21COAC101 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

BCA FIRST SEMESTER DEGREE EXAMINATION NOVEMBER 2024

COMPUTER APPLICATIONS

Fundamentals of Computers

Duration:2 Hours **Max Marks:60**

PART A

Answer any FIVE questions: **(5×2= 10)**

1) List the generations of computer.
2) What is the function of a register in a computer system?
3) Define algorithm.
4) What is a programming language?
5) Convert the octal 345 to Decimal.
6) What is SOP? Give an example.

PART B

Answer any FIVE questions : **(5×6= 30)**

7) What are the universal gates? Explain.
8) Draw a flow chart to find the factorial of a given number.
9) Write a short note on a) plotter and b) laser printer.
10) Explain a) Idempotent law b) Identity law c) complement law in boolean algebra.
11. Write a note on joystick and light pen
12. Simplify the Boolean function: F=x'yz + xy'z' + xyz + xyz' using K map.

PART C

Answer any TWO questions : **(2×10= 20)**

13. Explain a) System software b) Application Software. Give examples.
14. Minimize the following Boolean function using sum of products (SOP):
f(a,b,c,d) = \(\sum\)m(2,6,11,12,13,14,15)
15. Convert the binary a)10010 b) 110010 c)10110 to octal and decimal.

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21COAC102 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.C.A. FIRST SEMESTER DEGREE EXAMINATION NOVEMBER 2024

COMPUTER APPLICATIONS

Programming in C

Duration:2 Hours Max Marks:60

PART A

Answer any FIVE questions: (5x2= 10)

1) What is C character set? Give an example.
2) What are bitwise operators? Write any two.
3) How do you initialize a pointer variable? Give syntax.
4) What is recursion? Give example.
5) Differentiate break and continue statements in C.
6) What is the purpose of strcpy() function? Give an example.

PART B

Answer any FIVE questions : (5x6= 30)

7) Differntiate between a) getchar() and gets() b) putchar() and puts()
8) Explain any two decision making statements in C with syntax and example.
9) How do you read elements in two dimensional array? Explain with syntax and example.
10) How do you create a structure within a structure? Explain with an example.
11) Write a C program to count occurrences of a character in a string.
12) Explain printf() and scanf() function with syntax and example.

PART C

Answer any TWO questions : (2x10= 20)

13) a) Explain the basic structure of C programming language with an example.
    b) Explain any five features of C Programming language
14) a) Explain with examples type casting
    b) Write a note on condiitional operator with example.
15) Discuss the concept of binary search with a suitable example.

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21COAC103 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.C.A. FIRST SEMESTER DEGREE EXAMINATION NOVEMBER 2024

Mathematical Foundation

Duration:2 Hours **Max Marks:60**

PART - A

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

a. Find the matrix B if $A = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$ and $A + 2B = A^2$.

b. Find the value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$ where ω is the cube root of unity.
Hint : $1 + \omega + \omega^2 = 0$.

c. Find the characteristic equation of the matrix $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$.

d. In what ratio is the line joining the points $(5, 4)$ and $(11, -16)$ is divided by the point $(2, 14)$.

e. Find the value of k if the line joining $P(2, 3)$ and $Q(5, 7)$ is perpendicular to the line joining $A(5, k)$ and $B(3, 2)$.

f. The equation of the circle is $x^2 + y^2 + 6x + 8y + 25 = 0$. Find the centre and the radius of the circle .

g. Express $15°$ in radians .

h. Evaluate $\int (3 - 2x - x^4) dx$.

PART - B

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

a. Find the adjoint of the matrix $A = \begin{bmatrix} 2 & 2 & 3 \\ 1 & -2 & 3 \\ 0 & 1 & -1 \end{bmatrix}$.

b. Solve the system of equations by using Cramer's Rule :
$x + y + z = 6$
$x - y + z = 2$
$2x + y - z = 1$

c. Solve the system of equations by using Matrix method :
$x + 2y + 3z = 14$
$3x + y + 2z = 11$
$2x + 3y + z = 11$

d. Show that $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ bc & ca & ab \end{vmatrix} = (b-c)(c-a)(a-b)$.

PART - C

3. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

a. Compute the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$.

b. Show that the matrix $A = \begin{bmatrix} 6 & -2 & 2 \\ -12 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ satisfies its characteristic equation .

c. Reduce the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 1 \\ 2 & 4 & 6 & 2 \\ 1 & 2 & 3 & 2 \end{bmatrix}$ to it's normal form and find the rank.

d. If $A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$. Show that $A^3 - 3A^2 - 7A - 11I_3 = 0$.

PART - D

4. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

a. Show that $A(-3,-4), B(2,6), C(-6,2)$ are the vertices of right angled triangle. Also find its area.

b. If the midpoints of the sides of a triangle are $(6,-1), (-1,-2)$ and $(1,-4)$. Find the co-ordinates of the vertices.

c. Find the angles of the triangle ABC where $A(-4,2), B(12,-2), C(8,6)$.

d. Find the area of $\triangle ABC$ if $A \equiv (-1,5), B \equiv (3,1)$ and $C \equiv (5,7)$. If P, Q, R are the mid-points of the sides BC, CA, AB respectively. Verify that area of $\triangle ABC = 4$(area of $\triangle PQR$).

PART - E

5. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

a. If $\sec\theta = \frac{13}{5}$, θ is acute . Find the values of the trignometric functions of θ . Find the value of $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta}$.

b. Find $\lim_{x\to 1}\left[\frac{2}{x^2-1} + \frac{1}{1-x}\right]$.

c. Let $y = (3x^2+1)(x^3+2x)$, find $\frac{dy}{dx}$.

d. Find the maximum and minimum values of the function $\frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$.

24COAC101 Reg No : .....

CHOICE BASED CREDIT SYSTEM

BCA FIRST SEMESTER DEGREE EXAMINATION NOVEMBER 2024

COMPUTER APPLICATIONS

Fundamentals of Computers

Duration: 3 Hours **Max Marks: 80**

I. Answer any FIVE of the following : **(5×2= 10 Marks)**

1. What is an LCD monitor?
2. What is a keyboard?
3. List the phases of program development cycle.
4. Define a) Online b) Offline
5. What is AND gate and its logical symbol?
6. Convert the hexa-decimal numbers 3C4 to binary.

II. Answer any FIVE of the following : **(5×6= 30 Marks)**

7. What are registers in CPU? Name five registers with their functions.
8. Explain the applications of computers.
9. Write a note on a) Application software b) System software
10. Write an algorithm to check whether the given number is
    a) odd or even b) positive or negative
11. Convert the following binary numbers to decimal.
    a) 1010110 b)10011 c)101101
12. Explain a) Idempotent law b) Identity law c) complement law in boolean algebra.

III. Answer any FOUR of the following : **(4×10= 40 Marks)**

13. Write a note on a) Supercomputer b) Mainframes c) Microcomputer
14. Explain the following printers: a) Dot Matrix b) Drum Printer
15. a) Explain the different types of programming languages
    b) Explain any five characteristics of a good programming language
16. Draw flowchart a) to find largest of three numbers b) to add two numbers.
17. Find using 1's and 2's complement a) 101010 b) 100110

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24COAC101 Reg No : .....

CHOICE BASED CREDIT SYSTEM

BCA FIRST SEMESTER DEGREE EXAMINATION NOVEMBER 2024

COMPUTER APPLICATIONS

Fundamentals of Computers

Duration: 3 Hours **Max Marks: 80**

I. Answer any FIVE of the following : **(5×2= 10 Marks)**

1. What is an LCD monitor?
2. What is a keyboard?
3. List the phases of program development cycle.
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13. Write a note on a) Supercomputer b) Mainframes c) Microcomputer
14. Explain the following printers: a) Dot Matrix b) Drum Printer
15. a) Explain the different types of programming languages
    b) Explain any five characteristics of a good programming language
16. Draw flowchart a) to find largest of three numbers b) to add two numbers.
17. Find using 1's and 2's complement a) 101010 b) 100110

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24COAC102 Reg No : .....

CHOICE BASED CREDIT SYSTEM

BCA FIRST SEMESTER DEGREE EXAMINATION NOVEMBER 2024

COMPUTER APPLICATIONS

Programming in C

Duration:3 Hours **Max Marks:80**

I. Answer any FIVE of the following : **(5×2= 10 Marks)**

1. What is the purpose of \t escape sequence?
2. What condition must be met for binary search to work on an array?
3. Write any two string handling functions in C.
4. Define a variable in C programming.
5. What are relational operators in C programming?
6. What do you mean by arrays within structures? Give examples.

II. Answer any FIVE of the following : **(5×6= 30 Marks)**

7. Explain the difference between simple if and if-else statement with an example.
8. Explain the differences between an array and a structure in terms of data type, user-defined characteristics, accessing and searching.
9. I) Describe the rules for naming variables in C. Why are these rules important?
   II) What is the role of the & operator in scanf() function? Illustrate with an example.
10. Explain the concept of nested loops in C with an example.
11. Explain any two categories of functions with example.
12. Describe the character set used in C programming. What are the different categories included?

III. Answer any FOUR of the following : **(4×10= 40 Marks)**

13. Compare and contrast the getchar and putchar functions. Provide examples to illustrate their difference and similarities.
14. Write a program in C that demonstrates the declaration, initialization, and access of a one-dimensional array. Use the program to calculate the average of numbers stored in the array.

15. Explain the concept of unions in C. Write a program to demonstrate how different members of a union share the same memory location.

16. Explain with syntax and example a) switch statement b) else if ladder.

17. a) Describe the process of declaring, defining, and calling a user-defined function in C.

    b) What is the role of return values in functions? Explain with an example.

24COAC103 Reg No : .....

CHOICE BASED CREDIT SYSTEM

BCA FIRST SEMESTER DEGREE EXAMINATION NOVEMBER 2024

COMPUTER APPLICATIONS

Mathematical Foundation

Duration:3 Hours **Max Marks:80**

I. Answer any EIGHT of the following : **(8×3= 24 Marks)**

a. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$. Find A^2

b. Show that $\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix} \cdot \begin{vmatrix} 5 & 6 \\ 7 & 8 \end{vmatrix} = 4$

c. Find the rank of the matrix: $A = \begin{bmatrix} 1 & 4 & 3 & 2 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

d. In what ratio is the line joining the points $(7, -3)$ and $(-8, 11)$ is divided by the x- axis.

e. Find the value of k if the lines $2x - ky + 5 = 0$ and $5x + y = 0$ are perpendicular.

f. Find the equation of the circle , if the centre is $(-2, -3)$ radius 1 unit.

g. Convert $\frac{5\pi^c}{6}$ into degree.

h. Evaluate $\int(\sqrt{x} - \frac{1}{2}x)dx$

i. Heights of 6 students are $163, 173, 168, 156, 162$ and $165cms$. Find the arithmetic mean.

j. The following are the number of children for 20 couples. Find the mode.
Number of children per couple: $2, 3, 6, 3, 4, 0, 5, 2, 2, 4, 3, 2, 1, 0, 4, 2, 2, 1, 1, 3$

II. Answer any EIGHT of the following : **(8×7= 56 Marks)**

a. Find the adjoint of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$

b. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$, then show that $(A+B)^2 = A^2 + B^2$. Find a and b.

c. Reduce the matrix $A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{bmatrix}$ to it's normal form and find the rank.

d. Find the characteristic equation of the matrix $A = \begin{bmatrix} 1 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

e Find the area of the triangle formed by the points $(3,-7), (7,9)$ and $(-3,3)$.

f. Find the equation of the straight line passing through $(-1,-5)$ and
(i) Parallel to $2x + 3y = 5$.
(ii) Perpendicular to $2x + 3y = 5$.

g. Show that the points $A(3,4)$ and $B(-1,4)$ are equidistant from the line $3x + y = 5$. Are A and B lie on the same side of the line ? Justify your answer.

h. Find $\frac{dy}{dx}$ of the function :
(i) $y = 8x^2 - \frac{8}{x} + \frac{10}{x^3}$
(ii) $y = \frac{4}{3}x^3 - \frac{6}{7}x^7 + 4x^{-3}$

i. If $\cot\theta = \frac{24}{7}$, θ is acute, find the values of the remaining trignometric functions of θ.

j. Find the mean, median and mode.

Income(Rs)	1000	1500	2000	2500	3000	3500	4000
No.of Persons	80	62	33	16	6	2	0

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