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Name.....

Reg. No.....

**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME]
EXAMINATION, NOVEMBER 2020**

Computer Science and Engineering
CS/IT/PTCS 09 504—OPERATING SYSTEMS

Time : Three Hours

Maximum : 70 Marks

Part A

*Answer all questions.
Each question carries 2 marks.*

1. Define Process.
2. What is inter-process communication ?
3. Why is dynamic relocation performed ?
4. State the reason behind buffering.
5. Define Authorization.

(5 × 2 = 10 marks)

Part B

*Answer any four questions.
Each question carries 5 marks.*

6. Write short notes on controllers.
7. Give a brief account of mutual exclusion and how is it achieved.
8. Enumerate on the different ways to prevent deadlock.
9. Explain paging with segmentation process.
10. Write short notes on typical implementation of paging.
11. Give short notes on Linked allocation.

(4 × 5 = 20 marks)

Part C

*Answer all questions.
Each question carries 10 marks.*

12. Explain the design factors for operating system.

Or

13. Describe processes and threads.

Turn over

14. Given the set of processes, their arrival time and execution time. Calculate the average waiting time for FCFS and pre-emptive SJF.

Process Id	Burst Time (ms)	Arrival Time (ms)
P1	8	0
P2	6	2
P3	1	1
P4	3	2

Or

15. Describe Banker's algorithm.
16. Calculate the number of page faults using FCFS and optimal page replacement algorithms for the page reference stream : 0 2 1 6 4 0 1 0 3 1 2 1. Assume a frame size of 3.

Or

17. Detail the process of paging.
18. Describe free space management.

Or

19. Explicate Memory Mapped IO.

(4 × 10 = 40 marks)

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**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2009 SCHEME]
EXAMINATION, NOVEMBER 2020**

Computer Science and Engineering

CS/IT/PTCS 09 505—DIGITAL DATA COMMUNICATION

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

Each question carries 2 marks.

1. Distinguish between a low-pass channel and a band-pass channel.
2. What is a carrier signal ? What is its role in data transmission ?
3. Differentiate error detection and correction.
4. What are the three major components of a telephone network ?
5. Define Framing.

(5 × 2 = 10 marks)

Part B

Answer any four questions.

Each question carries 5 marks.

6. What is multiplexing ? Explain FDM with a neat diagram.
7. Compare and contrast PCM and DM.
8. What are the different types of errors ? Explain.
9. Compare and contrast a circuit-switched network and a packet-switched network.
10. Distinguish between HDLC and PPP.
11. Explain point-to-point frame format.

(4 × 5 = 20 marks)

Part C

Answer all questions.

Each question carries 10 marks.

12. List various impairments and explain how they affect information carrying capacity of a communication link ?

Or

13. Explain the structure of fibre-optic cable with a neat diagram. What are the advantages of fibre-optic cable over Twisted pair and Coaxial cables ?

Turn over

14. Explain Pulse Code Modulation technique for analog-to-digital conversion with a neat block diagram.

Or

15. Explain the different techniques for converting digital data to analog signals. Give the sample wave forms for each technique.

16. Explain the datagram approach for packet switching network with suitable diagram.

Or

17. Explain the structure of a switch used in a packet-switched network with a suitable diagram.

18. Explain the FSM model for stop-and-wait protocol with a state diagram.

Or

19. Explain flow control and error control in detail.

(4 × 10 = 40 marks)

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**FIFTH SEMESTER B.TECH. (ENGINEERING) [2014 SCHEME]
DEGREE EXAMINATION, NOVEMBER 2020**

Computer Science and Engineering
CS/IT 14 502—SOFTWARE ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any eight questions.

Each question carries 5 marks.

1. How does a software product differ from other products ? Also specify the reasons for failure of software projects.
2. Describe the incremental model of software development with its pros and cons.
3. Draw a class diagram for library management system and specify the functional requirements.
4. Describe the golden rules in user interface design.
5. List and explain the steps in creating an architectural design.
6. What are the objectives of testing ? Also list the standards and guidelines for coding.
7. Explicate how test plan is generated and test results are reported.
8. Why do we need system testing ? Explain the types of system testing with example.
9. Write a note on the methods for software licensing.
10. Explain how staffing is managed in software process.

(8 × 5 = 40 marks)

Part B

Answer all questions.

Each question carries 15 marks.

11. State the advantage and limitations of waterfall model along with description of its phases in software development.

Or

12. Which process model is best suited for risk management ? Discuss in detail with example. Give the advantages and disadvantages of this process model.

Turn over

13. Explain in detail the design concepts that are applied for an effective design.

Or

14. Draw the level 0, 1, 2 DFD for the safe home security system and convert it to structured chart using structured design.

15. What is black bod testing ? Explain the different types of black bod testing strategies with an example.

Or

16. For the following code, perform basis path testing and design test cases :

```
printf("Enter number of elements/n", n);
scanf("%d", &n);

printf("Enter %d integers/n", n);
for (c = 0, c < n; c++)
    scanf("%d", &array[c]);
for (c = 0 ; c < n - 1; c++)
{
    for (d = 0 ; d < n - c - 1; d++)
    {
        swap = array[d];
        array[d] = array[d+1];
        array[d+1] = swap;
    }
}
printf("sorted list in ascending order:/n")
for (c = 0; c < n, c++)
    printf("%d/n", array[c]);
return 0;
```

17. Explain with an example the COCOMO cost estimation model.

Or

18. Explain in detail the various phases of project management.

(4 × 15 = 60 marks)

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**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE
[2014 SCHEME] EXAMINATION, NOVEMBER 2020**

Computer Science and Engineering
CS/IT 14 503—OPERATING SYSTEMS

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any eight questions.
Each question carries 5 marks.*

1. Differentiate between Symmetric multiprocessing and Asymmetric multiprocessing with examples.
2. Compare the monolithic and microkernel structures in the operating system.
3. List any two open source operating systems along with its characteristics.
4. Write a note on thread libraries.
5. Explain the different states of a process with a neat diagram.
6. What is meant by interprocess communication ? Mention its advantages.
7. Differentiate between Paging and Segmentation mechanism. Which one is preferred mostly and why ?
8. Write about the various file access techniques.
9. Write about the goals of protection and about the protection principles.
10. Define Cryptography. How is cryptography used as a security tool ?

(8 × 5 = 40 marks)

Part B

*Answer all questions.
Each question carries 15 marks.*

11. (a) Explain in detail about the various operating system services.

Or

- (b) Explain the various types of system calls in detail with appropriate examples.

12. (a) Write in detail about the various multi-threading models.

Or

- (b) Explain the Shortest Job First scheduling algorithm and the Round-Robin CPU scheduling algorithm with appropriate examples.

Turn over

13. (a) Explain in detail about the various steps involved when a page fault occurs in memory management.

Or

- (b) Explain the various directory structures in detail.

14. (a) Explain the various RAID structures in detail.

Or

- (b) Explain the working of any three Disk scheduling algorithms in detail.

(4 × 15 = 60 marks)

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**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE
[2014 SCHEME] EXAMINATION, NOVEMBER 2020**

Computer Science and Engineering

CS/IT 14 504—DATABASE MANAGEMENT SYSTEMS

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any eight questions.
Each question carries 5 marks.*

1. Define Data Models and list the types of Data Model.
2. What is an Attribute ? Explain its types.
3. Explain the Codd's rules for relational database design.
4. Describe project and union operation of Relational Algebra with example.
5. Mention the pitfalls in relational database design. With a suitable example, explain the role of functional dependency in the process of normalization.
6. Prove that a relation which is in 4NF must be in BCNF.
7. Write a short note on two phase locking protocol. What are its advantages and disadvantages ?
8. What is deadlock ? Explain deadlock detection method.
9. Write about immediate update and deferred update recovery techniques.
10. Explain serializability in transaction management.

(8 × 5 = 40 marks)

Part B

*Answer all questions.
Each question carries 15 marks.*

11. Explain the purpose of the database system. Explain different database users. What are the responsibilities of a DBA ?

Or

12. Explain E-R model in detail. Draw E-R diagram for university and hospital (Specify the assumptions).

Turn over

13. List various aggregate functions. Explain any one with example.

Or

14. Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make.

15. What is Functional dependency ? Explain its usage in database design. Explain various types of functional dependency.

Or

16. What do you mean by Normalization ? Explain BCNF, 3NF and 2NF with a suitable example.

17. Describe the ACID properties of transaction management.

Or

18. What is concurrency ? If not controlled where it can lead to ? What are the methods to control concurrency ?

(4 × 15 = 60 marks)

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**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE
[2014 SCHEME] EXAMINATION, NOVEMBER 2020**

Information Technology Engineering

IT 14 505—INTRODUCTION TO MICROPROCESSOR SYSTEMS

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any eight questions.
Each question carries 5 marks.*

1. Differentiate between Microprocessors and Microcontrollers with suitable real time examples.
2. List the characteristics of Digital Signal Processors.
3. Differentiate between Procedures and Macros used in 8086 Assembly language programs.
4. Explain the following instructions with examples :
 - (i) CMP.
 - (ii) LOOP.
 - (iii) TEST.
 - (iv) IMUL.
5. What is stack ? What is the use of stack memory ? Explain the execution of push and pop instructions.
6. Differentiate between minimum and maximum modes in 8086 microprocessors.
7. What are the steps involved in interfacing peripherals with the 8086 microprocessor ?
8. Sketch and explain the 8086 bus activities during write machine cycle.
9. What are the main characteristics of RISC architectures ?
10. Explain the working of subroutines in ARM microprocessors with an example.

(8 × 5 = 40 marks)

Part B

*Answer all questions.
Each question carries 15 marks.*

11. (a) Explain the 8086 microprocessor architecture in detail with a neat sketch.

Or

- (b) Explain the flags of 8086 processors using suitable examples.

Turn over

12. (a) Write an ALP using 8086 instructions to count the numbers of zeros in a given 8-bit number.

Or

- (b) Explain the various string manipulation instructions available in 8086 microprocessors with examples.

13. (a) Sketch and explain the interface mechanism of 8279 to the 8086 microprocessor in minimum mode.

Or

- (b) Explain with a neat diagram the interfacing of stepper motor to 8086 using 8255 in detail.

14. (a) Explain the various addressing modes available in ARM processor.

Or

- (b) Sketch the ARM7TDMI block diagram and explain the components involved in it.

(4 × 15 = 60 marks)

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**FIFTH SEMESTER B.TECH. (ENGINEERING) [2014 SCHEME]
DEGREE EXAMINATION, NOVEMBER 2020**

Computer Science and Engineering

CS/IT 14 506—THEORY OF COMPUTATION

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any eight questions.
Each question carries 5 marks.*

1. Construct the ϵ -NFA, NFA, DFA and minimized DFA for the regular expression $a + b * a$. Trace the action of the automation for the input string "bbba".
2. Let x & y be real numbers. If " $5x + 25y = 1723$, then x or y is not an integer." Prove by direct approach, contra positive and contradiction.
3. Differentiate between positive closure and kleena closure. Give examples.
4. Prove by induction, for $n \in \mathbb{N}$ $4/(32n + 7)$.
5. Discuss the applications of finite automata.
6. Prove the equivalence of NFA and DFA using subset construction.
7. Explain Turing machines as a computer of integer functions with an example.
8. Prove that no Turing machine exists to solve the halting problem.
9. Explain about undecidability of PCP.
10. "Both a language L and its complement cannot be recursively enumerable." Prove.

(8 × 5 = 40 marks)

Part B

*Answer all questions.
Each question carries 15 marks.*

11. Construct DFA to accept the language :

$L = \{w \mid w \text{ is of even length and begins with } 11\}$.

Or

12. Construct DFA from two languages L_1 and L_2 given by the regular expressions $(0 + 1)^* 0$ and $1(0 + 1)^*$. Find DFA and regular expressions for $L_1 \cap L_2$, complement L_2 and reversal of L_2 .

Turn over

13. Given the following grammar G

$S \rightarrow AABBB.$

$A \rightarrow AA|a.$

$B \rightarrow BB|b.$

- (i) Remove all left recursions from G.
- (ii) Write G in Greibach normal form.
- (iii) Construct a PDA that accepts the language generated by G from GNF.
- (iv) Show the actions of the parser for a sample input.

Or

14. Explain Chomsky hierarchy of languages. Explain the automation accepting these languages with their formal definitions.

15. What is Universal Turing Machine ? Explain its working with encoding. Give illustrations.

Or

16. Describe a Turing Machine to reverse a given string in $\Sigma = \{a, b\}$. Test for an input string "baba"

17. State Post Correspondence problem. Prove that Post Correspondence problem is undecidable. Assuming $\Sigma = \{0, 1\}$ check whether the following Turing machine accepts string '10' and convert it into a MPCP instance.

Or

18. Does the following language satisfy conditions in Rice's theorem ? $P = \{ \langle M \rangle : M \text{ is a Turing machine and } L(M) = \{1011, 001100\} \}$. State and prove Rice's theorem.

(4 × 15 = 60 marks)