(01/13-II)

2353

B.C.A. (First Year)/Diploma in Computer Application EXAMINATION

(New Scheme)

PROGRAMMING FUNDAMENTAL USING C

BCA/DCA-103

Time : Three Hours *Maximum Marks :* 70

Note : Attempt any *Five* questions. All questions carry equal marks.

1. (a) What is a flowchart ? How is it better than algorithm ? Discuss various merits and demerits of flowcharting. 10

   (b) What is the difference between a linker and a loader ? 4

2. (a) Discuss in detail advantages and drawbacks of machine, assembly and high-level languages. 10

(b) What is the difference between Compiler and Interpreter ? 4

3. (a) What are various types of operators available in C ? Explain each operator by giving example ? 7

(b) Explain the input and output statements available in C. 7

4. Write short notes on the following :

(a) Compiler 5

(b) Debugger 2

(c) Assembler 2

(d) Linker and Loader. 5

5. (a) Write a C program to calculate a factorial of a number using recursion. 8

(b) Explain various types of control statements available in C. 6

6. (a) What is the difference between while loop and do-while loop ? Explain by giving example. 7

(b) What is the difference between break and continue statement ? 7

7. (a) What are arrays ? How are they defined ? Explain their use with the help of an example. 7

(b) What are local and external variables ? What do you understand by scope of a variable ? 7

8. (a) What is a pointer variable ? How is it different from other variables ? 6

(b) What is a function ? What are different methods of passing arguments to a function ? Explain in detail. 8

(b) Determine the number of triangles that can be formed by selecting from a set of 15 points out of which I are collinear.

8. Define the following with suitable examples :

(i) Composition of relations

(ii) Combinatorial arguments.

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B.C.A. (First Year)/ Diploma in Computer Application EXAMINATION

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BCA/DCA-104

MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Time : Three Hours *Maximum Marks : 70*

Note : Attempt any *Five* questions. All questions carry equal marks.

1. (a) Define identity and square matrix with suitable examples :

(b) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 4 \\ 1 & 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$. If A' denotes the transpose of the matrix A, verify that (AB)' = B'A'.

2. Find the inverse of the matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ where $ad - bc \neq 0$

3. (a) Define finite set and empty set with suitable examples.

   (b) Let $A = \{x : x^3 + 1 = 0\}$, $B = \{x : x^2 - x + 1 = 0\}$. Find $A \cap B$ when x is real and when x is not real.

4. (a) Let $R = \{1, 2, 3\}$ and $S = \{4, 5, 6\}$. Determine the Cartesian product.

   (b) Determine Finite set and Infinite set among the following :

   (i) K = {cities in India}

   (ii) L = {members of the Parliament}

   (iii) D = $\{x : x$ is a multiple of 3 and 5$\}$

5. (a) Let f, g be the functions from n to n, where n is the set of the natural numbers so that :

$$f(n) = (n + 1)$$

$$g(n) = 2n$$

Determine the composite functions :

(i) fof

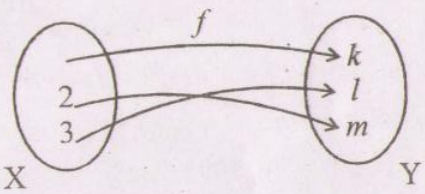
(ii) gof

(b) If A has m elements and B has n elements, how many functions are there from A to B and from B to A.

6. Define the following with respect to :

   (i) Surjective functions

   (ii) Consider $X = \{1, 2, 3\}$, $Y = \{k, l, m\}$ and $f : X \to Y$ such that $f = \{(1, k), (2, m), (3, l)\}$ as in the given figure.



Find the inverse of f.

7. (a) How many ways can be select a software development group of 1 project leader, 5 programmers and 6 data entry operators from a group of 5 project leaders, 20 programmers and 25 data entry operators.