

# CBCS SCHEME

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15CS61

## Sixth Semester B.E. Degree Examination, Jan./Feb. 2023 Cryptography, Network Security and Cyber Law

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain common cyber attacks. (04 Marks)  
b. Explain Extended Euclidean Algorithm. Using the extended Euclidean algorithm, compute the inverse of 12 modulo 79. (06 Marks)  
c. Define :  
i) Group and Chinese remainder theorem  
ii) Let  $N = 210$  and let  $n_1 = 5, n_2 = 6, n_3 = 7, x_1 = 3, x_2 = 5, x_3 = 2$ . Compute  $f^{-1}(3, 5, 2)$  and  $x$  using Chinese remainder theorem. (06 Marks)

OR

- 2 a. Explain the following Ciphers with example  
i) Mono-alphabetic ciphers  
ii) The Vigenere cipher  
iii) A transposition cipher  
iv) Hill cipher (08 Marks)  
b. With a neat diagram, explain the construction of DES (Data Encryption Standard) (08 Marks)

### Module-2

- 3 a. Explain key generation, encryption and decryption RSA operations. Using RSA algorithm encrypt and decrypt the message 00111011, assume prime numbers  $p = 3$  and  $q = 11$  and public key  $e = 3$ . (10 Marks)  
b. With a neat diagram, explain the computation of Secure Hash Algorithm (SHA - 1) (06 Marks)

OR

- 4 a. With a neat diagram, explain Diffie- Hellman Key Exchange protocol and man in the middle attack on Diffie-Hellman key exchange. (08 Marks)  
b. Explain EL Gamal Encryption algorithm. Give an example. (08 Marks)

### Module-3

- 5 a. Explain Public Key Infrastructure (PKI) Architectures with a help of neat diagrams. (05 Marks)  
b. With a neat diagram, explain password based and certificate based on way Authentication. (06 Marks)  
c. Explain Preliminary version 1 of the Needham-Schroeder protocol. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg,  $42+8 = 50$ , will be treated as malpractice.

OR

- 6 a. Explain IPsec IN ACTION. (10 Marks)  
b. Explain SSL hand shake protocol. (06 Marks)

**Module-4**

- 7 a. Explain how Authentication is dealt in 802.11. (05 Marks)  
b. In detail explain virus and worm features. (05 Marks)  
c. Explain worm propagation models. (06 Marks)

OR

- 8 a. Explain DDOS Attack Prevention/Detection (08 Marks)  
b. Explain Various technologies for web services. (08 Marks)

**Module-5**

- 9 a. Explain important provisions of the Information Technology (IT) Act. (06 Marks)  
b. Explain Digital Signature certificates. (04 Marks)  
c. Explain Penalties and Adjudication of IT Act. (06 Marks)

OR

- 10 a. Explain Regulations of certifying Authorities. (10 Marks)  
b. Mention the cyber Regulations Appellate Tribunal. (06 Marks)

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15CS62

## Sixth Semester B.E. Degree Examination, Jan./Feb. 2023 Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks: 80

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. What is Computer Graphics? Explain the applications of Computer Graphics. (08 Marks)  
b. Explain in brief Color CRT Monitor. (08 Marks)

OR

- 2 a. Explain Bresenham's line drawing algorithm. (08 Marks)  
b. Explain Point attribute functions. (04 Marks)  
c. List OpenGL Line attribute functions. (04 Marks)

### Module-2

- 3 a. Explain Inside outside tests. (08 Marks)  
b. What is Fill area? Explain Polygon classification by identifying concave polygon. (04 Marks)  
c. Explain OpenGL Wire – Frame methods. (04 Marks)

OR

- 4 a. Explain the Scan Line Polygon Fill algorithm. (08 Marks)  
b. Explain 2 Dimensional Translation, Rotation, Scaling. (08 Marks)

### Module-3

- 5 a. Explain Cohen Sutherland Line clipping algorithm. (08 Marks)  
b. What is Clipping and Clipping window? (04 Marks)  
c. Explain 3 Dimensional translation. (04 Marks)

OR

- 6 a. Explain the Ambient Light, Diffuse reflection and Specular reflection. (08 Marks)  
b. What is Affine transformation? (04 Marks)  
c. What is Color Models? Explain different color models characteristics. (04 Marks)

### Module-4

- 7 a. Explain the Orthogonal Projections. (08 Marks)  
b. Explain 3D viewing pipeline. (08 Marks)

OR

- 8 a. Explain OpenGL 3D viewing functions. (08 Marks)  
b. What is Projection plane, Parallel and Perspective projections? (06 Marks)  
c. What is Depth Curing? (02 Marks)

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**Module-5**

- 9 a. What are major characteristics which describe the logical behavior of an input devices? Explain how OpenGL provides functionality of each of the classes of logical input devices. (08 Marks)
- b. How Pop - up menus are created using GLUT? Illustrate with an example. (08 Marks)
- OR**
- 10 a. What is Display list? Give OpenGL code segment that generates a display list defining a red triangle with vertices at (90, 50) (150, 50) and (100, 150)? (08 Marks)
- b. List out any characteristics of good Interactive program. (04 Marks)
- c. Explain Bezier surfaces. (04 Marks)

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15CS63

## Sixth Semester B.E. Degree Examination, Jan./Feb. 2023 System Software and Compiler Design

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define system software. Distinguish between system software and application software. (06 Marks)  
b. List out registers used in SIC/XE machine architecture along with their use. (10 Marks)

OR

- 2 a. Explain the data structures and pass-1 algorithm of SIC assembler. (08 Marks)  
b. Define Macro. Give the features of macro processors and explain the data structures used in macro processors. (08 Marks)

### Module-2

- 3 a. What is loader? What are the basic functions the loader has to perform? (04 marks)  
b. Develop an algorithm for bootstrap loader. (07 marks)  
c. Explain dynamic linking with suitable diagram. (05 Marks)

OR

- 4 a. Differentiate between a linking loader and linkage editor, with the help of suitable diagram. (08 marks)  
b. Explain different loader option commands with examples. (04 marks)  
c. Illustrate MS - DOS object module with its record types. (04 Marks)

1 of 3

### Module-3

- 5 a. List and explain the various phases of a compiler and show the output of each phase for the expression  $a := b + c * 25$ . (08 marks)  
b. Construct transition diagram for recognizing relational operators. Sketch the program segment to implement it, showing the first state and one in final state. (08 marks)

OR

- 6 a. Explain input buffering strategy used in lexical analysis phase. (06 Marks)  
b. Write the regular definition for unsigned number, also write the transition diagram. (06 Marks)  
c. Construct the transition diagrams for a set of keywords like begin, end, if then and else and identifiers and constants along with a minimum set of relational operators. (04 Marks)

### Module-4

- 7 a. What is top down parser? What are key problems in top down parsing? (08 Marks)  
b. Explain the ambiguity in arithmetic expression. What is the ambiguity in parsing  $2 + 3 * 4$ ? Explain the solution for it. (08 Marks)

OR

- 8 a. What is meant by handle processing? How it helps on shift reduce parsing? List the actions of a shift reduce parser? (08 Marks)
- b. Form the Action/Goto table for the following grammar:  
 $S \rightarrow Aa \mid bAc \mid Ba \mid bBa$   
 $A \rightarrow d$   
 $B \rightarrow d$   
Justify whether the grammar is LR(0) or not. (08 Marks)

**Module-5**

- 9 a. Define synthesized and inherited attributes with examples. (04 Marks)
- b. Briefly explain the main issues in code generation. (08 Marks)
- c. Explain in brief dead code elimination. (04 Marks)

OR

- 10 a. Construct DAG for the expression,  
 $a + b * (a + b) + c + d$  (04 Marks)
- b. Give SDD of a simple calculator. (04 Marks)
- c. Write a note on common sub expression. (04 Marks)
- d. What are the steps involved in optimization of basic blocks. Explain any 2 steps in brief. (04 Marks)

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15CS653

## Sixth Semester B.E. Degree Examination, Jan./Feb. 2023

### Operations Research

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

#### Module-1

- 1 a. Define Operation Research. (04 Marks)  
 b. Discuss basic components of LP model. (04 Marks)  
 c. A computer company manufactures laptops and desktops that fetch total profit of Rs.700/- and 500/- per unit respectively. Each unit of laptop takes 4 hours of assembly time and 2 hours of testing time while each unit of desktop requires 3 hours of assembly time and 1 hour for testing. In a given month the total number of hours available for assembly is 210 hours and for inspection is 90 hours. Formulate the problem as LPP in such a way that the total profit is maximum. (08 Marks)

**OR**

- 2 a. Describe the steps involved in the formulation of LPP. (04 Marks)  
 b. Explain the terms : (i) Feasible solution (ii) unbounded solution (04 Marks)  
 c. A company produces two types of leather belts A and B and their profits are 40 and 30 rupees respectively. Each belt of type A requires twice as much a time as required for B. Company can produce 1000 belts per day. Leather is sufficient only for 800 belts per day. Belt A requires fancy buckles, there are only 400 buckles per day. For B only 700 buckles per day are available. How should the company manufacturers the 2 types of belts in order to maximize overall profit? Solve using graphical method. (08 Marks)

#### Module-2

- 3 a. Define with example : (i) Slack variable (ii) Surplus variable (iii) Basic feasible solution. (06 Marks)  
 b. Solve the following LPP using simplex method :  

$$Z_{\max} = 3x_1 + 2x_2$$
 Subjected to  $x_1 + x_2 \leq 40$   
 $x_1 - x_2 \leq 20$   
 where  $x_1, x_2 \geq 0$  (10 Marks)

**OR**

- 4 a. Solve the following LPP using Big M method :  
 Minimize  $z = 2x_1 + 3x_2$   
 Subjected to constraints  $x_1 + 2x_2 \leq 4$   
 $x_1 + x_2 = 3$  and  
 $x_1$  and  $x_2 \geq 0$  (10 Marks)  
 b. Explain briefly two phase method. (06 Marks)

#### Module-3

- 5 a. Explain the procedure of dual simplex method. (06 Marks)  
 b. Use dual simplex method to solve the following LPP :  
 Minimize  $z = 2x_1 + x_2 + 3x_3$   
 Subjected to  $x_1 - 2x_2 + x_3 \geq 4$   
 $2x_1 + x_2 + x_3 \leq 8$  and  $x_1 - x_3 \geq 0$  with all variables non negative. (10 Marks)

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OR

- 6 a. Explain briefly : (i) Formulation of dual linear programming problem.  
(ii) Unrestricted variables. (06 Marks)
- b. The dual simplex method to solve the following problem :  
 Maximize  $z = -2x_1 - 3x_2$   
 Subjected to  $x_1 + x_2 \geq 2$   
 $2x_1 + x_2 \leq 10$   
 $x_1 + x_2 \leq 8$   
 with  $x_1$  and  $x_2$  non negative. (10 Marks)

**Module-4**

- 7 a. Explain North-West corner method with an example. (06 Marks)
- b. Using Vogel's Approximation Method (VAM), solve the following transportation problem :

	Demand			
	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	
O <sub>1</sub>	2	7	4	5
O <sub>2</sub>	3	3	8	8
O <sub>3</sub>	5	4	7	7
O <sub>4</sub>	1	6	2	14
	8	8	18	

(10 Marks)

OR

- 8 a. Explain different types of assignment problems. (06 Marks)
- b. Four new computers (C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub>) are to be installed in a computer center. There are 5 vacant places (A, B, C, D and E) available. Because of limited space C<sub>2</sub> cannot be placed at C. and C<sub>3</sub> cannot be placed at A. The assignment cost of the computers to the places is given below. Find the optimal assignment.

	A	B	C	D	E
C <sub>1</sub>	4	6	10	5	6
C <sub>2</sub>	7	4	-	5	4
C <sub>3</sub>	-	6	9	6	2
C <sub>4</sub>	9	3	7	2	3

(10 Marks)

**Module-5**

- 9 a. Explain two person zero-sum game and non zero-sum game with example. (06 Marks)
- b. Solve the following game whose pay off matrix is,

		Player B	
		3	-2
Player A	2	3	-2
	5	2	5

(10 Marks)

OR

- 10 a. List the applications of game theory. (04 Marks)
- b. Explain min-max and max-min principle. (04 Marks)
- c. Distinguish between pure strategy and mixed strategy. (04 Marks)
- d. Explain the concept of dominance. (04 Marks)

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## Sixth Semester B.E. Degree Examination, Jan./Feb. 2023 Python Application Programming

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Explain various building blocks of a program. (05 Marks)
- b. Explain values and types in python. (05 Marks)
- c. Write a program to prompt the user for hours and Rate per hour to compute gross pay (gross pay = hours \* rate). (06 Marks)

**OR**

- 2 a. Explain the following with syntax, flowchart and example
  - i) Chained conditions
  - ii) Nested conditions (04 Marks)
- b. Explain the following with example
  - i) Type conversion functions
  - ii) Math functions
  - iii) Random functions (09 Marks)
- c. Write a note on catching an exception in python. (03 Marks)

### Module-2

- 3 a. Explain the use of break and continue in while loop with example. (04 Marks)
- b. Write a python script to find the largest value in a list or sequence using for loop. (06 Marks)
- c. Explain string indexing and traversing through string with a loop. (06 Marks)

**OR**

- 4 a. Discuss various string methods with example. (06 Marks)
- b. Write a python script to count number of lines in a file entered by users. (05 Marks)
- c. Write a python script to print all the lines which starts with word "python" from a file. (05 Marks)

### Module-3

- 5 a. Discuss various list methods. (06 Marks)
- b. Explain the following operators
  - i) in    ii) not in    iii) is    iv) is not. (04 Marks)
- c. Write a python script to print frequency of each word in a given file. (06 Marks)

**OR**

- 6 a. Write a python script to print 10 most common words from given text file. (08 Marks)
- b. Explain search and find all methods from re module. (08 Marks)

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**Module-4**

- 7 a. Explain classes in python with example. (04 Marks)  
b. Write a Rectangle class and show objects are mutable with example. (04 Marks)  
c. Write a definition for a class named circle with attributes 'center' and 'radius' where center is a point object and radius is a number. Instantiate a circle object that represents a circle with its center at (150, 100) and radius 75. Write a function named "area\_of\_circle" that calculate and returns area of a given circle. (08 Marks)

OR

- 8 a. Explain 'pure functions' with example. (05 Marks)  
b. Explain the importance of '\_int\_' method in python with example. (05 Marks)  
c. Discuss Type – Based dispatch with example. (06 Marks)

**Module-5**

- 9 a. What is a Socket? Explain different methods of socket. (08 Marks)  
b. Explain file retrieving using "urllib" with example and print the frequency of words. (08 Marks)

OR

- 10 a. What is XML? Explain XML parsing with example. (08 Marks)  
b. Explain Cursor and its methods with example in Database. (08 Marks)

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