

BCA First Semester Examination, Dec.-2016

FOURTH PAPER

Discrete Mathematics

Paper Code :- 1741

Time Allowed: Three Hours

Maximum Marks.70

(1) No supplementary answer book will be given to any candidate. Hence the candidates should write the answers precisely in the main answer book only.

(2) All the parts of one question should be answered at one place in the answer book.

(Attempt all six questions.)

Part A and Part B are compulsory (Question No. 1 & 2) & Part C (Question No. 3, 4, 5 & 6) has internal choice.

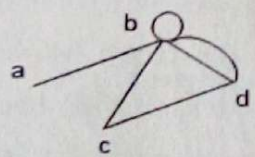
Part-A

1. Answer any 10 questions. Each question carries 1 mark.

10x1= 10

(Words limit up to 20 words each)

- a) Name any four types of codes.
- b) Find the value of  $1^2 + 2^2 + 3^2 + \dots + k^2$ .
- c) Find the decimal equivalent of the infinite repeating binary fraction :  
 $x = (0.1010101010 \dots)_2$
- d) State the De-Morgan's Law for any two sets A and B.
- e) Define a partially ordered set or a Poset.
- f) If two fair dice are rolled, find the probability of getting a doublet (Same number on both the dice)
- g) Define a Contradiction.
- h) Construct the truth table for the statement :  $\sim PVQ$
- i) Find the degree of the vertex b in the following graph :



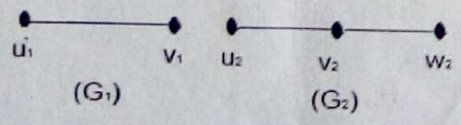
- j) Define a regular Graph.
- k) Define a Binary Tree.
- l) How many distinct permutations of the letters of the word PROPOSITION can be formed ?

2. Answer all the questions. Each question carries 5 marks.

4x5 = 20

(Words limit up to 50 words each)

- a) Find the binary form of 74.578125
- b) Using the principle of mathematical induction prove that :  
 $\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots + \frac{1}{(2n-1)(2n+1)} = \frac{n}{2n+1}$
- c) If  $G_1$  and  $G_2$  be two graphs given as :



then find their product  $G_1 \times G_2$ .

P.T.O.

d) Using truth table, prove that :  
 $(p \rightarrow q) \wedge (q \rightarrow r) \rightarrow p \rightarrow r$   
 is a tautology .

① 6  
 ② 4+2+1+5  
 ③ 3  
 ④ 2+2  
 ⑤ 5+5  
 ⑥ 2+2  
 ⑦ = 2  
 ⑧ = 37

Part-II  
 Unit-I

3. (a) Convert  $(4287.6875)_{10}$  to octal form.  
 (b) Encode the following in ASCII code : Good day !  
 OR  
 (a) For any three sets A, B and C prove that :  
 $A - (B \cap C) = (A - B) \cup (A - C)$   
 (b) Convert  $(A.C. 17)_{10}$  to binary.

Unit-II

4. (a) If  $R_1$  and  $R_2$  be two equivalence relations defined on a set A, then show that  $R_1 \cap R_2$  is also an equivalence relation on A. 5  
 (b) In how many ways can 7 girls and 4 boys dine at a round table if no two boys sit together. 5  
 OR  
 (a) Find the number of possible ways in which a student may attempt one or more questions out of 6 questions each having an alternative. 10  
 (b) If any five numbers from 1 to 8 are chosen, then show that two of them will add to 9. 10

Unit-III

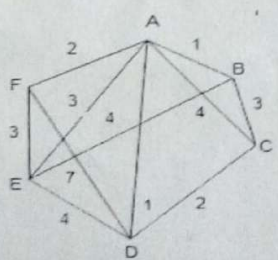
5. (a) Show that the proposition :  
 $(P \wedge Q) \wedge \sim (P \vee Q)$  is a contradiction. 5  
 (b) Define the converse, inverse and contraposition of a conditional statement  $p \rightarrow q$  and construct a truth table for them. 5  
 OR  
 (a) Find whether the propositions :  
 $p \rightarrow (q \wedge r)$  and  $(p \rightarrow q) \wedge (p \rightarrow r)$  are logically equivalent. 5  
 (b) Construct a truth table to prove that :  
 (i)  $(P \vee Q) \vee R \equiv P \vee (Q \vee R)$  and  
 (ii)  $(P \wedge Q) \wedge R \equiv P \wedge (Q \wedge R)$

Unit-IV

6. (a) Redraw the following graph to show that it is a bipartite graph :  
 5  
 (b) Prove that the number of odd vertices in a graph is always even. 5

OR

- (a) Prove that the complete graph  $K_5$  is non planar. 5  
 (b) Obtain a minimal spanning tree for the following weighted graph : 5



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**BCA First Semester Examination, Dec.-2016**

**THIRD PAPER**

**Programming in 'C'**

Paper Code:- 1731

**Time Allowed: Three Hours**

**Maximum Marks: 70**

- (1) No supplementary answer book will be given to any candidate. Hence the candidates should write the answers precisely in the main answer book only.
- (2) All the parts of one question should be answered at one place in the answer book.

(Attempt all six questions.)

**Part I (Question No. 1 & 2) is compulsory & Part II (Question No. 3, 4, 5 & 6) has internal choice.**

**Part-I**

**1. Answer any 10 questions. Each question carries 1 mark.**

**10x1= 10**

**(Words limit up to 20 words each)**

- Define structure of a 'C' program.
- Explain steps for executing a 'C' program.
- What are Identifiers ?
- What are Header Files ? Why we use them ?
- What is the difference between Do-While Loop and While Loop ?
- What is Base Address of an Array ?
- What is the difference between Actual Arguments and Formal Arguments ?
- What is the difference between Call by Value and Call by Reference ?
- What does it mean if there is no return statement in the function ?
- What is the difference between a Structure and a Union ?
- Write a statement to declare a structure with Roll No., name of the student and age.
- Name different types of data files available in 'C'.

**2. Answer all the questions. Each question carries 5 marks.**

**4x5 = 20**

**(Words limit up to 50 words each)**

- When is a switch statement better than multiple if statement ?
- What is the difference if we input a string using scan f() or gets ()? Give example of each.
- Write a program to add two integer numbers using pointers.
- Write a program to get characters from the user and convert the characters into uppercase and store it in a file.

**P.T.O.**

Part-II

Unit-I

3. Explain different types of operators available in 'C'. 10

OR

Explain all the decision making statements available in 'C' with examples. 10

Unit-II

4. What is the difference between 'break' and 'continue' statements? Give suitable examples of each. 10

OR

Write a program to find out maximum number of an array of N elements. 10

Unit-III

5. Write a program to find whether a string is palindrome or not using pointers. 10

OR

Explain all the storage classes available in 'C' with suitable examples. 10

Unit-IV

6. What is meant by Random File Access? How C implements the concept of random file access? 10

OR

Write a program using structures to count the total number of days elapsed between two given dates. 10

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① 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 9

② 4 + 3 + 3 + 3 = 13

③ 7 = 7

④ = 10

⑤ = 5

⑥ = 5

④9

**BCA First Semester Examination, Dec.-2016**

**SECOND PAPER**

**ELECTRICAL CIRCUIT & SEMICONDUCTOR PHYSICS**

Paper Code:- 1721

**Time Allowed: Three Hours**

**Maximum Marks.70**

(1) No supplementary answer book will be given to any candidate. Hence the candidates should write the answers precisely in the main answer book only.

(2) All the parts of one question should be answered at one place in the answer book.

(Attempt all six questions.)

**Part I (Question No. 1 & 2) is compulsory & Part II (Question No. 3, 4, 5 & 6) has internal choice.**

**Part-I**

**1. Answer any 10 questions. Each question carries 1 mark.**

**10x1= 10**

**(Words limit up to 20 words each)**

- a) What is the unit of Capacitance ?
- b) Define Intensity of Electric Field.
- c) What is Resistivity ?
- d) What is Curie Temperature ?
- e) What is the magnitude of magnetic induction 'B' inside the current carrying toroid ?
- f) The intensity of magnetic field at a point on the equatorial line of a small magnet is B. Keeping the distance same what will be the intensity of magnetic field if the point lies on the axis ?
- g) What is the electronic configuration of Ge ?
- h) Give any one example of impurity to make the P-type semiconductor .
- i) Define Mobility.
- j) Draw notations for NPN transistors.
- k) What is the maximum efficiency of half wave rectifier ?
- l) What is the ripple factor of full wave rectifier ?

**2. Answer all the questions. Each question carries 5 marks.**

**4x5 = 20**

**(Words limit up to 50 words each)**

- a) Discuss the effect of dielectric medium between the plates of a condenser on its capacity if space between its plates is completely filled by dielectric .
- b) Obtain an expression for the energy stored in an inductor.
- c) Explain ionic, covalent and metallic bonding .
- d) What is Zener Diode ? How is it used in voltage regulation ?

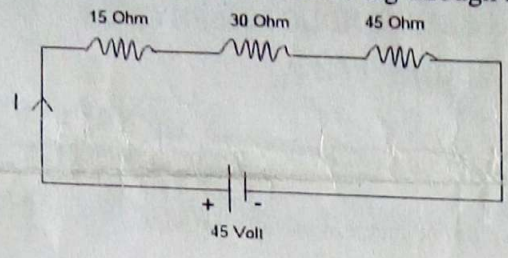
**P.T.O.**

37 + 20 = 57

Part-II

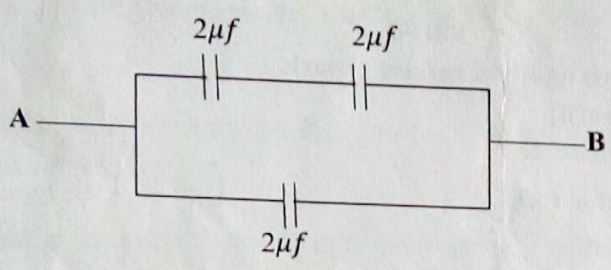
Unit-I

- 3. (a) State Kirchoff's current and voltage law . 6
- (b) Three resistance wires are connected as shown in the figure . Determine its equivalent resistance and the current flowing through it . 4



OR

- (a) Discuss the series and parallel combination of capacitors . 6
- (b) Calculate the equivalent capacitance between A and B . 4



Unit-II

- 4. (a) State Biot-Savart's Law . Determine the magnetic field at the centre of a current carrying coil using Biot-Savart's law. 6
- (b) A solenoid has 500 turns and its length is 0.5 m. If a current of 2 A flows through it , determine the magnitude of magnetic induction 'B' inside the solenoid . 4

OR

Considering the response of various materials to a magnetic field , classify these in dia , para and ferromagnetic materials . Also state the differences in the properties in these materials .

Unit-III

- 5. What is an Intrinsic Semiconductor ? Explain why the conductivity of a pure semiconductor increases with temperature . When does an intrinsic semiconductor behave as an insulator ? What is a hole in a semiconductor and how is it formed ? 10

OR

How are energy bands formed in a crystalline solid ? What are conduction band , valence band and forbidden energy gap ? Explain the classification of insulators , semiconductors and metals on the basis of these energy bands . 10

Unit-IV

- 6. What are Rectifiers ? Draw the circuit diagram of full wave rectifier and explain its working . 10

OR

Describe the working of NPN transistor . Draw circuit diagram and explain the method to obtain the characteristic curves of NPN transistor in common emitter configuration . 10

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**BCA First Semester Examination, Dec.- 2016**

**FIRST PAPER**

**Fundamentals of Computer Science**

Paper Code:- 1711

**Time Allowed: Three Hours**

**Maximum Marks.70**

*(1) No supplementary answer book will be given to any candidate. Hence the candidates should write the answers precisely in the main answer book only.*

*(2) All the parts of one question should be answered at one place in the answer book.*

**(Attempt all six questions.)**

**Part I (Question No. 1 & 2) is compulsory & Part II (Question No. 3, 4, 5 & 6) has internal choice.**

**Part-I**

**1. Answer any 10 questions. Each question carries 1 mark.**

**10x1= 10**

**(Words limit up to 20 words each)**

- a) What is Computer ?
- b) Define U.L.S.I.
- c) Define Virus and Antivirus.
- d) Differentiate between RAM and ROM.
- e) Write down any five names of Input Devices.
- f) Differentiate between Compiler and Assembler.
- g) How data is stored in secondary storage devices ?
- h) What are usages of application software ?
- i) Briefly discuss E-mail.
- j) Discuss Serial Port and Parallel Port.
- k) Discuss Soft Copy and Hard Copy.
- l) Describe Cache Memory.

**2. Answer all the questions. Each question carries 5 marks.**

**4x5 = 20**

**(Words limit up to 50 words each)**

- a) Briefly explain CRT (Cathod Ray Tube) display.
- b) Differentiate between Magnetic Disk and Magnetic Tape.
- c) Briefly explain the Algorithm and Flowchart.
- d) Discuss Computer Communication Protocol.

**P.T.O.**

**Part-II**

**Unit-I**

3. Define Generations of Computer in detail. 10

**OR**

Write short notes on (any two) :

5+5

- (i) Discuss characteristics of Computer Systems.
- (ii) Differentiate between CD and DVD.
- (iii) Types of printers.

**Unit-II**

4. What a Memory? Discuss Primary Memory in detail. 10

**OR**

Define Number System. Discuss various types of Number Systems. 10

**Unit-III**

5. Describe all generations of programming languages. 10

**OR**

Describe features of a good programming language. 10

**Unit-IV**

6. Define Operating System. Describe various types of Operating System. 10

**OR**

Write short notes on (any two) :

10

- (i) Router
- (ii) Switch
- (iii) Types of Computer Network

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1 - 10

2 - 13

3 - 10

4 - 8

5 - 5

6 - 5

51