

# MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-BCA (HONOURS)

FIRST SEMESTER EXAMINATION

(2024 ADMISION ONWARDS)

**MG1MDEBCA100– Cyber Laws and Security**

**Model Question Paper**

Duration: 1.5 Hours

Maximum Marks: 50

*Students should attempt atleast one question from each course outcome to enhance their overall outcome attainability.*

## **Part A**

**Very Short Answer Questions.**

*Answer All Questions*

**Each question carries 2 mark**

1. Describe the concept of Cyberspace. [K][1]
2. Identify the purpose of Cyber laws. [U][1]
3. Compare and contrast cyberstalking and identity theft as defined under the IT Act 2000. [U][1]
4. Outline the need for privacy law and regulations. [K][1]
5. Analyze the factors that influence the safety of saving credit card information on websites. [An][2]
6. What is the primary purpose of MFA? [U][2]
7. What is the primary purpose of HTTPS? [U][2]
8. Explain the significance of a cipher in data encryption and its role in securing information. [K][3]
9. What is the significance of vulnerability assessment in ethical hacking? [U][3]
10. How can you define the term "cyber forensics"? [U][3]

**[2 x 10 = 20]**

## **Part B**

**Short Answer Questions**

*Answer 6 Questions*

**Each question carries 5 marks**

11. What are the key features of the IT Act 2000? [U][1]
12. Explain different types of cyberbullying [U][1]
13. Discuss the various internet security threats. [U][2]
14. What factors would you consider to identify fraud risks in your financial accounts? [An][2]
15. Write down the benefits and limitations of biometric authentication. [A][2]
16. List the need for security [K][3]
17. What is the purpose of two-factor authentication (2FA) on the internet? [U][3]
18. What is the difference between symmetric and asymmetric cryptography in terms of key usage and management? [U][3]

**[5 x 6 = 30]**

**MAHATMA GANDHI UNIVERSITY, KOTTAYAM**  
**MGU-UGP (HONOURS)**  
**FIRST SEMESTER EXAMINATION**  
**(2024 ADMISSION ONWARDS)**  
**MG1CCRBCA100– Digital Fundamentals**  
**Model Question Paper**

Duration: 2hrs

Maximum Marks: 70

*Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.*

**Part A**

**Very Short Answer Questions. Answer All Questions**

**Each question carries 2 marks**

1. Explain the overflow condition in binary addition with a suitable example. [U][1]
  2. Define Multiplexer. [U][3]
  3. Draw the truth table for a three variable minterm representation  $F(x,y,z) = \sum(0,3,6)$ . [U][1]
  4. Distinguish the positive and negative edges of a clock pulse. [An][4]
  5. Convert the binary number 11012 to its decimal equivalent. [A][1]
  6. Write short notes on Maxterm and Minterm. [U][2]
  7. How can a NOR gate be used to implement the AND function? [A][2]
  8. Write short note on Combinational Logic Circuits and Sequential Logic Circuits. [U][4]
  9. Draw the truth table of a JK flip-flop. [U][4]
  10. What are the applications of an encoder in digital systems? [U][3]
- (10\*2=20 Marks)

**Part B**

**Short Answer Questions (5 out of 7 Questions)**

**Each question carries 6 marks**

11. Convert the decimal number 483 to its equivalent BCD using the 8421 code [A][1]
  12. Draw the logic diagram using only NOR gates  $F=xy'z + x'yz'$ . [A][2]
  13. Draw the circuit diagram of 1×8 De-multiplexer. [A][3]
  14. What are the applications of shift registers? [U][4]
  15. Convert the octal number 674 to hexadecimal. [A][1]
  16. Convert to SOP  $(A' + B' + C)(B + C' + D')(A + B + C + D')$ . [A][2]
  17. Describe T flip-flop. What is its use? [U][4]
- (5\*6=30 Marks)

**Part C**

**Essay Questions (2 out of 3 Questions)**

**Each question carries 10 marks**

18. Simplify using K-map, the expression  $F(A,B,C,D) = \sum m(0,2,7,8,14)$  with Don't care terms  $D = \sum m(1,6,9,13)$ . Draw the corresponding logic diagram. [A][2]
19. Design R-S flip-flop and JK flip-flop using NOR gates only. [U][4]

20. Explain the working of a digital encoder. Describe their applications and advantages.

[U][3]

(2\*10=20 Marks)

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP BCA (HONOURS)

FIRST SEMESTER EXAMINATION

(2024 ADMISSION ONWARDS)

MG1SECBCA100: FUNDAMENTALS OF PROGRAMMING USING C

MODEL QUESTION PAPER

Duration: 2hrs

Maximum Marks: 70

*Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.*

Part A:

Very Short Answer Questions.

**Answer All Questions. Each question carries 2 marks.**

1. What are the steps involved in the program development life cycle? [K][1]
2. Identify the types of language translators used in programming and briefly explain each. [K][1]
3. How does an expression differ from a statement in C? Provide examples. [U][2]
4. Write a do-while loop in C to repeatedly prompt the user until they enter a positive number. [An][3]
5. What are the ASCII value ranges for uppercase and lowercase characters in C? [K][2]
6. What is the purpose of the continue statement in C? [K][3]
7. Describe how you would compute the total cost of items stored in an array of prices. [A][4]
8. Analyze the output of the following code snippet and explain how printf() formats the output. float num = 45.6789; printf("%.2f", num); [An][3]
9. Demonstrate how to declare and call a function in C that returns an integer. [A][4]
10. What is the primary difference between a struct and a union in C? [U][4]

(10 X 2 = 20 Marks)

Part B:

Short Answer Questions.

**Answer any 5 out of 7 Questions. Each question carries 6 marks**

11. Outline a systematic approach to debugging a C program, and explain how debugging tools help, identify syntax, logical, and runtime errors. [U][1]
12. Explain operator precedence in C with an example. How does it affect expression evaluation? [U][2]
13. Why are delimiters important in C programming? Provide examples to illustrate their role. [K][2]
14. Write a C program to read a user's name and age, and display them using both printf and puts. Discuss the advantages of each function in this context. [A][3]
15. Write a recursive function in C to compute the nth Fibonacci number. [A][4]
16. Analyse the statement: "The switch statement is less flexible but more efficient than if-else." Provide examples and reasoning to support your analysis. [An][3]
17. Implement a recursive function to calculate the nth Fibonacci number. [A][4]

(5 X 6 = 30 Marks)

Part C:

Essay Questions.

**Answer any 2 out of 3 Questions. Each question carries 10 marks**

18. Compare the use of if-else statements and the if-else-if ladder in C. Provide examples to show when one approach may be preferred over the other. [An][3]
19. Describe the different storage classes in C (e.g., auto, static, extern, register) with examples. Explain how they influence variable behaviour. [U][4]
20. Define the following terms in the context of functions in C:
  - a) Function Declaration
  - b) Function Definition
  - c) Function Call
  - d) Return Type.

After defining each, explain the differences between a function declaration and a function definition with examples. [U][4]

(2 X 10 = 20 Marks)

**MAHATMA GANDHI UNIVERSITY, KOTTAYAM**  
FIRST SEMESTER EXAMINATION  
(2024 ADMISSION ONWARDS)  
MG1CCRBCA101 - DISCRETE MATHEMATICS

Duration: 2 hours

Maximum Marks: 70

*Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.*

**Part A**

**Answer any five questions. Each question carries 2 marks**

1. Find propositions from the given statements. Write the truth values of the propositions. (a) Chennai is the capital of Tamil Nadu. (b)  $x + 2 = 11$ . [U] [3]
2. Define the disjunction of two propositions and write the truth table. [K] [3]
3. Write the set of positive integers less than 10 in (a) Roaster form (b) Set builder form [U] [1]
4. Let A represent the set of all students at a university, and let B represent the set of all courses offered at the university. What is the Cartesian product of  $A \times B$ ? [U] [1]
5. Define transitive relation. Give an example of a transitive relation. [K] [6]
6. Let  $R_1$  and  $R_2$  be the relations from  $A = \{1, 2, 3\}$  to  $B = \{1, 2, 3, 4\}$  where  $R_1 = \{(1, 1), (2, 2), (3, 3)\}$  and  $R_2 = \{(1, 1), (1, 2), (1, 3), (1, 4)\}$ . Find  $R_1 \cap R_2$  and  $R_1 \cup R_2$ . [A] [6]
7. Show that the matrix  $\begin{bmatrix} 0 & -1 & 5 \\ 1 & 0 & 3 \\ -5 & -3 & 0 \end{bmatrix}$  is skew-symmetric. [U] [7]
8. Let  $A = \begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$ , find (a)  $A+B$  and (b)  $A-B$  [U] [7]

**Part B**

**Answer any five questions. Each question carries 6 marks**

9. Express the following propositions using p and q and logical connectives. (a) It is below freezing and snowing. (b) If it is below freezing, it is also snowing. (c) It is not below freezing and it is not snowing. [K] [3]
10. Find the bit strings for the following expressions:  
(a)  $11000 \wedge (01011 \vee 11011)$  [K] [3]  
(b)  $(01010 \oplus 11011) \oplus 01000$
11. (a) Define the complement of a set.  
(b) Let A be the set of positive integers greater than 10 (with universal set the set of all positive integers). Find the complement of A. [U] [2]
12. Prove the Absorption Laws: (a)  $A \cup (A \cap B) = A$ . (b)  $A \cap (A \cup B) = A$ . [A] [2]
13. Find the matrix representing the relations  $S \circ R$  where  
 $M_R = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$  and  $M_S = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}$  [An] [6]
14. The relation  $R = \{(a, b)/a \text{ and } b \text{ have same parents}\}$  on the set of all people. Show that it is an equivalence relation. [A] [6]
15. For matrices  $A = \begin{bmatrix} 6 & 1 \\ 3 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} 4 & 3 \\ 1 & 2 \end{bmatrix}$ , verify that  $\det AB = (\det A)(\det B)$  [U] [7]
16. Find the inverse of the matrix  $A = \begin{bmatrix} 2 & 4 & 1 \\ 1 & 2 & 1 \\ 3 & 4 & 2 \end{bmatrix}$ . [A] [8]

Part C

Answer any three questions. Each question carries 10 marks

17. (a) Prove that  $(p \vee q) \wedge (\neg p \vee r) \rightarrow (q \vee r)$  is a tautology. [A] [4]  
(b) Show that  $\neg(p \rightarrow q)$  and  $p \wedge \neg q$  are logically equivalent.
18. Make use of rules of inference, show that the following argument is valid:  
“If today is Tuesday, I have a test in Mathematics or Economics.”  
“If my Economics Professor is sick, I will not have a test in Economics.” [An] [5]  
“Today is Tuesday and my Economics Professor is sick.”  
Therefore “I have a test in Mathematics”.
19. (a) Define composite functions.  
(b) Let  $f$  and  $g$  be the functions from the set of integers to the set of integers defined by  $f(x) = 2x + 3$  and  $g(x) = 3x + 2$ . What is the composition of  $f$  and  $g$ ? What is the composition of  $g$  and  $f$ ? [A] [6]
20. If  $A =$  set of integers and  $R$  is defined as  $aRb$  if and only if  $a - b$  is divisible by 5.  
(a) Show that  $R$  is an equivalence relation. [A] [6]  
(b) Find all distinct equivalence classes.
21. (a) Solve the following system of equations using the matrix method:  
 $a + b + c = 3, a + 2b + 3c = 4, a + 4b + 9c = 6$ .  
(b) If  $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$  show that  $A^2 - 5A + 7I = 0$ , where  $I$  is the identity matrix of order 2. [A] [8]
22. Solve the following system of equations using the Cramer’s rule:  
 $2a + 3b = 4, 3a + 2b = -4$ . [A] [8]