB by Huffman coding?

(ii) How many bits are needed to encode the message BBB by arithmetic coding?

15. Explain H.261 Encoder and Decoder with a neat diagram.

Or

16. Explain Motion Compensation in MPEG1 with a neat diagram.

17. Explain R Trees in details.

Or

18. Write and Explain Image Segmentation Algorithm.

19. Explain nearest neighbour retrievals in TV-Trees.

Or

20. Explain with an example query relaxation/expansion for multimedia databases.

(5 × 12 = 60 marks)