



**X-2571**

**B. C. A. (Part I) EXAMINATION, 2014**

Paper First

DISCRETE MATHEMATICS

Time : Three Hours ]

[ Maximum Marks : 50

Note : Attempt any two Parts from each question. All questions carry equal marks.

**Unit-I**

1. (a) Prove that each of the following statements is a tautology :

$$(p \Leftrightarrow q) \wedge (q \Leftrightarrow r) \Rightarrow (p \Leftrightarrow r)$$

- (b) Explain the following :

- (i) Universal Quantifier
- (ii) Existential Quantifier

- (c) Write the following predicate into symbolic language :

- (i) For every real number there is a greater real number.
- (ii) Every irrational number is a real number.
- (iii) The number divisible by an even number is even.
- (iv) Every teacher of a college is learned.
- (v) All students are not wise

## Unit—II

2. (a) Let B be the set of all positive divisors of 30 i. e. :  
 $B = \{1, 2, 3, 5, 6, 10, 15, 30\}$   
 and the operations  $\vee$  and  $\wedge$  on B are defined as follows :

$$a \vee b = \text{L. C. M. of } a \text{ and } b$$

$$a \wedge b = \text{H. C. F. of } a \text{ and } b$$

Prove that  $(B, \vee, \wedge)$  is a Boolean Algebra.

- (b) To prove that, for any two elements  $a, b$  of a Boolean algebra :  
 $a + b = \text{least upper bound of } a \text{ and } b$   
 i. e.,  $a + b = \text{lub } \{a, b\}$ .
- (c) Draw the logic circuit with inputs  $a, b, c$  and output  $y$  which corresponds to the Boolean expression :  
 $Y = a b' c + a b c' + a b' c'$

## Unit—III

3. (a) Show that the number of minimal Boolean function in  $n$ -variables are  $2^n$ .
- (b) Express the following functions into disjunctive normal form :

$$f(x, y, z) = (x + y + z) \cdot (xy + x' \cdot z)'$$

- (c) Design a tree-net in three variables for the flow function :

$$x \cdot y \cdot z + x' \cdot y \cdot z + x \cdot y' \cdot z + x' \cdot y' \cdot z$$

## Unit—IV

4. (a) If A, B, C are any three non-empty sets, then prove that :

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

- (b) Show that the set Q of rational numbers is countable.
- (c) Show that the mapping  $f : R_+ \rightarrow R$  defined by  $f(x) = \log x, x \in R_+$  is one-one onto where  $R_+$  is the set of positive real numbers and R is the set of real numbers.

## Unit—V

5. (a) Explain the basic concept of Graph theory.
- (b) Write short notes on the following :
- (i) Binary trees
  - (ii) Spanning trees
- (c) Write short notes on the following :
- (i) Euler circuit
  - (ii) Hamiltonian graph

Roll No. ....



**X-2572**

**B. C. A. (Part I) EXAMINATION, 2014**

Paper Second

CALCULUS AND STATISTICAL METHODS

Time : Three Hours ]

[ Maximum Marks : 50

Note : Attempt any two parts from each question. All questions carry equal marks.

1. (a) If a function  $f : A \rightarrow \mathbb{R}, A \subset \mathbb{R}$ , has a limit at a point  $a \in A$ , then show that this limit is unique.

(b) Test the continuity of the function  $f(x) = \frac{1}{1-e^{1/x}}$  at  $x = 0$ .

(c) Test for differentiability of the function :

$$f(x) = \begin{cases} x^2 \sin \frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$$

at  $x = 0$ .

2. (a) If  $x = 2 \cos t - \cos 2t$ ,  $y = 2 \sin t - \sin 2t$ , then find  $\frac{dy}{dx}$  at  $t = \frac{\pi}{4}$ .

(b) If  $y = (1+x)^x$ , then find  $\frac{dy}{dx}$ .

(c) If  $y = \sin^{-1}(3x - 4x^2)$ , then find  $\frac{dy}{dx}$ .

[ 2 ]

X-2572

3. (a) Find the equation of tangent at the point  $x = \pi/3$  of the curve  $y = 2 \sin x + \sin 2x$ .
- (b) Find the equation of normal to the curve  $9x^2 - 4y^2 = 108$  at the point (4, 3).
- (c) If the function  $f(x) = x^4 - 62x^2 + ax + 9$  is maximum at  $x = 1$ , then find the value of  $a$ .
4. (a) A bag contains 5 white, 7 red and 4 black balls a man draws 3 balls at random. Find the probability of being all white.
- (b) State and prove multiplicative law of probability.
- (c) A problem in Mathematics is given to three students A, B and C whose chances of solving it are  $\frac{1}{2}$ ,  $\frac{1}{3}$  and  $\frac{1}{4}$  respectively. If they all try to solve the problem, what is the probability that problem will be solved?
5. (a) Find average deviation about median for the following distribution :

$x$	$f$
6	4
12	7
18	9
24	18
30	15
36	10
42	5

D-104

[ 3 ]

- (b) Two lines of regression are given by  $x + 2y - 5 = 0$  and  $2x + 3y - 8 = 0$  and  $\sigma_x^2 = 12$ . Calculate the mean value of  $x$  and  $y$ , variance of  $y$  and the coefficient of correlation between  $x$  and  $y$ .
- (c) Fit a straight line to the following data regarding  $x$  as the independent variable :

$x$	$y$
0	1
1	1.8
2	3.3
3	4.5
4	6.3

X-2572

1,200

D-104



Roll No. ....



**X-2573**

**B. C. A. (Part I) EXAMINATION, 2014**

Paper Third

INTRODUCTORY ELECTRONICS

Time : Three Hours ] [ Maximum Marks : 50

Note : Attempt all the five questions. One question from each Unit is compulsory. All questions carry equal marks.

**Unit—I**

1. (a) Explain N and P type semiconductors and its conductivity property. 5
- (b) Explain DTL circuit with diagram. 5

Or

- (a) What is diode ? Explain the biasing modes of diode. 5
- (b) Explain switching characteristics of transistor. 5

**Unit—II**

2. Explain how the following components can be fabricated in a monolithic IC : 10
  - (a) Diode
  - (b) Transistor
  - (c) Resistor
  - (d) Capacitor

[ 2 ]

Or

Explain the different steps in fabrication of a monolithic IC. 10

**Unit—III**

3. What is a binary number system ? How a decimal number is converted into its equivalent binary and octal numbers ? 10

Or

What is an ASCII Code ? How decimal numbers are converted in ASCII Code ? 10

**Unit—IV**

4. (a) State and prove De Morgan's theorem. 5  
(b) Explain the K-map and its truth table. 5

Or

- (a) Describe the NAND and XOR gates with truth tables. 5  
(b) Write Basic Boolean Laws. 5

**Unit—V**

5. Write short notes on any *two* of the following : 10  
(a) Binary Adder  
(b) Shift Register  
(c) Encoder  
(d) RAM

Or

Explain the working principle of JK flip-flop with logic diagram and truth table. How will you convert a JK flip-flop into T and D flip-flop ? 10

X—2573

1200

Roll No. ....



**X-2574**

**B. C. A. (Part I) EXAMINATION, 2014**

Paper Fourth

FUNDAMENTALS OF I. T. AND O. S.

*Time : Three Hours ]*

*[ Maximum Marks : 100*

**Note :** Attempt any two parts from each question. All questions carry equal marks.

1. (a) What are the different types of computer ? Explain.  
(b) What are the different computer generations ? Compare each of them.  
(c) Draw and explain block diagram of general purpose computer.
2. (a) Draw the block diagram of microprocessor.  
(b) Discuss various data storages and their retrieval techniques.  
(c) Draw the cathode ray tube and explain its working.
3. (a) Define operating system. What are the functions of operating system ?  
(b) Differentiate between assembler, compiler and interpreter.  
(c) Write down the difference between application software and system software.
4. (a) What is DOS ? Explain internal and external commands.

[2]

(b) Explain the following commands :

(i) Cat

(ii) Ls

(iii) Who

(iv) Ps

(v) Chmod

(c) Explain the following DOS commands :

(i) FDISK

(ii) ATTRIB

(iii) APPEND

(iv) TREE

(v) RESTORE

5. (a) What are the various versions of MS windows ?  
Explain.

(b) Describe the features of windows vista.

(c) Write short notes on the following :

(i) Internet explorer 7-0

(ii) Management Tools.

X-2574

D-107

2000



Roll No.



**X-2575**

**B. C. A. (Part I) EXAMINATION, 2014**

Paper Fifth

**PROGRAMMING IN 'C' LANGUAGE**

*Time : Three Hours ]*

*[ Maximum Marks : 100*

*[ Minimum Pass Marks : 40*

**Note:** Attempt any two parts from each question. All questions carry equal marks.

1. (a) Write a note on operations in 'C'.  
(b) Explain control constructs in 'C' with suitable example.  
(c) Write a program in C to print Fibonacci series.
2. (a) Write a program in 'C' to search an element in an array.  
(b) Write a program in 'C' to find factorial of a given number using recursion.  
(c) What do you understand by call by value and call by reference ? Explain with suitable example.
3. (a) Explain Enum with example.  
(b) Differentiate structure and union with example.  
(c) Explain array of structure with example.
4. (a) What are the different memory allocation functions ? Explain with example.

[ 2 ]

- (b) Write a program in 'C' to demonstrate pointer for function.
  - (c) What do you understand by array of pointer ? Explain with example.
5. (a) Explain file accessing function with example.
- (b) Explain C preprocessor directives with an example.
  - (c) Explain file handling through command line argument with example.

Roll No.



**X-2576**

**B. C. A. (Part I) EXAMINATION, 2014**

Paper Sixth

**INTRODUCTION TO PC SOFTWARE AND INTERNET  
APPLICATIONS**

*Time : Three Hours ]*

*[ Maximum Marks : 100*

*[ Minimum Marks : 40*

**Note :** Attempt any *two* questions from each Unit. All questions carry equal marks.

**Unit—I**

1. (a) What do you understand by page orientation in MS Word ? Explain various types of orientation supported by word processors.
- (b) What is the purpose of Macros in MS Word ? Write down the steps for create an Macro, make your own assumption.
- (c) Create an Interview Call letter as the main document and create 5 records for 5 persons, using MS word. Use mail merge to create letter for 3 selected persons among the 5.

**Unit—II**

2. (a) Explain any *five* mathematical functions in excel with appropriate example.

[ 2 ]

X-2576

- (b) What do you understand by cell referencing ? Explain various types of it with example.
- (c) What is Pivot table ? What is the use of it ? Explain with an appropriate example.

**Unit—III**

- 3. (a) What is slide layout ? Create a presentation of five slides describing republic day celebration in your college.
- (b) Create an inventory table in MS Access with the following fields :
  - (i) Product Id
  - (ii) Product Name
  - (iii) Product Quantity
  - (iv) Product PriceCalculate total amount to be paid.
- (c) Describe the steps to insert, select and delete records in a MS-Access table.

**Unit—IV**

- 4. (a) Create a web page in HTML Set the background of this page to an image that you select.
- (b) What do you understand by ordered list and unordered list ? Explain how we can create in HTML.
- (c) What is web standard ? Explain the external and internal linking between pages.

D-103

[ 3 ]

**Unit—V**

- 5. (a) What do you understand by tweeing ? Explain shape tweeing with example.
- (b) What is Flash ? Write a simple step to importing sound through Flash.
- (c) What is mask layers ? Explain how to creating layers motion tweeing.

X-2576

D-103

2000



Roll No. ....



**X-2577**

**B. C. A. (Part I) EXAMINATION, 2014**

Paper Seventh

**PROGRAMMING IN VISUAL BASIC**

*Time : Three Hours ]*

*[ Maximum Marks : 50*

*[ Minimum Pass Marks : 20*

**Note :** Attempt any two parts from each question.

**Unit—I**

1. (a) Differentiate event driven programming and procedural programming.
- (b) Write a program to find even/odd number with the help of control structures.
- (c) Explain basic components of Visual Basic programming.

**Unit—II**

2. (a) Explain array as a constant pointer. List different kind of array dimensions with example.
- (b) Differentiate call-by-value and call-by-reference with example.
- (c) What is recursion ? Explain its different types.

[ 2 ]

**Unit—III**

3. (a) List the animation controls available in VB . Explain with example.
- (b) Differentiate SDI and MDI forms.
- (c) List different dialog controls with examples.

**Unit—IV**

4. (a) Write a program to read the values from files and perform sum of these values.
- (b) Explain error handling mechanisms in VB with trace records.
- (c) What are different error trapping tools ? Explain with example.

**Unit—V**

5. (a) List five commands of DDL, DML and DCL in SQL with examples.
- (b) Explain different data containers in VB with examples.
- (c) What is data report ? Explain how data reports can be created.

X-2577

2000