

G 7120

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Computer Science and Engineering

OPERATING SYSTEMS (R)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

1. What are the advantages and disadvantages of multiprocessor system ?
2. Write notes on batch processing systems.
3. Define Process Control Block. Explain the functions of Process Control Block.
4. Define Process and a thread. What resources are used when a thread is created ?
5. What are critical sections ? Explain how to processes co-operate to enter critical section.
6. Explain the design issues related to resource pre-emption in deadlock elimination.
7. Write the steps performed by the OS when a page fault occurs.
8. What are the advantages and disadvantages of paging ?
9. What are inverted files ? Explain.
10. Write short notes on virtual devices.

(10 × 4 = 40 marks)

Part B

11. (a) Discuss in detail the structure of UNIX OS.

Or

- (b) Describe the various types of OS.

12. (a) Classify scheduling algorithms. Explain any *two* algorithms in each class with examples.

Or

- (b) (i) Give the complete process transition diagram by indicating which system calls and possible events would cause particular state transitions.

(8 marks)

Turn over

(ii) To what degree, do the following algorithms favour CPU-board processes ?

- (a) First-Come-First-Served
- (b) Shortest Job First
- (c) Shortest Remaining Time
- (d) Multilevel feedback queues.

(4 marks)

13. (a) Explain the various issues in deadlock avoidance. Illustrate Bankers algorithm with a suitable example.

Or

(b) (i) Write short notes on monitors.

(4 marks)

(ii) Single instance of each resource type R_1 , R_2 and R_3 is available. Process P_1 may use R_1 and R_2 , P_2 may use R_2 and R_3 and P_3 may use R_3 and R_1 . Requests occur in the order given below :

$P_2 \rightarrow R_3, P_1 \rightarrow R_2, P_3 \rightarrow R_1, P_3 \rightarrow R_3, P_2 \rightarrow R_2, P_1 \rightarrow R_1$.

- (a) Indicate whether each of the above requests can be granted, so that deadlock is avoided.
- (b) State the reason when a request cannot be granted.
- (c) Indicate which process will finish first and last.
- (d) If the above sequence of requests is granted freely, in that order (without testing for possible deadlock) will there be a deadlock ? If so, identify the allocation which results in a deadlock.

(8 marks)

14. (a) Discuss contiguous allocation Vs non-contiguous allocation. What are their merits and demerits ?

Or

(b) Explain how Demand Paging is similar to a paging system with swapping.

15. (a) Explain the different types of disk scheduling algorithms with an example.

Or

(b) Discuss the linear list and hash table file organization models.

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, APRIL 2011**Fifth Semester**

Branch : Computer Science and Engineering/Information Technology

DATABASE MANAGEMENT SYSTEMS (R,T)

(Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

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

1. Mention the responsibilities of various users in a Database environment.
2. What is the difference between physical data independence and logical data independence ? Which is easier to accomplish ? Why ?
3. Write a query for the following : —
 - (a) Retrieve the second maximum salary from employee table.
 - (b) Retrieve the employees who earn more than the average salary of the department.
 - (c) Retrieve the employees who earn more than the average salary in their respective department.
 - (d) Retrieve the employees who earn more than the total salary earned by the employees whose name starts with "R".
4. Define the following terms with respect to the tuple calculus : tuple variable, range relation, atom, formula.
5. Illustrate how concurrency control plays an essential role in Database system.
6. Describe the desirable properties of transaction.
7. Discuss the problem(s) which may be associated with a relation that is in 4NF but not 5NF with the help of an example. Define the term 5NF.
8. Describe the term Multivalued Dependency in the context of relational database management system by giving an example.
9. What additional functions does a DDBMS have over a centralized DBMS ? What are the main software modules of a DDBMS ?
10. What is a fragment of a relation ? What are the main types of fragments ? Why is fragmentation a useful concept in distributed database design ?

(10 × 4 = 40 marks)

Turn over

Part B

Each question carries 12 marks.

11. (a) (i) Discuss the main characteristics of Database system over traditional file processing system. (8 marks)

(ii) Distinguish the following attributes : —

- (a) Simple Vs Composite.
- (b) Single-valued Vs Multi-valued.
- (c) Stored Vs Derived.

(4 marks)

Or

- (b) A database is to be designed for an organisation to monitor its activity. The organisation consists of a number of departments. Each department has employees working for it. No employee can work for more than one department. Each department uses parts in certain quantities. Each department also maintains the information about the suppliers of parts. Each department is identified by its number and has budget and a place of operation. Employees are identified by its number and have a salary and designation. Construct the ER diagram for above problem description. Assume reasonable relationship between concepts in real world.

12. (a) Describe the operations of relational algebra with example for each.

Or

- (b) (i) Describe the basic data types for attributes in SQL. (5 marks)
- (ii) How does SQL allow implementation of the entity integrity and referential integrity constraints? Explain with example. (7 marks)

13. (a) Explain how serializability can be achieved, using time stamp ordering of transactions. (7 marks)

Or

- (b) Write a PL/SQL program to create a function create-dept. to accept the department name and location as input and the department code should be generated through sequence and a record should be inserted into department table. Also return the newly generated department code.

14. (a) (i) Explain 1NF, 2NF and 3NF by taking suitable examples. (7 marks)

(ii) Define BCNF. How does it differ from 3NF? Explain by taking suitable example. (5 marks)

Or

- (b) (i) Explain different types of anomalies in connection with relations. (7 marks)
(ii) What is functional dependency? Explain with an example. (5 marks)
15. (a) Explain Data fragmentation, Replication techniques for a DDBMS.

Or

- (b) Write notes on the following :—
- (i) Degree of homogeneity of a DDBMS.
 - (ii) Fragmentation transparency.
 - (iii) Distribution transparency.

(5 × 12 = 60 marks)

G 7138

(Pages : 2)

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B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch : Computer Science and Engineering

FILE STRUCTURES AND ALGORITHMS (R)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer all the questions.

Part A

Each question carries 4 marks.

1. Explain the functions of file organization.
2. List out the differences between Direct and Secondary key files.
3. What do you mean by Single Level Ordered Index file?
4. List out the differences between Sequential mented and Binary search.
5. List out the different Hash functions available.
6. What is meant by Extendible Hashing?
7. What are the some applications for ALL Trees?
8. What is the function of weight balanced trees?
9. What is meant by storage allocation?
10. What is best fit memory allocation? Explain briefly.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Discuss in detail about Heap and sequential files with suitable examples.
Or
(b) Explain the function of Indexed sequential file and direct files.
12. (a) Discuss in detail about the Multilevel Indexes and Indexes on multiple keys.
Or
(b) With suitable example, explain the searching operation using binary and sequential search.

Turn over

13. (a) Write a technical note on :

- (i) Hash Tables.
- (ii) Mid square division.

Or

(b) Discuss in detail about the Collision and Resolution techniques.

14. (a) Explain the function of height balanced trees and how it is different from others.

Or

(b) What are B-trees? How are they used in maintaining indexes? What are the factor that affect the design criterion for level and the number of nodes per level?

15. (a) Discuss in detail about the term "Storage allocation, Management and liberation".

Or

(b) Write a short technical note on Buddy system and Garbage Collection and Compaction.

(5 × 12 = 60 marks)

G 7148

(Pages : 2)

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B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

LANGUAGE PROCESSORS (R, T)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. Define a Language processor.
2. What are the tables created in an Assembler?
3. What are Macros?
4. What are various stages of compilers?
5. Explain function of lexical analysis.
6. Define storage allocation dynamically.
7. What is global optimization?
8. Explain function of an incremental compiler.
9. What is meant by loading?
10. What are overlays?

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each question carries 12 marks.

11. (a) Is it essential to have two stages in an Assembler? If so, explain why?

Or

- (b) Explain the schematics for Macro Expansion.

12. (a) What happens when the following expression $a := b * c - d$ is compiled? Show various stages.

Or

- (b) Explain the top-down and bottom-up parsing.

Turn over

13. (a) Discuss the code generators and intermediate code forms for expressions.

Or

(b) Explain the compilation of expressions and how the operator priorities are handled.

14. (a) Explain the compilation of IF THEN ELSE ; at various forms.

Or

(b) What is optimization transformation and local optimization?

15. (a) How do the linkage editors handle the runtime environment?

Or

(b) What is a relocatable loaders? Explain its design and how to set up the operation.

(5 × 12 = 60 marks)

G 7155

(Pages : 2)

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B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch : Computer Science Engineering/Information Technology

DATA COMMUNICATION (R T)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each questions carries 4 marks.

1. Differentiate PWM from PPM. Explain the difference.
2. State and explain Sampling theorem.
3. Explain the need and Principle of multiplexing.
4. State and derive Shannon's Theorem.
5. What is meant by Isochronous transmission. Explain.
6. Differentiate Half Duplex from Full Duplex.
7. Explain in detail the basic principles of switching.
8. What are FEC and ARQ ? Explain the difference in detail.
9. List and explain the components of Computer Communication.
10. Differentiate coaxial cable from fiber optic cable.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. Explain the generation and principles of PCM with neat sketches.

Or

12. Explain in detail the generation of :

- (i) PAM.
- (ii) PWM.
- (iii) PPM.

(4 + 4 + 4 = 12 marks)

13. Draw a neat block schematic of TDM and explain its principle in detail.

Or

14. Differentiate TDM from FDM. Explain the difference.

Turn over

15. Discuss in detail the different types of noise with empirical equations.

Or

16. Explain in detail the basic principles of circuit switching and message switching.

17. Explain the principle of linear block codes. Derive the algorithm.

Or

18. Give an account on EBCDIC and ASCII codes.

19. Explain the functioning of front end processor.

Or

20. Write technical notes on :

- | | |
|------------------------------|-----------|
| (i) GSM system architecture. | (4 marks) |
| (ii) Concentrators. | (4 marks) |
| (iii) Twisted pair cable. | (4 marks) |

[5 × 12 = 60 marks]

10. (a) Describe the method of solving an unbalanced transportation problem. (10 marks)
 (b) Solve the transportation problem :

		To			
		A	B	C	Availability
From	I	50	30	220	1
	II	90	45	170	3
	III	250	200	50	4
Requirement		4	2	2	

(10 marks)

[5 × 20 = 10 marks]

B.TECH. DEGREE EXAMINATION, APRIL 2011

Fifth Semester

Branch—Computer Science and Engineering/Information Technology

ENGINEERING MATHEMATICS—IV (R, T)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

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

Module I

1. (a) With usual notation, show that probability distribution of Queue-length is given by $\rho^n (1 - \rho)$

where $\rho = \frac{\lambda}{\mu} < 1$ and $n \geq 0$.

(10 marks)

- (b) People arrive at a Theatre ticket booth in Poisson distributed arrival rate of 25 per hour. Service time is constant at 2 minutes. Calculate (a) the mean number in the waiting line ; (b) the mean waiting time ; (c) the utilisation factor.

(10 marks)

Or

2. (a) Derive Little's formula. (10 marks)

- (b) A petrol station has two pumps. The service time follows exponential distribution with mean four minutes and cars arrive for service in a Poisson process at the rate of 10 in cars per hour. Find the probability that a customer has to wait for service. What proportion of time do the pumps remains idle ?

(10 marks)

Module II

3. (a) Solve by Newton's method $e^x = 4x$. (8 marks)

- (b) Solve by Gauss Seidel method :

$$8x - 3y + 2z = 20 ; 4x + 11y - z = 33 ; 6x + 3y + 12z = 35.$$

(12 marks)

Or

Turn over

4. (a) Determine the root of $xe^x - 3 = 0$ correct to 3 decimal places using Regula-Falsi method. (10 marks)
- (b) Solve by Jacobi's method : (10 marks)
- $$27x + 6y - z = 85; 6x + 15y + 2z = 72; x + y + 54z = 110.$$

Module III

5. (a) Using Newton's divided difference formula find the value of $f(8)$ given : (10 marks)
- | | | | | | | |
|--------|------|-----|-----|-----|------|------|
| x | : 4 | 5 | 7 | 10 | 11 | 13 |
| $f(x)$ | : 48 | 100 | 294 | 900 | 1210 | 2028 |
- (b) Using Simpson's 1/3 rule evaluate $\int_0^2 \frac{dx}{1+x^3}$ to two decimal places by dividing the range into 4 equal parts. (10 marks)

Or

6. (a) Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 3.8$ from the following :— (10 marks)
- | | | | | |
|-----|----------|---------|---------|---------|
| x | : 3 | 3.5 | 4 | 4.5 |
| z | : 1.4843 | 1.55023 | 1.60746 | 1.65801 |
- (b) Using Trapezoidal rule evaluate $\int_1^2 \frac{dx}{x}$ by dividing the interval into 5 equal parts. (10 marks)

Module IV

7. (a) Using dual simplex method solve : (10 marks)
- $$\text{Maximize } Z = 6x_1 + 4x_2 + 4x_3$$
- subject to
- $$3x_1 + x_2 + 2x_3 \geq 2$$
- $$2x_1 + x_2 - x_3 \geq 1$$
- $$-x_1 + x_2 + 2x_3 \geq 1$$

- (b) Use Big M-method to solve : (10 marks)
- $$\text{Minimize } Z = 4x_1 + 3x_2$$
- subject to
- $$2x_1 + x_2 \geq 10$$
- $$-3x_1 + 2x_2 \leq 6$$
- $$x_1 + x_2 \geq 6.$$
- Or

8. (a) Using Graphical method solve : (10 marks)
- $$\text{Minimize } Z = 3x_1 + 2x_2$$
- subject to
- $$5x_1 + x_2 \geq 10$$
- $$x_1 + x_2 \geq 6$$
- $$x_1 + 4x_2 \geq 12$$
- (b) Using Simplex method solve : (10 marks)

- $$\text{Maximize } Z = 4x_1 + 10x_2$$
- subject to
- $$2x_1 + x_2 \leq 50$$
- $$2x_1 + 5x_2 \leq 100$$
- $$2x_1 + 3x_2 \leq 90$$

Module V

9. (a) Explain an algorithm for solving a transportation problem. (10 marks)
- (b) Using Vogel's approximation method find the solution of :

		Destination			Supply
		A	B	C	
Source	1	2	7	4	5
	2	3	3	1	8
	3	5	4	7	7
	4	1	6	2	14
Demand		7	9	18	34

Or

(10 marks)

Turn over