Roll No. .....
Printed Pages : 4

34001

BT-4 / M-18

COMPUTER ARCHITECTURE AND ORGANIZATION

Paper–CSE-202 E

Time allowed : 3 hours] *[Maximum marks : 100*

Note:- *Attempt only five questions. All questions carry equal marks.*

1. (a) Describe about CPU Organization. Explain in detail about the roles of decode and execute Units. 10

(b) A block-set-associative cache consists of a total of 64 blocks divided into four-block sets. The main memory contains 4096 blocks, each consisting of 128 words. 10

(i) How many bits are there in a main memory address?

(ii) How many bits are there in each of the TAG, SET, and WORD blocks?

(iii) What is the size of the Cache memory?

2. (a) Assume we have the following values stored in memory and R1 storing 200. 10

Location	Value
1000	1300
1100	1200
1200	800
1300	1200

What is loaded into the AC using the MARIE instruction Load 1000 when using each of the following addressing modes?

(a) Immediate

(b) Direct

(c) Indirect

(d) Indexed

(b) Briefly explain the two basic approaches used to minimize register memory operations on RISC machine. Difference between RISC and CISC? 10

3. (a) Suppose that in 1000 memory references there are 40 misses in L I cache and 10 misses in L2 cache. If the miss penalty of L2 is 200 clock cycles, then what should be the hit time of L1 is I clock cycle, and hit time of L2 is 15 clock cycles, the average memory access time of the clock cycles. 10

(b) Explain the importance of different addressing modes in computer architecture with suitable example. 10

4. (a) Why does DMA have priority over CPU when both request a memory transfer? Explain working of direct memory access (DMA) with the help of block diagram. 10

(b) A computer uses a memory unit with 256 K words of 32 bits each. A binary instruction code is stored in one word of

memory. The instruction has four parts: an indirect bit. An operation code, a register code part to specify one of 64 registers, and an address part. 10

(i) How many bits are there in the operation code, the register code part, and the address part?

(ii) Draw the instruction word format and indicate the number of bits in each part.

(iii) How many bits are there in the data and address inputs of the memory?

5. (a) Write a program to evaluate the arithmetic statement: 10

$X = (A - B + C \cdot (D \cdot E - f)) / (G + H \cdot K)$

(a) Using a general register computer with three address instructions.

(b) Using a general register computer with two address instructions.

(c) Using an accumulator type computer with one address instructions.

(d) Using a stack organized computer with zero-address operation instructions.

(b) Explain the different types of mapping procedures in the organization of cache memory with block diagram. 10

6. (a) A no pipeline system takes 50 ns to process a task. The same task can be processed in 6 segment pipeline with a clock cycle of 10 ns. Determine the speedup ratio of pipeline for 100 tasks. What is maximum speedup ratio? 10

(b) A cache may be organized such that: 10

- In one case, there are more data elements per block and fewer blocks
- In another case, there are fewer elements per block but more blocks. However, in both cases - i.e. larger blocks but fewer of them OR shorter blocks, but more of them - the cache's total capacity (amount of data storage) remains the same. What are the pros and cons of each organization? Support your answer with a short example assuming that the cache is direct mapped.

7. (a) What is Paging and Page replacement Policy? Explain with the help of suitable diagram. 10

(b) Explain the interrupt cycle with the help of flow chart? When a device interrupt occurs, how does the processor determines which device issued the interrupt? 10

8. Give five examples of external interrupts and five examples of internal interrupts. What are the five differences between a software interrupt and a subroutine call? 20

Roll No. .....

34066

Printed Pages : 4

BT-4/M–18

COMPUTATIONAL TECHNIQUES

Paper–MAT-204E

Mathematics–IV

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *There are 9 questions in all. Candidates are required to attempt **5** questions selecting at least **one** from each Part. All questions carry equal marks.*

Part–A

1. (a) Prove that

$$u_1x + u_2x^2 + u_3x^3 + \ldots = \frac{x}{1-x}u_1 + \left(\frac{x}{1-x}\right)^2 \Delta u_1 + \left(\frac{x}{1-x}\right)^2 \Delta^2 u_1 + \ldots$$

(b) Derive the Newton Cotes Quadrature formula up to 4 terms. Hence derive Simpson's 3/8th rule.

2. (a) Derive Stirling's formula of central differences.

(b) Find the missing values in the following table :

x :	45	50	55	60	65
y :	3.0	–	2.0	–	–2.4

Part–B

3. (a) A series of values of y_n satisfies the relation

$$y_{n+2} + ay_{n+1} + by_n = 0.$$

Given that $y_0 = 0, y_1 = 1, y_2 = y_3 = 2$; show that

$$y_n = 2^{n/2} \sin\frac{n\pi}{4}$$

(b) Solve the difference equation :

$$y_{n+2} - 3y_{n+1} + 2y_n = n^2 + 2n - 1.$$

4. (a) Using-Gauss Elimination Method, find the inverse of the matrix

$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$$

(b) Using Crout's Method, find the inverse of the matrix

$$\begin{bmatrix} 2 & -2 & 4 \\ 2 & 3 & 2 \\ -1 & 1 & -1 \end{bmatrix}$$

Part–C

5. (a) Explain Regula Falsi method with its Pit false and condition of convergence. Also, find its order of convergence.

(b) Using *Newton-Raphson method,* compute the real root of the equation $x = \sqrt{28}$ correct up to four decimal places.

6. (a) Solve the following equations by Relaxation Method :

$4x - 4y + 3z = -8,\ 3x + 9y - 2z = 11,\ 4x + 2y + 13z = 24.$

(b) Use Gauss-Seidel Method to solve the following set of equations

$$28x + 4y - z = 32,$$

$$x + 3y + 10z = 24,$$

$$2x + 17y + 4z = 35.$$

Part–D

7. (a) Using Euler's modified method, compute y(2) from

$$\frac{dy}{dx} = 2 + \sqrt{(xy)},\ y(1) = 1,\ \text{taking } h = 0.2.$$

(b) Derive predictor-corrector formula for Adam Bashforth method.

8. (a) Fit a second degree parabola to the following data :

x:	1	3	4	6	9
y:	0.63	2.05	4.08	10.78	27.43

Hence calculate y when x=5.

(b) Using principle of least squares, find a and b such that $y = x/(a+bx)$ is the best fitting curve to the following data :

x:	3	5	8	12	15
y:	7.148	10.231	13.509	16.434	17.992

Roll No. .....
Printed Pages : 2

34002

BT-4 / M-18

PROGRAMMING LANGUAGES

Paper–CSE–204-E

Time allowed : 3 hours] *[Maximum marks : 100*

Note :- *Attempt **five** questions in all, selecting at least **one** question from each unit. All questions carry equal marks.*

Unit–I

1. (a) With the help of diagrams, explain and compare the translation, compilation and interpretation. 10

   (b) Why the breakpoints and assertions are useful components in programming languages? 10

2. (a) Give your verdict that why it is necessary to implement and specify Characters and Enumerations in elementary data types? 10

   (b) Identify the factors which influence the evolution of programming languages. 10

Unit-II

3. (a) Define type equivalence? Mention its advantages and disadvantages. 10

   (b) Explain the difference between row major and column major layout for contiguously allocated arrays. 10

4. (a) How abstraction, encapsulation and generic subprograms are used for the subprograms and programmer defined data types? 10

(b) Identify the roles of Union and Pointer in structured data objects. How to specify and implement Union and Pointer for in structured data objects? 10

Unit–III

5. (a) How the synchronization through semaphores is achieved? Mention its advantages and disadvantages. 10

(b) Define static and dynamic scoping. Mention its advantages and disadvantages. Explain both of them using suitable programs or algorithms. 10

6. (a) Why exception and exception handlers are important mechanisms during sequence control? 10

(b) In what way subprogram level concurrency can be achieved to control the sequence of a program? 10

Unit-IV

7. (a) Recognize the role of predicate calculus in logic programming. 10

(b) Explain the following: 10

(i) Heap storage management

(ii) Stack based storage management

8. (a) Write a short note on functional programming language. 10

(b) Explain the following LISP functions, with examples: 10

(i) car (ii) cdr (iii) cons (iv) cond (v) let

Roll No. .....
Printed Pages : 2

34092

BT-4 / M-18

OBJECT ORIENTED PROGRAMMING

Paper–CSE–202N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *Attempt five questions in all selecting at least one question from each unit.*

Unit–I

1. (a) Distinguish between object and class. 5

   (b) What are preprocessor directives in C++? Explain any three. 5

   (c) What is function overloading in C++? Explain with a suitable example. 5

2. (a) How can you create constant object in C++? What is importance of such objects? 5

   (b) What is abstract class? Why do you need them? 5

   (c) What is '::' operator? Explain two uses of it. 5

Unit–III

3. (a) What is 'this' pointer? Explain its uses with suitable examples. 5

   (b) What is parameterized constructor? How can you supply default values to parameterized constructor? Explain with an example. 5

   (c) What is friend class? How can you make a class as a friend

of another class? Explain. 5

Unit–III

5. (a) What is pure virtual function? Explain the rules to write and use it. 5

   (b) Explain the need of virtual destructor with an example. 5

   (c) What is polymorphism? Distinguish between late and early binding. 5

6. (a) What are rules to overload binary operator? Overload '+' operator to add objects of Distance class. Distance is given in feet and inches. 7

   (b) What are rules to overload unary operator? Overload '++' operator to increment x, y values of Coordinate class. 8

Unit–IV

7. (a) What is template class? Write a template class to find sum of elements of an Array. 8

   (b) How can you rethrow an exception? Explain with an example. 7

8. (a) What are file pointers? Explain each with a suitable example. 7

   (b) How can you read and write objects to a file randomly? Explain with an example. 8

Roll No. .....

34066

Printed Pages : 4

BT-4/M–18

COMPUTATIONAL TECHNIQUES

Paper–MAT-204E

Mathematics–IV

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *There are 9 questions in all. Candidates are required to attempt 5 questions selecting at least one from each Part. All questions carry equal marks.*

Part–A

1. (a) Prove that

$$u_1x + u_2x^2 + u_3x^3 + \ldots = \frac{x}{1-x}u_1 + \left(\frac{x}{1-x}\right)^2 \Delta u_1 + \left(\frac{x}{1-x}\right)^2 \Delta^2 u_1 + \ldots$$

(b) Derive the Newton Cotes Quadrature formula up to 4 terms. Hence derive Simpson's 3/8th rule.

2. (a) Derive Stirling's formula of central differences.

(b) Find the missing values in the following table :

x :	45	50	55	60	65
y :	3.0	–	2.0	–	–2.4

Part–B

3. (a) A series of values of y_n satisfies the relation

$$y_{n+2} + ay_{n+1} + by_n = 0.$$

Given that $y_0 = 0, y_1 = 1, y_2 = y_3 = 2$; show that

$$y_n = 2^{n/2} \sin\frac{n\pi}{4}$$

(b) Solve the difference equation :

$$y_{n+2} - 3y_{n+1} + 2y_n = n^2 + 2n - 1.$$

4. (a) Using-Gauss Elimination Method, find the inverse of the matrix

$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$$

(b) Using Crout's Method, find the inverse of the matrix

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Part–C

5. (a) Explain Regula Falsi method with its Pit false and condition of convergence. Also, find its order of convergence.

(b) Using *Newton-Raphson method,* compute the real root of the equation $x = \sqrt{28}$ correct up to four decimal places.

6. (a) Solve the following equations by Relaxation Method :

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(b) Use Gauss-Seidel Method to solve the following set of equations

$$28x + 4y - z = 32,$$

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$$2x + 17y + 4z = 35.$$

Part–D

7. (a) Using Euler's modified method, compute y(2) from

$$\frac{dy}{dx} = 2 + \sqrt{(xy)},\ y(1) = 1,\ \text{taking } h = 0.2.$$

(b) Derive predictor-corrector formula for Adam Bashforth method.

8. (a) Fit a second degree parabola to the following data :

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y:	0.63	2.05	4.08	10.78	27.43

Hence calculate y when x=5.

(b) Using principle of least squares, find a and b such that $y = x/(a + bx)$ is the best fitting curve to the following data :

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y:	7.148	10.231	13.509	16.434	17.992

Roll No. .....
Printed Pages : 2

34094

BT-4 / M-18

DIGITAL DATA COMMUNICATION

Paper–CSE–206 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- Attempt five questions in all, selecting at least one question from each unit. All questions carry equal marks.

Unit–I

1. What is Amplitude Modulation? Bring out the points of distinction between Double-sideband suppressed-carrier transmission (DSB-SC) modulation, Single-sideband (SSB) modulation and Vestigial sideband modulation

2. What are the different types of Angle modulation? What is the difference between Narrowband FM and Wideband FM?

Unit–II

3. Plot the Manchester and differential Manchester encoding for the bit sequence 110001010. What are the benefits and drawbacks of Manchester and differential Manchester encoding over other encoding schemes?

4. What is Pulse Code Modulation? Describe the functions performed by a PCM encoder. Distinguish between pulse code modulation and delta modulation.

Unit–III

5. Distinguish between:
   (a) Asynchronous and synchronous transmission
   (b) Twisted pair and coaxial cable
   (c) DTE and DCE

6. What is the need of introducing redundancy in error detection techniques? Describe the cyclic redundancy code and checksum method for detecting errors using suitable examples.

Unit–IV

7. (a) How is multiplexing done using FDM and TDM? What are the disadvantages of synchronous TDM? Distinguish between synchronous and asynchronous TDM.
   (b) How is secure communications done by spreading the signal over a large frequency band?

8. What are the parts of a satellite system? What are the various categorization criteria for satellites? Describe the capacity allocation strategies used for satellite communication.

Roll No. .....
Printed Pages : 2

34095

BT-4 / M-18

MICROPROCESSOR AND INTERFACING

Paper–CSE–208-N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *Attempt five questions in all selecting at least one from each unit. All questions carry equal marks.*

Unit–I

1. Describe the evaluation of Microprocessor in detail. Give all the features of 8085 Microprocessor. Also draw the functional block diagram of 8085 internal architecture. 15

2. Draw the pin configuration of 8085 Microprocessor and explain the function of all the pins in detail. 15

Unit–II

3. (a) Explain the working of EU and BIU of 8086 Microprocessor. 7

   (b) Explain with the help of diagram the working of static and dynamic RAM and ROM memories. 8

4. Draw and explain the block diagram and pin diagram of 8086 microprocessor and explain its PSW. 15

Unit–III

5. (a) Discuss the following assemble directives.

   (i) ASSUME

   (ii) SEGMENT 6

[Turn over

(b) Write a programme to compute factorial for a number N between 1 and 8. 9

6. Write 8086 ALP to generate 10 elements of Fibonacci series. 15

Unit–IV

7. (a) What is Intel's 8259 chip? Discuss its use and operation in a 8086 Microprocessor based systems. 9

(b) Describe the operation, characteristic and interfacing of D/A convertor with 8086 Microprocessor. 6

8. (a) Define an interrupt. Explain its various applications. 7

(b) Write short note on the following:

(i) Description and interfacing of 8251.

(ii) Interfacing of 8×8 Keyboard. 8

Roll No. .....

Printed Pages : 2

36128

BT-6/M–18

ESSENTIALS OF IT

Paper–CSE-209N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting at least **one** question from each unit.*

Unit–I

1. (a) Describe the various steps in problem solving on computer in brief. 7½

(b) Draw a flowchart to find roots of a quadratic equation. 7½

2. (a) Write an algorithm to search a number using binary search. 7½

(b) Write algorithm for inserting and deleting an element in a stack. 7½

Unit–II

3. (a) Explain various types of branching and looping statements in java in detail. 7½

(b) How can you create and use arrays in java ? Explain by writing a program to find sum of the elements of a matrix. 7½

4. (a) What are the various types of constructors in Java ? Explain using suitable examples. 7½

(b) Describe various operators along with their precedence in java in brief. 7½

Unit–III

5. What do you understand by the concept of Packages in Java ? Discuss various built-in package in Java. Also explain the procedure to create a user-defined package with the help of examples. 15

6. What do you understand by inheritance ? Explain various types of inheritances in java in detail by using suitable examples for each. 15

Unit–IV

7. (a) What do you mean by data independence ? Discuss various types of data independence. 7½

(b) What is an ER model ? How can you convert an ER diagram into relational schema ? Explain using suitable example. 7½

8. Explain with examples the following operations performed on relations :

(i) SELECT (ii) PROJECT

(iii) CARTESIAN PRODUCT (iv) JOIN. 15

Roll No. .....
Printed Pages : 2

34096

BT-4 / M-18

OPERATING SYSTEM

Paper–CSE–210 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *Attempt **five** questions in all by selecting at least **one** question from each unit. All questions carry equal marks.*

Unit–I

1. (a) How can you classify operating systems? Explain in detail. 7.5

   (b) Explain various modes of operating systems along with its architecture. 7.5

2. (a) Discuss the storage structure and hierarchy in a computer system. 7.5

   (b) Comment on the need of protection of a system. How it can be achieved? Explain. 7.5

Unit–II

3. (a) What is inter-process communication? How synchronization can be achieved with the help of Peterson's algorithm? 7.5

   (b) What is a semaphore? How semaphores can be implemented? Discuss various types of semaphores along with their usage. 7.5

4. Comment on the need of CPU-Scheduling. Explain various CPU scheduling algorithms using suitable examples. 15

Unit–III

5. (a) What is segmentation? Discuss segmentation hardware with the help of diagram. What type of fragmentation can be caused by segmentation? 7.5

   (b) Write and explain Banker's algorithm with the help of an appropriate example. 7.5

6. (a) What is demand paging? Explain its advantages and disadvantages. Explain with suitable example. 7.5

   (b) How a system can recover from a deadlock situation? Explain. 7.5

Unit–IV

7. (a) Explain various directory structures used by operating systems in detail. Also give advantages and disadvantages of each of them. 7.5

   (b) Find the total head movement when head starts at cylinder 50 in case of (i) FCFS (ii) SSTF (iii) SCAN (iv) C-SCAN (v) LOOK (vi) C-LOOK Disk queue is: 90, 170, 30, 55, 68, 98, and 89. 7.5

8. (a) Explain various file allocation method. 7.5

   (b) Explain various protection issues and protection measures in detail. 7.5

Roll No. .....
Printed Pages : 2

36001

BT-6 / M-18

MOBILE COMPUTING

Paper–CSE-302 Opt. II

Time allowed : 3 hours] *[Maximum marks : 100*

Note :- *Attempt **Five** questions in all, selecting at least **one** question from each unit. All questions carry equal marks.*

Unit–I

1. (a) Explain the various challenges in mobile computing. 10
   (b) What do you understand by the term 'Frequency Reuse'. 5
   (c) Differentiate between FDMA, TDMA and GSM. 5
2. (a) Describe the cellular architecture in detail. 10
   (b) Explain mobile IP and cellular IP with the help of a suitable diagram. 10

Unit–II

3. (a) Describe pull and push based data delivery models. 10
   (b) Explain the need of file system support for mobility. 10
4. (a) Write a short note on distributed file sharing for mobility support. 10
   (b) Describe coda and other storage manager for mobility support. 10

Unit–III

5. (a) Explain Adhoc network routing protocols. 10
   (b) Write a short note on dynamic source routing. 10

6. (a) Describe global state routing with the help of a suitable diagram. 10

   (b) Explain zonal routing algorithm. 10

Unit–IV

7. Describe Kangaroo and Joey transactions with the help of suitable example. 20

8. Write short note on the following:

   (a) Protocols for mobile commerce. 10

   (b) Recovery model for mobile transactions. 10

Roll No. .....
Printed Pages : 2

36002

BT-6 / M-18

COMPUTER HARDWARE TECHNOLOGIES

Paper–CSE-304 Opt.-I

Time allowed : 3 hours] *[Maximum marks : 100*

*Note :- The candidate is required to attempt **five** questions in all selecting at least **one** question from each unit.*

Unit–I

1. (a) What are the improvements made in memory design in order to enhance the performance of a computer system?10

   (b) Discuss the different ways in which memory modules are assembled. 10

2. Describe the objectives of a good UPS system for PCs and also highlight the kind of specification needed. 20

Unit–II

3. (a) How BIOS acts as an intermediary between the parts of the computer? 10

   (b) Outline the key components in a typical motherboard layout. 10

4. (a) How IRQ resources are completely different from the memory address and I/O port address resources? 10

   (b) Give a performance comparison of AGP and PCI system bus. 10

Unit–III

5. (a) Why USB are proving to be good replacement for the serial and parallel ports on the computers? 10

   (b) Discuss the characteristics of video adapter in term of its components and video memory requirements. 10

6. (a) Why Master/Slave configuration is required to connect devices using ATA interface? Also explain the possible jumper configurations for the same. 10

   (b) Give a performance comparison between SCSI and IDE interface. 10

Unit–IV

7. Explain in detail the various components of a typical CD-ROM drive. 20

8. (a) What are the important features of a printer that affect the quality of print out? 10

   (b) What is the technology used in LCD monitors? Also explain the pros and cons of LCD monitors. 10

Roll No. .....
Printed Pages : 2

36114

BT-6 / M-18

ESSENTIALS OF INFORMATION TECHNOLOGY

Paper–CSE–304 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *Students are required to attempt **five** questions in all, selecting at least **one** question from each unit. All questions carry equal marks.*

Unit–I

1. (a) Mention and explain the techniques / methods involved in problem solving. 8+7=15

   (b) Write any four quality of an algorithm. How algorithms are implemented?

2. (a) Write the binary search algorithm. How the time complexity of this algorithm is calculated? 8+7=15

   (b) How data is inserted and detected in a stack? Discuss different stack operations.

Unit–II

3. (a) Explain break and continue statements. Give a specimen example. 8+7=15

   (b) Why and how type conversion is performed in any programming language?

4. Write note on the following: 5+5+5=15

   (a) Access specifiers

(b) Command line arguments

(c) Class diagrams

Unit–III

5. (a) What do you mean by inheritance? Discuss different type of inheritance. 8+7=15

(b) What is constructor? How constructors are overloaded?

6. What standard industry proposed for best coding practices? How a programming code is tuned and optimized? 15

Unit–IV

7. (a) What is relational model? Write the different steps to translate ER diagram to relational schema. 8+7=15

(b) Why normalization is required? Discuss 3rd normal form with specimen example.

8. (a) What is SQL? Write the purpose and syntax of Alter and Update statement. 8+7=15

(b) What are the database design issues? How SQL queries can be fine- tuned?

Roll No. .....
Printed Pages : 2

36003

BT-6 / M-18

NETWORK MANAGEMENT AND SECURITY

Paper–CSE-306

Time allowed : 3 hours] *[Maximum marks : 100*

Note :- *Attempt any **five** questions, selecting at least **one** from each unit. All questions carry equal marks.*

Unit–I

1. (a) What are the key principles of security? Explain. 10

(b) Explain various transposition techniques in detail. 10

2. What do you mean by cryptography? What is the difference between symmetric and asymmetric key cryptography? Also explain RSA algorithm with example. 20

Unit–II

3. Explain various memory and address protection mechanisms in operating system. 20

4. What are the various access control models? Discuss. 20

Unit–III

5. Explain malicious code. How it works and also discuss its defensive measures. 20

6. Discuss: 20

(a) POP

(b) IPSEC

Unit–IV

7.	(a)	Discuss protocol vulnerabilities in TCP/IP.	10
	(b)	Explain Denial of Service attack in detail.	10
8.		Write short notes on (any two):	20
	(a)	Digital Signatures	
	(b)	Firewall	
	(c)	Intrusion Detection System	

Roll No. .....
Printed Pages : 2

36115

BT-6 / M-18

MOBILE COMPUTING

Paper–CSE–306 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt **five** questions in all selecting at least **one** question from each unit. All questions carry equal marks.*

Unit–I

1. What is Mobile Computing? What are its characteristics? Describe the three-tier architecture of mobile computing.

2. (a) What are the issues involved in Handoffs' in the context of cellular networks?

(b) Give a brief overview of the various generations in Cellular network technology.

Unit–II

3. Explain the working of traditional TCP protocol and discuss the issues that may arise for TCP in wireless networks.

4. (a) What are the components of WAP architecture?

(b) Give an overview of Bluetooth.

Unit–III

5. (a) Highlight the issues and challenges in mobile data management systems.

(b) What do you mean by data replication for mobile computers? What are the forms and strategies of replication?

6. (a) Classify the different types of cloud deployment models.

(b) What is a public cloud? What are the significant advantages provided by a public cloud service?

Unit–IV

7. Give an introduction of Ad hoc networks along with a discussion of various issues related to Ad hoc networks.

8. Derive a classification of routing protocols for Ad hoc wireless networks. Discuss in brief the working of one routing protocol of each category.

Roll No. .....

36004

Printed Pages : 3

BT-6/M–18
SOFTWARE ENGINEERING
Paper–CSE-308

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt any five questions, selecting at least one question from each unit.*

Unit–I

1. (a) Describe the term Software crisis ? What are the causes associate with it. 10

(b) Explain iterative enhancement model of software development life cycle ? 10

2. (a) What is project scheduling ? Explain any two project scheduling techniques ? 10

(b) Explain COCOMO model using suitable example. 10

Unit–II

3. (a) Explain various software risks and risk management activities. 10

(b) Define software configuration management ? How configuration management helps the developer to manage changes in evolving software systematically ? 10

4. (a) What do you mean by structured analysis ? Differentiate between structured analysis and object oriented analysis ? 10

(b) What is the importance of Software Requirement Specification (SRS) ? Discuss the characteristics of a good software requirement specification document ? 10

Unit–III

5. (a) Define the term software design. Also discuss the coupling in the context of software design. For a good design, the module should have low coupling, why ? 10

(b) How do you define Reliability ? Explain fault avoidance and tolerance method in detail. 10

6. Explain the following terms :

(a) Object oriented design. 10

(b) Defensive programming. 10

Unit–IV

7. (a) Does simple presence of fault mean software failure ? Justify your answer with proper example ? 10

(b) Define software maintenance. Explain different types of software maintenance ? 10

8. (a) What do you understand by integration testing ? Explain top down and bottom up integration testing ? 10

(b) Write a short note on Computer Aided Software Engineering (CASE) tcols. 10

Roll No. .....
Printed Pages : 2

36116

BT-6 / M-18

WEB ENGINEERING

Paper–CSE–308N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *Attempt any five questions.*

Unit–I

1. (a) What are various challenges of organizing information? 7

   (b) Explain various design issues of searching system. 8

2. (a) What are the various design issues during designing of elegant navigation system? 8

   (b) Explain: 7

   (i) Architectural page Mock-ups.

   (ii) Design sketches.

Unit–II

3. (a) Explain XHTML Document structure with example. 8

6. (a) Write a Java Script to validate email address and phone number. 8

   (b) Explain various object creation and modification methods in Java script. 7

Unit–IV

7. (a) What are list of lists in Python? Give an example along with its memory model. 5

   (b) Write a Python program to check whether a given number is prime or net, using for-else statement. 6

   (c) List any four built-in string functions in Python with example. 4

8. (a) Explain various data types in Python. 10

   (b) Write the syntax for concatenating two lists in Python. 5

Roll No. .....
Printed Pages : 2

36117

BT-6 / M-18

SOFTWARE ENGINEERING

Paper–CSE-310N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting at least **one** question from each unit. All questions carry equal marks.*

Unit–I

1. (a) What are the attribute of good software ? What are key challenges facing software engineering. 7

(b) With the neat diagram, explain the spiral model of software development. 8

2. (a) Write suitable application of different software models. 7

(b) Discuss incremental process model and evolutionary development model with reference to suitability of the software project. 8

Unit–II

3. (a) Give software requirement specification (SRS) for developing a software for payroll management system. 10

(b) Discuss various levels of quality assurance in software engineering. 5

4. (a) Draw DFD (level 0, 1 and 2) for software of course management system. 10

(b) Discuss the different task in software configuration managment. 5

Unit–III

5. (a) What are the design principles of good software design ? Explain. 7

   (b) What is effort ? What is the need of effort and project size estimation ? 8

6. (a) Discuss on modularity and functional independence of design concepts. 8

   (b) Expalin the cyclomatic complexity. How is it computed ? 7

Unit–IV

7. (a) What is the objective of regression testing ? Explain the regression testing techniques. 8

   (b) Explain different types of software maintenance. Why are these maintenances required ? 7

8. (a) What do you mean by software reverse engineering ? Why it is required ? Explain various activities undertaken during reverse engineering. 8

   (b) How the maintenance cost is calculated. Explain with example. 7

Roll No. .....
Printed Pages : 2

36007

BT-6 / M-18

ADVANCED DATABASE SYSTEM

Paper–CSE-324

Time allowed : 3 hours] *[Maximum marks : 100*

Note:- *Students are required to attempt **five** questions selecting at least **one** question from each unit. All questions carry equal marks.*

Unit–I

1. What are the steps involved in query processing? Why queries are to be optimized? With an example explain how queries are optimized.

2. (a) Why is load balancing required in parallel database systems? Explain how it is performed?

(b) Explain how concurrency control mechanism is used in distributed databases. 10+10=20

Unit–II

3. What do you mean by clustering? Discuss specific requirements for clustering. How Manhattan distance function is used in Hierarchical clustering? 20

4. Define data mining? How you can obtain multiple decision trees? Discuss the role of information gain for constructing a decision tree. 20

Unit- III

5. Discuss the necessary characteristics a system must satisfy to be considered as an object-oriented database management system (OODBMS). 20

6. (a) What are the trades off and benefits of using OODBMS over an ORDBMS? Explain.

   (b) Briefly explain object structures in OODBMS. 10+10 =20

Unit- IV

7. (a) What is the significance of GIS, and how it relates to geographic information systems? 20

   (b) What do you mean by multimedia databases? What are its contents? 20

8. What is transaction? What are its properties? How you will ensure integrated access and security of transactions over multiple data sources? 20

Roll No. ..... Total Pages : 02

BT-7/M-18 37001

COMPILER DESIGN

CSE-401

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. The compilation process is a sequence of various phases. Justify. Also distinguish between :
   (a) Compiler and Interpreter
   (b) Lexical analyzer and Parser
   (c) Loader and linker.

2. How are parsing techniques classified based on the implementation of production rules ? What is predictive parsing ? How does a predictive parser implement recursive-decent parsing ?

Unit II

3. What is the purpose of intermediate code generation phase ? What are the properties of intermediate code ?

Describe the following in the context of intermediate code generation :

(a) Postfix notation (b) Three address code

(c) Syntax tree.

4. What purpose is served by the symbol table ? What items are stored in symbol table ? What are the ways to implement symbol tables ?

Unit III

5. What do you mean by run time environment in compiler design ? Describe the following in the context of run time environment :

   (a) What type of information is required for allocating memory to data items ?

   (b) What is an activation record ? What is its structure ?

6. What kind of errors can be encountered in different phases of compiler design ? What are the goals of error handler in parser ? What are the semantics errors that the semantic analyzer is expected to recognize ?

Unit IV

7. What is the objective of code optimization ? What are the various phases at which improvement can be made ? What techniques are used for loop optimization ?

8. What are the main tasks of a code generator ? What things should be taken into consideration by the code generator to generate the code ? How is register allocation performed ?

Roll No. ..... Total Pages : 03

BT-8/M-18 38001

NEURAL NETWORKS AND FUZZY LOGIC
CSE-402

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. (a) Define activation functions. What are the two types of learning in neural network ? **10**

   (b) Compare weights and bias. How does threshold help to obtain the output ? **10**

2. (a) How is perceptron net used in the aspect of linear separability ? **10**

   (b) Explain in detail the development of Artificial neural Networks. **10**

Unit II

3. (a) Discuss in detail the energy function used in discreate Hopfield Net. **10**

(b) Explain the discrete Hopfield net with its architecture. **10**

4. (a) Differentiate between Kohonen and Grossberg Learning Rules. **10**

(b) How is counter propagation neural network used for data compression ? **10**

Unit III

5. (a) Draw the architecture of a Bi-directional Associative memory and discuss its training algorithm. **10**

(b) What are the two types of BAM ? State the algorithm of a discrete BAM. **10**

6. (a) What are the three states of ART Network ? Explain. **10**

(b) How is ART net designed for both stability and plasticity ? **10**

Unit IV

7. (a) Explain with a neat diagram, how holographic correlators are used for image recognition system. **10**

(b) Explain neocognitron net in brief. Briefly describe the training procedure adopted for neocognitron net. **10**

8. (a) Discuss Genetic algorithm evolving neural networks. **10**

(b) Write short notes on the following : **10**

(i) Optical neural networks

(ii) Cognitron and neocognitron.

Roll No. ..... Total Pages : 02

BT-8/M-18 38002

INTERACTIVE COMPUTER GRAPHICS
CSE-404

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Difference between Raster scan and Random scan display system. **10**

(b) What is CRT ? Explain its working in detail. **10**

2. What do you mean by display processor ? Explain the concept of character generator. **20**

Unit II

3. Discuss Bresenham's line drawing algorithm and draw a line with endpoints (20, 10) and (30, 18). **20**

4. (a) Difference between Screen Co-ordinate and User co-ordinates with examples. **10**

(b) What is polygon clipping ? Explain Sutherland Hodgeman polygon clipping with example. **10**

Unit III

5. (a) What do you mean by interactive and non-interactive graphics with examples. **10**

(b) Explain the working of light pen and touch panel. **10**

6. Discuss the various Zooming and panning clipping techniques. **20**

Unit IV

Difference between 2D and 3D graphics. Explain perspective display for 3D graphics in detail. **20**

8. Write notes on the following : **10+10**

(a) Hidden line (b) 3D transformation.

12/05/2018

Roll No. ..... Total Pages : 03

BT-7/M-18 37004

SOFTWARE PROJECT MANAGEMENT
CSE-441

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Why is software economics quite useful for conventional software management ? 7

   (b) Explain the different principles of software management and justify their roles. 8

2. (a) What type of automation can be done through software environment ? Justify with a suitable example. 8

   (b) Discuss the different software processes which are involved and their role to build effective software system. 8

Unit II

3. Identify the roles of the following :

   (a) Workflows of the process 7

   (b) Checkpoint of the process. 8

4. Define artifacts. Explain the role of management artifacts, engineering artifacts and pragmatic artifacts to design cost effective software process. 15

Unit III

5. (a) Write a short note on the working of model based software architectures. 7

   (b) Explain the role of life-cycle expectations in software management. 8

6. (a) Why the elaboration, construction and training phase are the important processes in software process ? 8

   (b) Describe all the roles of process discriminants in managing software projects. 7

Unit IV

7. Explain the following :

   (a) Life cycle expectations **5**

   (b) Evolution of organizations **5**

   (c) ROI. **5**

8. Why the project control and process instrumentation core metrics are essentials for managing software project ? Explain with the help of suitable process flow mechanism of any real time software project. **15**

Roll No. ..... Total Pages : 02

BT-8/M-18 **38006**

SOFTWARE VERIFICATION, VALIDATION AND TESTING

CSE-450

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) What is the difference between Verification and Validation ?

   (b) What is the difference between a Test Plan and a Use Case ?

   (c) What is the reason that Software has Bugs ?

   3×5=15

2. (a) List the generic procedure which is used for generation of tests, using cause effect graphing. 8

   (b) Discuss the role of discrete mathematics in software testing. 7

Unit II

3. Explain Gorilla Testing, Stress testing and graph matric with example. 15

4. Explain various black box testing techniques in detail. 15

Unit III

5. (a) Discuss class test, cyclomatic complexity and domain testing with example. 9

   (b) Differentiate Cohesion and coupling with example. 6

6. (a) How many types of graphs are used in software testing ? Give suitable example. 7

   (b) Discuss various schemes to reduce number of test cases. 8

Unit IV

7. (a) Discuss various automated testing tools used in software testing. 7

   (b) Discuss Win Runner and Load Runner in detail. 8

8. Discuss various dynamic tools used in software testing in detail. 15

Roll No. ..... Total Pages : 02

BT-7/M-18 37007

SECURITY AND CRYPTOGRAPHY

CSE-473

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. What are the different modes of operations in DES ? Explain about triple DES algorithm with example. What is meant by Avalanche effect in DES algorithm ? 15

2. (a) What is RSA Algorithm ? Discuss the attacks on RSA algorithm.

   (b) Distinguish between differential and linear cryptanalysis. 8+7=15

Unit II

3. (a) Explain digital signature standard. Differentiate between Secret key and public key signatures.

(b) Briefly explain Diffle-Hellman key exchange algorithms. **8+7=15**

4. (a) Elaborately explain Kerberos authentication mechanism with suitable diagram.

   (b) Describe MD5 algorithm in detail. Compare its performance with SHA-1 algorithm. **8+7=15**

Unit III

5. What are the principles of database security ? How password technology and administration ensures database security ? **15**

6. (a) Discuss the life-cycle of a virus. How can system be prevented from virus ?

   (b) What do you mean by Trojan horse and bombs ? Discuss any *two* advanced antivirus techniuqes in detail. **8+7=15**

Unit IV

7. What do you understand by network security ? How can you secure Local area network ? Discuss its security plan and policy. **15**

8. Write notes on the following :

   (a) Network setting priorities

   (b) Securing network components. **8+7=15**

Roll No. ..... Total Pages : 02

BT-8/M-18 38009

DATA WAREHOUSING AND DATA MINING

CSE-476

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five.* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. What is Data Warehouse ? Discuss the steps for designing, construction and implementation of data warehousing. **15**

2. What is Data Mining ? Explain different tools of data mining. Give an example of business application where data mining can be used. **15**

Unit II

3. (a) Differentiate between LAN based and Virtual data warehousing ? **8**

   (b) Compare OLTP and OLAP in a table. **7**

4. Write notes on the following : 15

(a) Centralized data warehousing

(b) Distributed data warehousing.

Unit III

5. Describe 2-Tier architecture of Data Warehousing. With a block diagram, explain the various components of a typical 2-Tier architecture. 15

6. What do you understand by Decision Support System (DSS) ? What is the difference between DSS and Management Information System (MIS) ? Write a detailed note on the use of data warehousing and mining DSS. 15

Unit IV

7. (a) Describe the steps involved in Knowledge Discovery in database (KDD). 8

(b) What is multilayer feed-forward neural network ? 7

8. (a) What is Fuzzy Logic ? Write a note on the use of Fuzzy logic in data mining. 8

(b) How can Genetic algorithm facilitate knowledge discovery in a data warehouse ? Discuss. 7