



65121

**I Semester B.C.A. Degree Examination, April/May 2023
(CBCS Scheme – Repeaters) (2018 – 19 Onwards)**

COMPUTER APPLICATION

BCA-103T : Problem Solving Techniques Using C



Time : 3 Hours

Max. Marks : 70

Instruction : Answer all the Sections.

SECTION – A

I. Answer **any 10** questions, **each** question carries **2** marks. **(10×2=20)**

- 1) Why C is called a middle level language ?
- 2) What is algorithm ?
- 3) What are language translators ?
- 4) What is the purpose of getchar () and putchar() function ?
- 5) What is nested loop ?
- 6) What is the difference between if and switch statement ?
- 7) What is static variables ? Explain it.
- 8) Define a structure with an example.
- 9) What is enumerated data types ? Give example.
- 10) What is a pointer ?
- 11) Mention different file opening modes.
- 12) What is command line arguments ?

SECTION – B

II. Answer **any 5** questions, **each** question carries **10** marks. **(5×10=50)**

- 13) a) Write a note on classification of softwares.
b) Explain the structure of a C program with example. **(5+5)**
- 14) a) What is an operator ? Explain the relation and logical operators in C.
b) What is type conversion ? Explain its type with an example. **(5+5)**

P.T.O.



- 15) a) Explain formatted input function in C.
b) Write a C program to find largest of two numbers. (5+5)
- 16) a) Explain any two looping statements with an example.
b) Explain call by value and call by reference with an example. (5+5)
- 17) a) Explain multi-dimensional array with example.
b) Explain any five built-in string handling functions. (5+5)
- 18) a) Write a note on storage Classes.
b) Difference between structure and union. (5+5)
- 19) a) Explain how pointer arithmetic can be performed.
b) Write a note on memory allocation functions. (5+5)
- 20) a) Explain any two macro substitution directives with an example.
b) Explain creating and implementing user defined header file. (5+5)
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65122

**I Semester B.C.A. Degree Examination, April/May 2023
(CBCS) (Repeaters)**



**COMPUTER SCIENCE – V
BCA104T : Digital Electronics**

Time : 3 Hours

Max. Marks : 70

Instruction : Answer **all** Sections.

SECTION – A

I. Answer **any ten** questions. **Each** question carries **two** marks. **(10×2=20)**

- 1) State Kirchhoff's current law.
- 2) Define cycle and periodic time with respect to AC wave form.
- 3) What is RMS value ?
- 4) Define frequency.
- 5) What is semiconductor ?
- 6) Define energy band.
- 7) Find 2's complement of 111011.
- 8) Write truth table and circuit of NOT gate.
- 9) What is sequential circuit ?
- 10) Convert binary number 110101 to gray.
- 11) What are the applications of flipflop ?
- 12) What are the different types of shift registers ?

SECTION – B

II. Answer **any five** questions. **Each** question carries **ten** marks. **(5×10=50)**

- 13) a) Explain Super position theorem. **5**
b) Explain forward bias and reverse bias. **5**
- 14) a) Explain PN junction with neat diagram. **5**
b) Write a note on TTL and CMOS. **5**

P.T.O.



- 15) a) Explain Kirchhoff's voltage law. 5
b) Compare between half wave and full wave rectifier. 5
- 16) a) State and prove Demorgan's theorem. 5
b) Subtract $(25)_{10} - (16)_{10}$ by 2's complement method. 5
- 17) a) What is universal gate ? Realize NAND is universal gate. 5
b) Write a neat diagram and explain full subtractor. 5
- 18) a) Convert $(4096.3125)_{10} = (?)_2$. 5
b) Simplify by K-map $F(ABCD) = \sum m(1,5,7,8,9,13) + \sum d(3,12)$. 5
- 19) a) With neat circuit diagram explain R-S flipflop. 5
b) Explain De-multiplexer with neat diagram. 5
- 20) a) Explain SISO register. 5
b) Write a note on application of shift register. 5
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65123

First Semester B.C.A. Degree Examination, April/May 2023
(CBCS) (Repeaters)

COMPUTER SCIENCE (Paper – I)
Discrete Mathematics

Time : 3 Hours

Max. Marks : 100

Instruction : Answer *all* Sections.

SECTION – A

Answer **any ten** of the following :

(10×2=20)

1. If $A = \{2, 3, 4, 5\}$ and $B = \{0, 1, 2, 3\}$ find $A \cap B$.
2. If $P = \{1, 2\}$ form the $P \times P \times P$.
3. Define Tautology.
4. Define square matrix with an example.
5. If $A = \begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 3 \\ 4 & -3 \end{bmatrix}$, find $A + 3B$.
6. Find the eigenvalues of the matrix $A = \begin{bmatrix} 1 & -2 \\ 3 & 0 \end{bmatrix}$.
7. Prove that $\log_b a \cdot \log_c b \cdot \log_a c = 1$.
8. Find 'n' if $2({}^nP_3) = {}^nP_5$.
9. Define a group.
10. If $\vec{a} = 3\hat{i} + 4\hat{j} + 5\hat{k}$ and $\vec{b} = \hat{i} - 4\hat{j} + 5\hat{k}$, find $|2\vec{a} + \vec{b}|$.
11. Find the distance between the points $A(2, -3)$ and $B(4, 5)$.
12. Define slope of a line.

P.T.O.



SECTION – B

Answer **any six** of the following :

(6×5=30)

13. Verify whether $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ is a tautology.
14. Prove that $\sim(p \leftrightarrow q) \equiv \sim[(p \rightarrow q) \wedge (q \rightarrow p)]$.
15. Consider $f : \mathbb{R} \rightarrow \mathbb{R}$ given by $f(x) = 4x + 5$. Prove that f is one-one and on-to.
16. Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$.
17. Write converse, inverse and contrapositive of the conditional,
“If I work hard then I get a grade”.
18. Solve using Cramer's rule.
 $4x + y = 7; 3y + 4z = 5; 3z + 5x = 2$.
19. Find the eigenvalues and the eigenvectors of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$.
20. If $A = \begin{bmatrix} 3 \\ 2 \\ 3 \end{bmatrix}$ $B = \begin{bmatrix} 2 & 3 & 5 \end{bmatrix}$ prove that $(AB)' = B'A'$.

SECTION – C

Answer **any six** of the following :

(6×5=30)

21. If $\log \left(\frac{a+b}{2} \right) = \frac{1}{2}(\log a + \log b)$, show that $a = b$.
22. Prove that the set $G = \{1, -1, i, -i\}$ is a group under multiplication.
23. Prove that $H = \{0, 2, 4\}$ is a subgroup of the group $G = \{0, 1, 2, 3, 4, 5\}$ under addition modulo 6.
24. How many different words can be formed with the letters of the word “MISSISSIPPI” ?
25. If ${}^{2n}C_3 : {}^nC_2 = 44 : 3$, find n .



26. Find the value of λ for which the vectors $\vec{a} = 3\hat{i} + \hat{j} - 2\hat{k}$ and $\vec{b} = \hat{i} + \lambda\hat{j} - 3\hat{k}$ are perpendicular to each other.
27. Show that the points A(1, 2, 3), B(2, 3, 1) and C(3, 1, 2) are vertices of an equilateral triangle.
28. Find the area of the triangle whose vertices are A(1, 3, 2), B(2, -1, 1), C(-1, 2, 3).

SECTION – D

Answer **any four** of the following :

(4×5=20)

29. Show that the points (2, -3), (6, 5), (-2, 1) and (-6, -7) form a rhombus.
30. Find the area of the triangle whose vertices are (3, 4), (2, -1) and (4, -6).
31. Find the equation of the locus of the point which moves such that it is equidistant from the points (1, 2) and (-2, 3).
32. Show that the line joining the points (2, -3) and (-5, 1) is parallel to the line joining the points (7, -1) and (0, 3).
33. Find the equation of the line passing through (-2, 2) and the sum of the intercepts on the co-ordinate axes is 3.
34. Find the equations of the line for which
- a) $p = 4, \alpha = 120^\circ$.
- b) $p = 7, \alpha = 60^\circ$.
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DCCA – 101

**I Semester B.C.A. Degree Examination, February/March 2023
(NEP)**



**COMPUTER APPLICATIONS
CAC 01 : Fundamentals of Computers**

Time : 2½ Hours

Max. Marks : 60

Instruction : Answer *all* the Sections.

SECTION – A

I. Answer **any 6** questions, **each** question carries **2** marks. **(6×2=12)**

- 1) What is a compiler ?
- 2) Define Unicode.
- 3) Mention any two characteristics of computers.
- 4) What is microkernel based operating system ?
- 5) Mention any four types of operating system.
- 6) Define Data and Database.
- 7) Mention any two TCL commands.
- 8) What is URL ? Give an example.
- 9) What is web browser ? Give an example.

SECTION – B

II. Answer **any 4** questions, **each** question carries **6** marks. **(4×6=24)**

- 10) Explain the basic organization of computer with neat block diagram.
- 11) Write a note on Boolean operators with truth table.
- 12) Explain the classifications of computers based on function and operations.
- 13) Explain the functions of an operating system.
- 14) Discuss in detail database users.
- 15) Explain the structure of HTML with suitable example.

P.T.O.



SECTION – C

III. Answer **any 3** questions, **each** question carries **8** marks. (3×8=24)

- 16) a) What is flowchart ? Draw a flowchart for sum of two numbers. 4
b) Convert the following : (2+2)
i) $1AF_{(16)} = (?)_{(8)}$
ii) $(25.213)_{10} = (?)_{(2)}$
- 17) a) Write a note on types of software. 4
b) Explain any two output devices. 4
- 18) a) Write a note on Uniprogramming operating system. 4
b) Explain any two Unix commands with example. 4
- 19) Explain the DML commands with example. 8
- 20) a) Explain the logical and physical address. 4
b) Write a note on domain name system. 4
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DCCA – 102

**I Semester B.C.A. Degree Examination, February/March 2023
(NEP Scheme)**



**COMPUTER APPLICATIONS
CAC 02 : Programming in C**

Time : 2½ Hours

Max. Marks : 60

Instruction : Answer *all* the Sections.

SECTION – A

I. Answer **any 6** questions. **Each** question carries **2** marks. **(6×2=12)**

- 1) What is C token ? Mention its types.
- 2) Write the memory size of char, int, float and double data types.
- 3) Write the difference between == and = operator.
- 4) What is type casting ?
- 5) What is one dimensional arrays ? Give the syntax.
- 6) Define character with an example.
- 7) What is pointer ? Give an example.
- 8) What is an actual and formal arguments ?
- 9) Define structure. Give its syntax.

SECTION – B

II. Answer **any 4** questions. **Each** question carries **6** marks. **(4×6=24)**

- 10) Explain the basic structure of C program with an example.
- 11) Explain the classification of constants.
- 12) Explain any three types of operators with an example.
- 13) Explain two dimensional arrays with syntax and example.
- 14) Mention the advantages and disadvantages of pointers.
- 15) Explain function with parameters and return type with an example.

P.T.O.



SECTION – C

III. Answer **any 3** questions. **Each** question carries **8** marks.

(3×8=24)

- | | |
|--|---|
| 16) With an example explain getchar(), putchar(), gets() and puts() functions. | 8 |
| 17) a) Explain switch case statement with syntax and example. | 6 |
| b) Differentiate between break and continue statement. | 2 |
| 18) a) Explain if_else statement with syntax and example. | 4 |
| b) Explain do_while loop with suitable program. | 4 |
| 19) Write a C program to demonstrate string functions. | 8 |
| 20) Explain the components of user defined function in detail. | 8 |
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**I Semester B.C.A. Examination, February/March 2023****(NEP Scheme)****MATHEMATICS****Mathematical Foundation**

Time : 2½ Hours

Max. Marks : 60

Instruction : Answer all the Sections.**SECTION – A**Answer **any six** of the following questions.**(6×2=12)**

1. Write the truth table for the proposition $\sim(p \wedge q)$.
2. Define a proposition. Give an example.
3. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{1, 2, 3, 4, 5\}$, $B = \{5, 6, 7, 8\}$ find A' and B' .
4. If $A = \{7, 8\}$ and $B = \{5, 4, 2\}$ find
 - i) $A \times A$
 - ii) $A \times B$.
5. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ find $3A + 4B$.
6. Define a Null matrix and give an example.
7. Find determinant of the matrix A, if $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$.
8. If $y = 3x^4 - 2x^3 + x + 8$ find $\frac{dy}{dx}$.
9. Find the value of $\lim_{x \rightarrow 1} \left(\frac{x^3 - 8}{x - 2} \right)$.



SECTION – B

Answer **any four** of the following questions.

(4×6=24)

10. Prove that $(p \leftrightarrow q) \leftrightarrow [(\sim p \vee q) \vee (\sim q \vee p)]$ is a tautology.

11. Prove that a function $f : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = 2x - 3$ is a bijective function.

12. Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{0, 3, 6\}$, find (i) $A \cup B$ (ii) $A \cap B$ (iii) $A - B$ (iv) $B - A$.

13. Find the inverse of $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$.

14. Find the Rank of the matrix $A = \begin{bmatrix} 0 & -1 & 5 \\ 2 & 4 & -6 \\ 1 & 1 & 5 \end{bmatrix}$.

15. If $y = x^3 - 6x^2 - 5x + 3$, find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1$ and $x = 2$.

SECTION – C

Answer **any three** of the following questions.

(3×8=24)

16. a) Prove that : $\sim(p \vee q) \cong \sim p \wedge \sim q$.

b) Verify whether $(p \wedge \sim q) \wedge (\sim p \vee q)$ is a contradiction or not.

17. a) Show that the relation $R = \{(1, 2), (2, 1)\}$ defined on the set $A = \{1, 2, 3\}$ is symmetric but neither reflexive nor transitive.

b) Show that the function $f : \mathbb{R} \rightarrow \mathbb{R}$ given by $f(x) = 2x$ is one-one and onto.



18. a) If $A = \begin{bmatrix} 2 & 1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$, then prove that $(A')' = A$.

b) If $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 0 \\ 1 & 5 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 0 \\ 1 & -2 \end{bmatrix}$, show that

i) $A + (B + C) = (A + B) + C$

ii) $A(BC) = (AB)C$.

19. a) Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 5 & 7 \end{bmatrix}$ by reducing to the Echelon form.

b) Find the characteristic equation of $A = \begin{bmatrix} 1 & 2 \\ 0 & 2 \end{bmatrix}$.

20. a) Find the derivative of $y = x^3$ using first principle.

b) Find the maximum value of the function $f(x) = 3x - x^2$.
