F 3541

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fifth Semester

Branch : Computer Science and Engineering

FILE STRUCTURES AND ALGORITHMS (R)

(Regular / Improvement / Supplementary)

Time : Three Hours   Maximum : 100 Marks

Answer **all** *questions.*

Part A

1. Distinguish between physical and logical files.

2. List some advantages and disadvantages of sequential files.

3. Mention the different types of indexes commonly used.

4. Explain the main motive behind using multilevel indexes.

5. Write notes on dynamic hashing. How does it differ from static hashing?

6. What is meant by closed hashing? What are its advantages and disadvantages?

7. Differentiate between the terms height and weight in the context of a search tree.

8. What is a B+ tree? In what respect is it different from a B tree?

9. What is meant by static storage management? How is it different from dynamic storage management?

10. What is meant by memory fragmentation? What are the different types of memory fragmentation?

$(10 \times 4 = 40 \text{ marks})$

Part B

11. (a)   Write notes on file organization. Explain the different operations possible on files.

Or

(b)   What are sequential files? Write notes on the access techniques applicable to such files with suitable examples.

12. (a)   Write notes on the different search techniques commonly used in files.

Or

Turn over

(b) Explain interpolation search technique with a proper example. List the advantages of this approach over other search techniques.

13. (a) Explain extendiable hashing with suitable examples.

Or

(b) Explain the concept of hashing. List and describe the different hash functions commonly used.

14. (a) What is an AVL tree? Explain the different possible AVL rotations corresponding to the insertion and deletion of elements into the same.

Or

(b) Explain the concept of a B-tree. Insert the following elements into a B-tree of order 3: 30, 60, 50, 40, 10, 70, 20, 80, 90. Show the tree at different stages of insertion. After inserting all the elements, delete elements 60, 10 and 80. Show the tree at different stages of deletion.

15. (a) Explain the different dynamic memory allocation strategies. Compare the strategies and list their merits and demerits.

Or

(b) Write notes on garbage collections and storage compaction. Explain the importance of these operations in the efficient functioning of a storage management system.

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fifth Semester

Branch : Computer Science and Engineering / Information Technology

ENGINEERING MATHEMATICS – IV (R, T)

(Regular/Improvement/Supplementary)

Time : Three Hours   Maximum : 100 Marks

*Answer any **one** question from each module.*
All questions carry equal marks.

MODULE I

1. (a) Describe (i) Transient state, (ii) Steady state and (iii) explosive state in a queuing system.

                             (6 marks)

    (b) Patients arrive at a clinic according to a Poisson distribution at the rate of 30 patients per hour. The waiting room does not accommodate more than 14 patients. Examination time per patient is exponential with mean rate of 20 per hour.

        (i)   Find the effective arrival rate at the clinic.

        (ii)   What is the probability that an arriving patient will not wait?

        (iii)   What is the expected waiting time until a patient is discharged from the clinic?

                             (14 marks)

Or

2. (a) On an average 96 patients per 24 hour-day require the service of an emergency clinic. Also on an average, a patient requires 10 minutes of active attention. Assume that the facility can handle only one emergency at a time. Suppose that it costs the clinic Rs.100 per patient treated to obtain an average sevicing time of 10 minutes, and that each minute of decrease in this average time would cost Rs. 10 per patient treated, how much would have to be budgeted by the clinic to decrease the average size of the queue from $\frac{4}{3}$ patients to $\frac{1}{2}$ patient?

                             (12 marks)

    (b) In a service department manned by one server, on an average one customer arrives every 10 minutes. It has been found out that each customer requires 6 minutes to be served. Find (i) the average queue length ; (ii) the average time spent in the system.   (8 marks)

Turn over

MODULE II

3. (a) Find by Horner's method, the positive root of the equation $x^3 + x^2 + x = 100$.   (12 marks)

    (b) Find by Newton's method, the root of the equation $\log x = \cos x$.   (8 marks)

Or

4. (a) Solve the system of equations.

    $10x - 2y - z - w = 3$, $-2x + 10y - z - w = 15$, $-x - y + 10z - 2w = 27$, $-x - y - 2z + 10w = -9$ by Gauss - Seidel iteration method.   (12 marks)

    (b) Find a root of the equation $\cos x = 3x - 1$ which lies between 0 and 1 correct to three decimal places, using bisection method.   (8 marks)

MODEL III

5. (a) Use Simpson's rule to find $\int_0^{0.6} e^{-x^2} dx$ by taking seven ordinates.   (10 marks)

    (b) Find the polynomial $f(x)$ with the following data, using Newton's divided difference formulae.

x :	-4	-1	0	2	5
$f(x)$:	1245	33	5	9	1335

            (10 marks)

Or

6. (a) In the table given below, the values of y are consecutive terms of a series of which 23.6 is the 6th term. Find the first and tenth terms of the series.

x :	3	4	5	6	7	8	9
y :	4.8	8.4	14.5	23.6	36.2	52.8	73.9

            (10 marks)

    (b) Evaluate $\int_0^1 \dfrac{dx}{1+x^2}$ using Trapezoidal rule taking $h = \dfrac{1}{8}$ and hence find the approximate value of π.   (10 marks)

MODULE IV

7. (a) Use graphical method to solve the following LPP. Minimize $Z = 20x + 10y$ subject to the constraints,

    $x + 2y \le 40$, $3x + y \ge 30$, $4x + 3y \ge 60$ with $x, y \ge 0$.   (8 marks)

    (b) How will you identify alternate solution of an LPP? Using simplex algorithm, solve the following LPP: Maximize $Z = 3x + 2y + 5z$ subject to the constraints

    $x + 2y + z \le 430$, $3x + 2z \le 460$, $x + 4z \le 420$ with $x, y, z \ge 0$.   (3 + 9 = 12 marks)

Or

8. (a) Use Big - M method to solve the following LPP. Minimize $Z = 2x_1 + 9x_2 + x_3$ subject to the constraints.

    $x_1 + 4x_2 + 2x_3 \ge 5$, $3x_1 + x_2 + 2x_3 \ge 4$, with $x_1, x_2, x_3 \ge 0$.   (10 marks)

    (b) Using principle of duality, solve the following LPP: Minimize $Z = x - 3y + 2z$ subject to the constraints,

    $3x - y + 2z \le 7$, $-2x + 4y \le 12$, $-4x + 3y + 8z \le 10$, with $x, y, z \ge 0$.   (10 marks)

MODULE V

9. (a) Write a short note on the differences and similarities between Transportation Problem and Assignment Problem.   (8 marks)

    (b) What do you mean by degenerate solution of a transportation problem? The following table gives cost matrix of transporting one unit of product from the sourced A, B and C to the destinations D, F, G and H. Determine the optimum allocation minimum cost using MODI method.

	D	F	G	H	Supply
A	19	30	50	10	7
B	70	30	40	60	9
C	40	8	70	20	18
Demand	5	8	7	14	34

            (4 + 8 = 12 marks)

Or

10. (a) Differentiate between Linear Programming Problem and Assignment Problem. (6 marks)

    (b) A department has five employees (I, II, III, etc) with five jobs (A, B, C, etc) to be performed. The time (in hours) each men will take to perform each job is given in the following matrix. How should the jobs be allocated, one per employee, so as to minimize the total man-hours?

	I	II	III	IV	V
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

            (14 marks)

F 3532   (Pages : 2)   Reg. No.............................

Name.............................

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fifth Semester

Branch—Computer Science and Engineering/Information Technology

DATABASE MANAGEMENT SYSTEMS (R, T)

(Regular/Improvement/Supplementary)

Time : Three Hours   Maximum : 100 Marks

Answer **all** *the questions.*

Part A

1. Describe briefly about the components of DBMS.

2. What do you mean by data independence ?

3. Why is the relational database model most popular ?

4. In a database table STUDENT (NAME, AGE, TOTAL MARK, BRANCH), write an SQN Query to find the name of the student with the highest mark.

5. Explain briefly about Query processing.

6. Write short note on curson in PL/SQL.

7. List out the differences between Integrity and domain constraints.

8. What do you mean by pitfalls in Relational-database design ?

9. List out the applications of distributed-database.

10. Mention the applications of Query Processing.

(10 × 4 = 40 marks)

Part B

11. (a) What are object-oriented databases ? Giving examples of one or two, cite their features in comparison to relational models.

Or

(b) How are one to one relationship between the same entity sets represented in the E.R. models ?

12. (a) Compare relational algebra to tuple relational calculus based on the fundamental operation.

Or

(b) With suitable examples, explain the functions of insert, delete and update statements in SQL.

Turn over

13. (a) What is the need for Query optimization ? What techniques are adopted by DBMS to achieve optimized Query execution ?

Or

(b) Explain the basic structure of oracle system. Also discuss in detail about programming in PL/SQL.

14. (a) Discuss in detail functional dependency and its normalization with an example.

Or

(b) Write a technical note of the following :—

    (i) Second and third normal forms.

    (ii) Multi – valued dependency.

    (iii) Joint dependency and fifth normal form.

15. (a) What is data replication ? What is the need for replication of data ? What are the various methods in which replication can be done ?

Or

(b) Describe in detail how database recovery is done using log files.

(5 × 12 = 60 marks)

F 3551 (Pages : 2) Reg. No..............................

Name..............................

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fifth Semester

Branch : Computer Science and Engineering / Information Technology

LANGUAGE PROCESSORS (RT)

(Regular/Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

1. Explain the use of assembler directives.

2. Define positional and keyword parameters.

3. Explain the use of regular expressions in scanning.

4. Write a note on top down parsing.

5. Explain limitations of stack based memory allocation.

6. Write a note on triples and indirect triples.

7. Write a short note on the objectives of code optimization.

8. Write a note on dead code elimination.

9. Define linking and loading.

10. What is meant by binary programs ?

(10 × 4 = 40 marks)

Part B

11. (a) Discuss two pass translation and single pass translation methods used in assemblers.

    (b) Write a note on error reporting in assemblers.

Or

12. Explain the design of macro processor.

13. Explain operator precedence parsing.

Or

14. Develop a recursive descend parser, for the following grammar : —

   $E \rightarrow E + E \,|E - E|\, E * E \,|id|$

Turn over

15. Explain allocation data structures, in detail.

Or

16. Briefly explain code generation algorithm, with example.

17. Explain how procedure calls are handled by compilers ?

Or

18. Write a note on global optimization.

19. Explain linking process in detail.

Or

20. What is meant by dynamic loading and loading schemes ?

(5 × 12 = 60 marks)

F 3523

(Pages : 2)

Reg. No..................................

Name.....................................

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fifth Semester

Branch : Computer Science and Engineering

OPERATING SYSTEMS (R)

(Regular / Improvement / Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries **4** *marks.*

1. What are the functions of shell in a operating systems?

2. Mention the applications of windows 2000.

3. What are threads? Why are they called light weight processes?

4. What is Zombic process?

5. What do you mean by co-operating process?

6. What is a stab? Mention its applications.

7. Explain briefly about overlays.

8. What is virtual memory? Where it is used?

9. Mention the applications of Directories.

10. List out the differences between serial and Direct access devices.

(10 × 4 = 40 marks)

Part B

Answer **all** *the questions.*

Each operation carries **12** *marks.*

11. (a) What are the major subsystems of an operating system? Explain their services and functions.

Or

(b) Briefly enumerate the features of the linux operating system.

Turn over

12. (a) Describe the makeup of the process control block.

Or

(b) Discuss in detail about scheduling algorithms.

13. (a) Write a technical note on procedure graph and critical section problem.

Or

(b) What is a semaphore? What are the different types of semaphores? How do they help in solving the mutual exclusion problem?

14. (a) Write a technical note "paging and fragmentation".

Or

(b) Discuss in detail about the memory management in UNIX.

15. (a) Explain the various types of file organization.

Or

(b) Explain in detail about channels and control units. Also discuss about dish scheduling methods.

(5 × 12 = 60 marks)

F 3558

Reg. No..............................

Name..............................

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Fifth Semester

Branch — Computer Science and Engineering / Information Technology

DATA COMMUNICATION (RT)

(Regular/Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer **all** questions.*
Each question carries 4 marks.

1. (a) Define modulation index with respect to an Amplitude modulated wave.

   (b) Define sampling theorem.

   (c) What is the need for multiplexing techniques in data communication ?

   (d) Define 'Channel capacity' in data transmission.

   (e) Differentiate between serial and parallel method of data transmission.

   (f) How is asynchronous mode of data transmission different from isochronous mode ?

   (g) What is the significance of using different coding techniques ?

   (h) Differentiate between EBCDIC and ASCII code.

   (i) What is meant by point to point communication ?

   (j) What is the importance of GSM architecture ?

   (10 × 4 = 40 marks)

Part B

*Answer **either** (a) **or** (b) part from each question.*
Each question carries 12 marks.

2. (a) Briefly describe the different analog modulation techniques with waveforms.

   Or

   (b) PCM is different from other forms of pulse modulation techniques. Explain.

3. (a) Compare the different digital modulation techniques based on different criteria.

   Or

   (b) What is Multiplexing ? Explain the different types of multiplexing techniques used in data communication.

Turn over

4. (a) Differentiate between the different types of switching used in data communication.

Or

(b) Describe the different ways in which digital data can be transmitted.

5. (a) Differentiate between Hamming code and Block code in all aspects.

Or

(b) Explain in detail how ARQ techniques are implemented in data communication.

6. (a) Describe how a computer communicates with other computers.

Or

(b) Explain in detail about the different transmission media through which data can be communicated.

(5 × 12 = 60 marks)