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B212

B.C.A. EXAMINATION, 2021

(Second Semester)

(B Scheme) (Re-appear Only)

(BCA)

BCA104B

PROGRAMMING IN C

Time : 2½ Hours] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) What is Structured Programming ?

(b) Define Macro. Give example.

(c) What is a function prototype ?

(d) Differentiate between pointer to an array and an array of pointers.

(e) How is a user defined function different from library function ? Give examples of some library functions.

2. (a) Why do we need a programming language ? Explain the features of a good programming language ?

(b) How is a keyword different from and identifier ? Explain the rules to use a name as an identifier.

3. (a) Discuss two unformatted input and two unformatted output statements in C language. Quote examples to clearly define.

(b) Define a Symbolic Constant. Write a program to illustrate the use of symbolic constants in a real life application.

4. (a) Discuss the operators of C language along with their hierarchy and associativity.

(b) Differentiate between break and continue statement with example.

5. (a) Give three values, write a program to read three values from keyboard and print out the largest of them using if statement.

(b) Describe the two ways of passing parameters to a function. When do we prefer to use each of them ?

6. (a) What is a data structure ? Why is an array called a data structure ?

(b) Write a program to calculating the sum of squares of the elements of an integer array.

7. (a) What is a Pointer ? How can it be initialized ?

(b) Define a structure data type called time_struct containing three members integer hour, integer minute and integer second. Develop a program that would assign values to the individual members and display in the following form :

16 : 40 : 51

8. (a) Describe the use and limitations of functions getc and putc.

(b) Explain the facilities provide by the C preprocessor with examples.

9. (a) Write a program in C to implemented Bubbler sort algorithm.

(b) Explain, with the help of example, the automatic and external storage classes.

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20B742

B.C.A. EXAMINATION, 2021

(Second Semester)

(C Scheme) (Main Only)

(BCA)

BCA104C

DATA STRUCTURE USING C

Time : 2½ Hours] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. Define a data structure. List the different categories of data structures. What different operations can be performed on data structures ? What are the applications of different data structures ?

2. (a) List any *five* applications of data structures.

(b) Differentiate between linear and non-linear data structure. Give suitable examples.

3. (a) Consider the following multidimensional array X(–5 : 5, 3 : 33), Y(3 : 10, 1 : 15, 10 : 20). Find the length of each dimension and number of elements of X and Y.

Suppose Base (Y) = 600 and $w = 4$. Find the effective indices E1, E2, E3 and address of Y [5, 10, 15) when Y is stored in Row Major Order and when Y is stored in Column Major Order.

(b) Write an algorithm to delete an element with given location LOC from Linked List.

4. (a) Compare and contrast arrays and linked list.

(b) What do you mean by a threaded list ? Write some applications of linked lists.

5. What is a Stack ? Consider the following arithmetic expression P written in postfix notation P : 5, 6, 2, +, *, 12, 4, /, –.

Evaluate the expression P using Stacks.

6. Write an algorithm to delete an element from queue when queue is represented using LINKED LIST. Also illustrate the algorithm for some example.

7. (a) Define a binary tree. Write an iterative 'C' function for inorder traversal of a binary tree.

(b) Compare and contrast the sequential and linked representation of graphs.

8. What is a binary search tree ? What are its advantages over linked list and array ? Show stepwise procedure to construct a binary search tree from the following numbers 61, 13, 22, 72, 55, 99, 35, 45, 80, 95. Show that state of tree after deleting 55 and 35.

9. (i) Name any *three* schemes to measure the space complexity of the algorithms.

(ii) Define dynamic data structures.

(iii) What are polish notations ?

(iv) Write *two* applications of circular list.

(v) Write any *three* advantages of using DFS algorithm for graphs.

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B213

B.C.A. EXAMINATION, 2021

(Second Semester)

(B Scheme) (Re-appear Only)

(BCA)

BCA106B

MATHEMATICS-II

Time : 2½ Hours] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Find the pairs of equal sets of any, give reasons also :

$A = \{0\}$, $B = \{x : x > 15 \text{ and } x < 5\}$, $C = \{x : x - 5 = 0\}$, $D = \{x : x^2 - 25 = 0\}$, $E = \{x : x \text{ is a positive integral root of } x^2 - 2x - 15 = 0\}$.

(b) Find x and y if $(x + 3, 5) = (6, 2x + y)$.

(c) Evaluate :

$$\begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$$

(d) If $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$, $C = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$, compute $A + B - 2C$.

(e) $\lim_{x \to 2} \frac{x^2 - 5x + 6}{x^2 - 4} = ?$

(f) Differentiate $\left(x^2 + x + 1\right)^4$ w.r.t. to x.

(g) Evaluate :

$$\int e^{2x-3} dx .$$

(h) Find mean deviation from mean for the data :

13, 17, 16, 14, 11, 13, 10, 16, 11, 18, 12, 17.

2. (a) If A = {3, 5, 7, 9, 11}, B = {7, 9, 11, 13}, C = {11, 13, 15} and D = {15, 17}, then show that :

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$

(b) In a group of 65 people, 40 like cricket, N like both Cricket and Tennis. How many like Tennis only and not cricket ? How many like Tennis ? Draw Venn Diagram also.

3. (a) If A = {1, 2, 4}, B = {1, 2, 3, 4}, C = {2, 3, 5}, then verify that :

$$A \times (B \cap C) = (A \times B) \cap (A \times C)$$

(b) Define a relation on the set of natural numbers. A relation R = {(x, y) : $y = x + 5$ and $x \in$ N and $x < 4$}. Depict this relation by an arrow diagram. Also write its domain and range.

4. (a) Solve by using the Cramer's Rule :

$$5x - 7y + z = 11$$
$$6x - 8y - z = 15$$
$$3x + 2y - 6z = 7.$$

(b) Without expanding the determinant, show that :

$$\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4acb$$

5. (a) Show that the matrix $A = \begin{bmatrix} 1 & 0 & -2 \\ -2 & -1 & 2 \\ 3 & 4 & 1 \end{bmatrix}$, satisfies the equation $A^3 - A^2 - 3A - I_3 = 0$.

(b) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & 2 \\ 2 & 2 & -3 \end{bmatrix}$, find AB and BA. Are they equal ?

6. (a) If the function $f(x) = \begin{cases} Kx + 1 & x \le 5 \\ 3x - 5 & x > 5 \end{cases}$ is continuous at x = 5, find the value of K.

(b) Find $\frac{dy}{dx}$, given that $x = \frac{2t}{1+t^2}$, $y = \frac{1-t^2}{1+t^2}$.

7. (a) Evaluate :

$$\int \frac{(2x-1)}{(x-1)(x+2)(x-3)}\,dx .$$

(b) Evaluate :

$$\int_0^{\pi/2} \sqrt{1+\sin x}\,dx .$$

8. (a) Find the standard deviation of the following data :

x :	4.5	14.5	24.5	34.5	44.5	54.5	64.5
f :	1	5	12	22	17	9	4

(b) Find variance of the following data :

Marks	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of Students	3	6	13	15	14	5	4

9. (a) Find $\sqrt{5+12i}$ and express it on an argand plane.

(b) Simplify :

$$\frac{2+i}{1-i}+\frac{1}{3+i}-\frac{7i+5}{4}+\frac{(2+i)^2}{(1+i)^3}$$

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20B745

B.C.A. EXAMINATION, 2021

(Second Semester)

(C Scheme)

(BCA)

HUM202BC

Communication Skill—II

Time : 2½ Hours] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Do as directed (Attempt any *ten*) :

One-word substitution :

(i) That which cannot be read

(ii) A person who leaves his country to settle in some other country

(iii) A child whose parents are dead

(iv) Money paid for freeing forcibly kept persons

(v) One who abstains from alcoholic drinks

(vi) A place where water animals are kept

(vii) A collection of flowers

(viii) One who tests eyesight and sells spectacles

(ix) One who writes for the newspaper

(x) One who watches over students taking an examination

(xi) A man whose wife is dead

(xii) The scientific study of industrial arts

(b) Write any *five* useful English "Greeting words" (other than "Hello") and *five* words showing different "emotions".

2. (a) Distinguish the following pairs of words by making sentences (do any *seven*) :

(i) Birth, Berth

(ii) Angel, Angle

(iii) Accept, Except

(iv) Loose, Lose

(v) Meet, meat

(vi) Lesson, Lessen

(vii) Dairy, Diary

(viii) Pain, Pane

(ix) Waste, Waist

(b) Give synonyms of the following words (do any *four*) :

(i) hate

(ii) love

(iii) allow

(iv) brief

(v) confuse

(c) Give antonyms of the following words (do any *four*) :

(i) accuse

(ii) hard

(iii) blunt

(iv) belief

(v) stout

3. Write notes on any *two* of the following :

(i) Kinesic Communication

(ii) Paralinguistic Communication

(iii) Haptic Communication.

4. Write notes on any *two* of the following :

   (i) E-mail Etiquettes

   (ii) Dressing Etiquettes

   (iii) Elevator Etiquettes

5. What are the Do's and Don'ts of Presentation ?

6. Read the passage given below and answer the questions that follow it :

   An interview is a conversation with a purpose : the Interview Board aims at selecting the best ones by weeding out the average and the mediocre candidates. To impress the Interview Board you have not only to look immaculate and pleasant but also sound knolwedgeable and understanding. Awareness of current events, in-depth study of your specialised discipline and the convincing manner of answering the questions asked to you is the key to success. But most important of all these is the impression you make on the Board by your manners and disposition, and this may sometimes be the lasting one. So you must enter the interview room with due permission, wish the Chairman with due respect and then occupy the seat offered to you with grace and a soft 'Thank You, Sir'. Sit in your seat in a relaxed manner and face the Chairman with the humility and confidence of a well-groomed person. And with this, you have won the first round.

   (i) What is the aim of the Interview Board ?

   (ii) How one can impress the interview Board ?

   (iii) What may be the lasting impression on the Interview Board ?

   (iv) How well-groomed a person behave in front of the Interview Board ?

   (v) Give a suitable title of the passage.

7. What is a memorandum ? How does it differ from a social letter ?

   Or

   You have recently bought a TV from an authorised dealer of a renowned company. The TV doesn't give satisfactory performance. Write a letter to the Public Relations officer of the company asking for a replacement.

8. Write the meaning and definition of Report Writing. What are the essential requirements of good report writing ?

9. Do as directed :

(i) Make new words using the following prefix :

(a) Inter....

(b) Re....

(c) Post....

(ii) Make new words using the following suffix :

(a) ....ess

(b) ....ant

(c) ....ful

(iii) What is non-verbal communication ?

(iv) Write any *two* Business etiquettes.

(v) How the distribution of time is arranged in a presentation ?

(vi) Write any *two* guidelines for using visual aids.

(vii) Make a layout of a business letter.

(viii) Write the format of a report.

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20B744

B.C.A. EXAMINATION, 2021

(Second Semester)

(C Scheme)

(BCA)

MATHS112C

MATHEMATICS–II

Time : 2½ Hours] [*Maximum Marks : 75*

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Show that the function is discontinuous at $x = 0$:

$$f(x) = \begin{cases} \dfrac{e^{1/x} - 1}{e^{1/x} + 1}, & \text{when } x \neq 0 \\ 0, & \text{when } x = 0 \cdot \end{cases}$$

(b) Prove that the greatest integer function $[x]$ is continuous at all points except at integer points.

2. (a) Evaluate the limit (i) $\underset{x \to 2}{\text{Lt}} \dfrac{x^3 - 6x^2 + 11x - 6}{x^2 - 6x + 8}$; (ii) $\underset{x \to a}{\text{Lt}} \dfrac{x^m - a^m}{x^n - a^n}$.

(b) If $ax^2 + bx + c = 0$ and $bx^2 + cx + a = 0$, $a \neq 0$, $b \neq 0$ have a common root, prove that $a^3 + b^3 + c^3 = 3abc$.

3. (a) For any *two* events A and B, show that :

$$P(\overline{A} \cap B) = P(B) - P(A \cap B)$$

and if BCA then prove that $P(A \cap \overline{B}) = P(A) - P(B)$.

(b) A problem in statistics is given to three students A, B and C, whose chances of solving it are $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$ respectively. What is the probability that the problem will be solved if all of them try independently ?

4. A integer is chosen at random from two hundred digit. What is the probability that the integer is divisible by 6 or 8 ? From a vessel containing 3 white and 5 black balls, 4 balls are transferred into an empty vessel. From this vessel a ball is drawn and is found to be white. What is the probability that out of four balls transferred 3 are white and 1 is black ?

5. (a) What are the limits for correlation coefficient also dying the meaning of correlation ?

(b) Write a note on Spearman's Rank correlation coefficient.

6. (a) What is Regression co-efficients and write its all properties ?

(b) Obtain the equations of two lines of regression for the following data. Also obtain the estimate of x for $y = 70$:

x	:	65	66	67	67	68	69	70	72
y	:	67	68	65	68	72	72	69	71

7. (a) Prove that $(4, -1)$, $(6, 0)$, $(7, 2)$ and $(5, 1)$ are the vertices of a rhombus. Is it a square ?

(b) And the equation of the line which passes through the point (3, 4) and the sum of its intercepts on the axis is 14.

8. (a) One side of a rectangular lies on the line $4x + 7y + 5 = 0$. Two of its vertices are (–3, 1) and (1, 1). Find the equation of the other three sides.

(b) If A (–2, 1), B (2, 3) and C (–2, –4) are three points, find the angle between AB and BC.

9. (a) State Section formula.

(b) Find the angle between two lines of Regression.

(c) Show that the regression co-efficent are independent of show that two independent variables are uncorrelated.

(d) If A, B, C are mutually independent events then $A \cup B$ and C are also independent.