

BCA First Semester Examination, Dec-2017

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.

$10 \times 1 = 10$

(Words limit up to 20 words each)

- a) Define Coulomb's Law.
- b) What is Electric Current?
- c) Define Conductivity.
- d) Define Bio Savrt's Law.
- e) Give two differences between Diamagnetic and Paramagnetic materials.
- f) What is Curie Temperature?
- g) What is the electronic configuration of Si?
- h) What is Mobility?
- i) Give differences between Covalent and Metallic Bonds.
- j) Define Depletion Layer ?
- k) Draw notations for PNP transistors.
- l) What is the maximum efficiency of Full Wave Rectifier?

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

$4 \times 5 = 20$

(Words limit up to 50 words each)

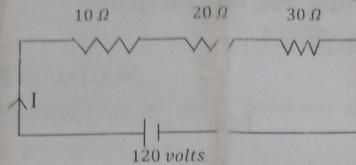
- a) Explain Kirchoff's Current and Voltage Laws.
- b) Explain diamagnetic, paramagnetic and ferromagnetic materials.
- c) Explain Energy Band Theory of crystals .
- d) What is P – N Junction? How is it formed?

P.T.O.

Part-II

Unit-I

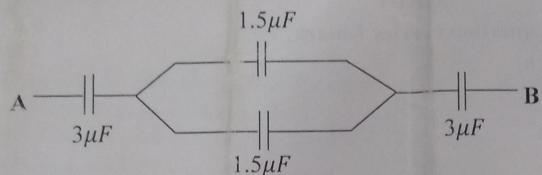
3. (a) Explain Electric Lines of Force and Gauss Law of Electrostatics. 6
(b) Three resistance wires are connected as shown in the figure. Determine its equivalent resistance and the current flowing through it. 4



OR

- (a) Discuss the series and parallel combination of resistances.
(b) Calculate the equivalent capacitance of the following circuits.

6
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) Explain Faraday's Law of Electromagnetic Induction. 4

OR

- Discuss the growth and decay of current in LR circuit. 10

5. What are Extrinsic Semi Conductors? Explain why the conductivity of a pure semiconductor increases with temperature. When does an intrinsic semi conductor behave as an insulator? What is a hole in a semiconductor and how is it formed? 10

OR

- a) Explain Conduction Band, Valence Band and Forbidden Energy Gap.
b) Explain the classification of insulators, semiconductors and metals on the basis of these bands. 10

Unit-IV

6. Giving circuit diagram, explain the working of Full-Wave Rectifier and give its special features. Determine its efficiency and calculate ripple for it. 10

OR

- Explain the working of a zener diode. How is it used for the voltage regulation? Explain NPN and PNP transistors. 10

BCA First Semester Examination, Dec-2017

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) Convert $(101)_2$ into decimal form.
- b) Convert $(3486)_{10} = ()_{16}$
- c) If $A = \{2, 4, 6, 8\}$ and $B = \{1, 2, 3, 4\}$, find $A \cap B$.
- d) In how many ways can 6 boys stand in a row?
- e) Define Equivalence Relation.
- f) Find the probability of getting odd number by throwing a dice.
- g) Construct the truth table for the statement $\sim p \wedge q$.
- h) Define Conjunction.
- i) Define Quantifier.
- j) Define Order of a Graph.
- k) Define Isolated Vertex in a Directed Graph.
- l) State a relation between vertices and edges in a tree.

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

4x5 = 20

(Words limit up to 50 words each)

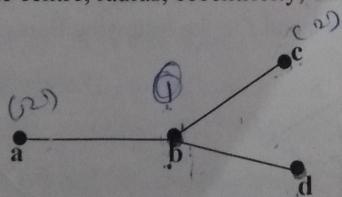
a) Convert the hexadecimal number $(A72)_{16}$ to its decimal equivalent.

b) Prove by the principle of mathematical induction that:

$$1^3 + 2^3 + \dots + n^3 = \frac{1}{4}n^2(n+1)^2$$

c) Make a truth table for the statement $(\sim p \wedge q) \vee p$.

d) Find the centre, radius, eccentricity, diameter of the vertices of the following tree:



Part-II**Unit-I**

3. (a) Show that $(38)_{10} + (69)_{10} = (1101011)_2$ 5
 (b) Represent "HEAD" in EBCDIC code. 5

OR

- (a) In a group of 500 people, 300 can speak Hindi only and 120 can speak English only.
 How many can speak both Hindi and English. 5
 (b) If A and B are any two sets then 5

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

Unit-II

4. (a) If a relation R is defined from a set $A = \{2, 3, 4, 5\}$ to the set $B = \{3, 6, 7, 10\}$
 as $(x, y) \in R \Leftrightarrow x \text{ divides } y$. Express R as a set of ordered pairs and determine the domain and range of R. Also find R^{-1} . 5
 (b) A committee of 6 teachers and 4 students is to be formed out of 10 teachers and 16 students.
 In how many ways is it possible? 5

OR

- (a) Prove by the principle of mathematical induction that:

$$\frac{1}{1 \cdot 3} + \frac{1}{3 \cdot 5} + \frac{1}{5 \cdot 7} + \cdots + \frac{1}{(2n-1)(2n+1)} = \frac{n}{2n+1}$$

- (b) If A and B are finite sets then prove

$$|A \cup B| = |A| + |B| - |A \cap B|$$

5

Unit-III

5. Construct a truth table and prove De Morgan's law 5+5
 (i) $\sim(p \wedge q) \equiv (\sim p) \vee (\sim q)$
 (ii) $\sim(p \vee q) \equiv (\sim p) \wedge (\sim q)$

OR

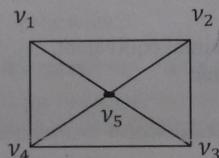
- (a) Show that the proposition:
 $(p \vee q) \wedge (\sim p \wedge \sim q)$ is a contradiction. 5

- (b) Show that:

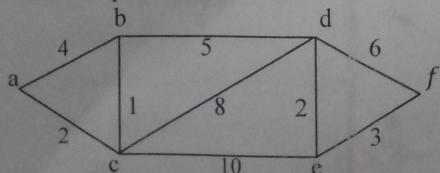
$$\sim(p \rightarrow q) \Leftrightarrow p \wedge \sim q$$

Unit-IV

6. (a) Prove that complete bipartite graph $K_{3,3}$ is non-planner. 5
 (b) The graphs G and G' shown in figure, prove that they are isomorphic 5

**OR**

- (a) Find the shortest path between the vertices a and f in the following figure: 5



- (b) Prove that number of vertices of odd degrees in a graph is always even. 5

BCA First Semester Examination, Dec.- 2017

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.

$10 \times 1 = 10$

(Words limit up to 20 words each)

- a) Write any two applications of Computer.
- b) Write the function of projector.
- c) Write the name of any two pointing devices in brief.
- d) What are the various types of RAM available?
- e) Give introduction about optical disk.
- f) What is Central Processing Unit?
- g) What is Algorithm?
- h) What are the features of good programming language?
- i) Define System Software.
- j) What do you understand by Operating System?
- k) What is E-mail?
- l) What is Network?

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

$4 \times 5 = 20$

(Words limit up to 50 words each)

- a) Explain Impact Printers and Non-Impact Printers.
- b) Solve the following conversions
 - i. Convert $(51)_{10}$ into binary
 - ii. Convert $(632)_8$ to decimal
- c) Differentiate between CD – ROM and DVD – ROM.
- d) Define Virus and Antivirus in detail.

P.T.O.

Part-II
Unit-I

3. Explain classification of computer on the basis of size, 10

OR

Explain the following devices :

5+5

- a. Digital camera
- b. Speech recognition
- c. Light pen
- d. Printer

Unit-II

4. Explain primary and secondary memory in detail. 10

OR

Define the classification of secondary storage devices in detail. 10

Unit-III

5. Explain the following application software 10

- a. MS Word
- b. MS Excel
- c. Web Browsers

OR

Define classification of programming languages. 10

Unit-IV

6. What is Internet? Explain all its uses. What are the applications of Internet? 10

OR

Explain various types of Network Topology. 10

BCA First Semester Examination, Dec.-2017

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.

$10 \times 1 = 10$

(Words limit up to 20 words each)

- a) What is 'Pseudocode'?
b) Enlist the names of date types available in C language.
c) What do you mean by 'Array'?
d) Define 'Function' in C program.
e) What is the use of 'Pointers'?
f) Name different Control Statements used in C programming.
g) What is 'Recursion'?
h) Differentiate between getch() and getchar() functions.
i) Define Strings in C.
j) Write any four names of header files.
k) Distinguish between 'Local' and 'Global' variables in C.
l) Give any two advantages of using data files.

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

$4 \times 5 = 20$

(Words limit up to 50 words each)

- a) Write a program in C to find sum of n elements of an array.
b) Discuss the basic structure of a 'C' program with the help of suitable example.
c) Write a program in C to find the area and perimeter of a circle using pointers.
d) Write a short note on 'File handling' in C.

P.T.O.

Part-II
Unit-I

3. What is 'Flowchart'? List the flowcharting rules. Draw a flowchart for finding the largest and smallest of given set of numbers in an array. 10

OR

- What are the features of a good programming language? 10

Unit-II

4. Write a program in C to sort a given array of integer numbers. 10

OR

- What are the various 'Loops' available in C language? Discuss the working of 'nested loop' with the help of suitable example. 10

Unit-III

5. What are Structures? How they are used? Also discuss that how they are different from union? 10

OR

- Write a program to demonstrate the functioning of a pointer. 10

Unit-IV

6. Create a structure containing five members: Roll no, name of student, Marks1, Marks2 and Marks3. Write a program to access those members using structure variable or pointer. 10

OR

- What are Files? Explain different types of file opening modes available in C. 10
