

MAHATMA GANDHI UNIVERSITY
KOTTAYAM

BACHELOR DEGREE COURSE
IN
COMPUTER APPLICATIONS

MODEL QUESTION PAPERS
as per
REVISED SCHEME & SYLLABUS
(Effective from 2007 Admissions onwards)

First Semester BCA Degree Examination

BCA 102 Mathematics

(2007 Admission onwards)

Time : 3 hrs

Marks: 75

Part A

(Answer any TEN questions, each question carries 3 marks)

1. Define a) conjugate of a matrix b) hermitian matrix

2. Prove that
$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc(1+1/a + 1/b+1/c)$$

3. What is a singular matrix ? Give an example.

4. Derive the partial differential equation

$z = (x + a)(y + b)$
5. Find d^2y / dx^2 when $x=a(t-\sin t)$, $y=a(1+\cos t)$

6. Differentiate $e^{\tan^{-1} x}$ with respect to $\cos^{-1} x$

7. If $y=a \cos(\log x)+b \sin(\log x)$, prove that $x^2 y_2 + x y_1 + y = 0$

8. State the Dirichlet's conditions of the Fourier series

9. Find the Laplace transform of $\sin^2 3t$

10. State the convolution theorem

11. Let $A = \begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ and $f(x) = x^2 - 3x + 4$ Find $f(A)$

12. If $L\{f(t)\} = f(s)$, then prove that $L\{e^{at}f(t)\} = f(s-a)$

PART B
(Answer all questions)

13. Examine whether the following system of equations are consistent, if so, solve
 $2x - y + 2z = 8$, $3x + 2y - 2z = -1$, $5x + 3y - 3z = 3$ (9 marks)

OR

14. Find A^{-1} where $A = \begin{pmatrix} 5 & 3 & 3 \\ 2 & 6 & -3 \\ 8 & -3 & -2 \end{pmatrix}$ and hence solve the equations

$$5x + 3y + 3z = 48, 2x + 6y - 3z = 18, 8x - 3y - 2z = 21 \quad (9 \text{ marks})$$

15. (a) Find the n^{th} derivative $\log(9x^2 - 4)$ (4 marks)
 (b) If $y = \sin^{-1}x$, prove that $(1 - x^2)y_{n+2} - (2n+1)xy_{n+1} - n^2y_n = 0$ (5 marks)

OR

16. (a) Find the n^{th} derivative of $(10x - 21)/(2x - 3)(2x + 5)$ (4 marks)
 (b) If $y = [x + \sqrt{1 + x^2}]^m$, prove that $(1 + x^2)y_{n+2} + (2n+1)xy_{n+1} + (n^2 - m^2)y_n = 0$ (5 marks)

17. Solve (a) $(x^2 - y^2 - z^2)p + 2xyz = 2xz$
 (b) $p \tan x + q \tan y = \tan z$ (9 marks)

OR

18. a) Form the partial differential equation
 $z = f(xy/z)$ (4 marks)
 b) Solve $(y + z)p + (z + x)q = x + y$ (5 marks)

19. Find a Fourier series to represent $x - x^2$ from $x = -\pi$ to $x = \pi$ (9 marks)

OR

20. Explain $f(x) = x \sin x$, $0 < x < 2\pi$, as a Fourier series (9 marks)

21. (a) Find the Laplace transform of $(1 - e^t)/t$ (4 marks)
 (b) Find the Inverse Laplace transform of $s/(s+a)^2$ (5 marks)

OR

22. Using convolution theorem, find the inverse Laplace Transforms
 (a) $1/s(s^2 + 4)$ (b) $s^2 / (s^2 + 4)^2$ (9 marks)

First Semester BCA Degree Examinations

BCA 103 PROBABILITY & STATISTICS

(2007 Admission onwards)

Time : 3 hrs

Marks: 75

PART A

(Answer any Ten questions, Each question carries 3 marks)

1. What is primary data?
2. Define Simple Random Sampling.
3. Define Pie-Diagram.
4. What is Coefficient of variation.
5. Define random experiment.
6. What is conditional Probability.
7. Define correlation.
8. What is regression Coefficient.
9. What is trend.
10. Define seasonal variation.
11. Define Median
12. What is Histogram

PART B

(Answer all questions, Each question carries 9 marks)

13. Explain different methods of sampling

OR

14. What are the different methods of collecting data?

15. Draw ogive for the following data

Class:	0-10	10-20	20-30	30-40	40-50
Frequency:	5	7	13	8	3

OR

16. Find Mean, Median and Mode

Class:	0-9	10-19	20-29	30-39
Frequency:	5	10	15	5

17. State & Prove Bayes theorem

OR

18. A problem in statistics is given to 3 students Their chances of solving this problem are $\frac{1}{3}, \frac{2}{3}, \frac{1}{3}$ respectively what is the probability that the problem will be solved.

19. Find rank, Correlation Coefficient

X : 22 25 18 25 26 22

Y : 28 29 25 28 29 30

OR

20. Find regression lines

X: 1 3 5 7 9

Y: 2 4 6 8 10

21. Explain different components of time series

OR

22. Find trend line equation & trend values

Year: 1990 91 92 93 94 95

Values: 50 52 48 55 57 60

First Semester BCA Degree Examinations

BCA 104 Introduction to Computers

(2007 Admission onwards)

Time : 3 hrs

Maximum : 75 marks

PART A

(Answer any Ten questions, Each question carries 3 marks)

1. Distinguish between hardware and software.
2. List out advantages of high level languages.
3. Why ROM is necessary for a computer system ?
4. What is OCR ?
5. What is meant by refresh rate of a monitor ?
6. What is the difference between impact and non impact printers ?
7. What is meant by an instruction cycle ?
8. What is a Cache Memory ?
9. What is booting ?
10. What is formatting ?
11. Define an operating system
12. What are Computer Viruses ?

PART B

(Answer all questions, Each question carries 9 marks)

13. With a neat sketch explain the various parts of a Computer System ?
OR
14. Explain the advantages and disadvantages of different categories of Computer Languages.
15. Explain various optical input devices
OR
16. Explain the various factors that affect the display of a monitor.
17. Explain the different types of character representation schemes used in computer
OR
18. Discuss the various factors affecting the processing speed of a computer system
19. Explain how does OS find data on a disk
OR
20. Explain how data is written into and read from a CD – ROM

21. Explain the major uses of interest

OR

22. Discuss the threats to hardware and data in a computer system

First Semester BCA Degree Examinations

BCA 105 Problem Solving and Programming in C

(2007 Admission onwards)

Time : 3 hrs

Marks: 75

PART A

(Answer any Ten questions, Each question carries 3 marks)

1. Describe the features of a good computer program.
2. What is meant by type casting?. Explain.
3. List out the precedence of arithmetic, relational and logical operators.
4. Distinguish between do ..while and while statement
5. What will be the value of k,y,z(all integer variables) after executing the following statements (i) $y+=(-y)\times 2/k++$ (2) $(k>2)?,y+=k++,z-=k--$ on the assumption that the initial value of $k=2,y=3,z=1$
6. Explain how an array differs from a structure
7. Briefly explain any three string functions available in string.h
8. What is a user defined function?. What advantages it offers in programming.
9. Write a function to swap the content of two memory locations using pointers.
10. Explain with an example the use of enum data type in C programming.
11. Discuss the working of a C program using command line arguments.
12. Explain preprocessor directive statements.

PART B

(Answer all questions, Each question carries 9 marks)

13. Distinguish algorithm and flowchart. Write an algorithm and draw a flowchart to find the number of negative numbers, zeros and positive numbers from a list of n given numbers.

OR

14. Write short note on the following
 - i) Structured programming
 - ii) Top-down programming approach
 - iii) Bottom-up programming approach
15. Explain in detail the fundamental data types in terms of key word, size in bytes, range of number it can occupy and format specifier etc

OR

16. What is a mixed mode expression?. Explain how it will be evaluated with an example program illustrating truncation effect.
17. Write a program to sort an array of integers in ascending order and to

print the position of an integer in the sorted sequence.

OR

18. Write a program to manipulate a string in the following way
- i) To count no of words on the assumption that a blank space separate two words.
 - ii) No of times a given alphabet occurs.
 - iii) Replace the first letter of all words in upper case
19. Explain the concept of array of structure. With an example illustrate the passing of a structure variable into a function.

OR

20. What is a recursive function?. Write a recursive function to find the n^{th} power of a number. Using this function write a program to sum the series $1 + x + x^2 + x^3 + \dots$ for the first 20 terms.
21. Discuss the advantages of using pointers in programming. Explain pointer arithmetic and how an array can be referenced using a pointer to the array.

OR

22. Explain any three file manipulation functions in C language.

Second semester BCA Degree Examination

202 DISCRETE MATHEMATICS

Model Question Paper

(2007 Admission onwards)

Time: 3Hrs

Maximum marks:75

PART A

Answer any **Ten** questions

1. Define a partial order relation with an example
2. Prove that the union of transitive relation is not transitive.
3. State the principle of mathematical induction
4. Write inclusion and exclusion principle for 2 sets and for three sets
5. State the first five laws of Boolean algebra
6. State the Demorgan's laws for the propositions.
7. Write the two classic rules of inference in propositional calculus
8. Define the quantifiers used in predicate calculus with examples.
- 9 Define with example (a) spanning tree (b) planar graphs
10. What is the principle of optimality.
11. What are the different types of tree searching ?
12. Prove that the graph $K_{3,3}$ is not coplanar.

(3*10=30 marks)

PART B

(Answer all Questions)

- 13(a) Define a relation R on N by $x R y = (x-y)$ is divisible by 5. Prove that R is an Equivalence relation (5 marks)
- (b) Let the functions f and g be defined by $f(x)=2x+1$ and $g(x)=x^2-2$. Compute fog and gof (4 marks)
- OR**
14. Explain the Hamming codes. (9 marks)
- 15(a) Find the number of ways that 12 students can be partitioned into three teams ,so that each team contains four students? (4 marks)
- (b) In how many ways ,a party of 4 or more can be selected from 10 persons? (5 marks)

OR

- 16(a) 5 men and 4 women are to be seated in a row. Find the number of arrangements if no two women are to sit next to each other (4 marks)
- (b) Prove that $nCr_{-1} + nCr. = (n+1)Cr$ (5 marks)
- 17(a) Check whether $(P \rightarrow Q) \rightarrow ((P \vee R) \rightarrow (Q \vee R))$ is a tautology or not (5 marks)

(b) Explain reductio ad absurdum method with an example (4 marks)

OR

18(a) Show that $R \rightarrow S$ can be derived from premises $P \rightarrow (Q \rightarrow S)$, $\neg (R \vee P)$ and Q (5 marks)

(b) Construct the truth table for $((p \rightarrow q) \wedge (q \rightarrow r)) \rightarrow (p \rightarrow r)$ (4 marks)

19(a) Explain the rules for converting predicate calculus (6 marks)

(b) Express the statement in symbolic form

“If all men are giants then everything is a man only if everything is a giant (3 marks)”

OR

20(a) Explain the resolution principle in predicate calculus (5 marks)

(b) Prove that $(\exists x) P(x) \wedge (\exists x) Q(x)$ will not imply $(\forall x)(P(x) \wedge Q(x))$ (4 marks)

21 (a) State and prove Euler’s theorem for Euler cycles (9 marks)

OR

22. Explain Warshall’s algorithm and Floyd’s algorithm (9 marks)

BCA 203 ACCOUNTING AND BUSINESS DATA PROCESSING IN COBOL

Model Question Paper

(2007 Admission onwards)

Time : 3 hrs

Marks: 75

Part A

(Answer any 10 Questions)

1. What are the different functions and objectives of accounting?.
2. What are the different types of account and explain the rule for debit and credit.
3. Distinguish between trial balance and balance sheet
4. What is a cash book?.
5. Explain Bank Reconciliation statement.
6. What are literals?.
7. Discuss the ON SIZE ERROR option
8. Explain the rule associated with MOVE statements in COBOL
9. What is meant by picture clause?.
10. Explain COMPUTE verb.
11. Discuss RENAMES clause with example
12. Explain GO TO DEPENDING ON clause in COBOL (10x3 = 30 marks)

PART B

(Answer all Questions)

13. What are the different subsidiary books?. Explain Each. (9 marks)
OR
14. From the following transactions, prepare the journal, post them into ledger accounts and balance the accounts. (9 marks)

2008 Dec 1 Raju started business with capital Rs.25000/-

2 Purchased furniture for Rs. 2500/-

3. Bought goods on credit from Mr.Venu for Rs.4000/-

14. Sold goods to Mr.Sunil for Rs 2500/-

15. Received Cash from Sunil Rs. 1500/-

18. Purchased goods for cash Rs 6000/-

27. Goods Sold for cash Rs. 4000/-

28. Rent Paid Rs. 600/-

31. Paid Mr.Venu Rs 1500/- on account

15. From the following trial balance of Mr.Agarwal as on 31st December 2003
Prepare Final Accounts.

Particulars	Debit	Credit
Buildings	5000	
Plant and Machinery	10,000	
Capital		45,000
House-hold Expense	5000	
Purchases	80,000	
Cash at bank	10,000	
Sales		1,05,000
Return	10,000	8,000
Stock	16,000	
Salaries	2,000	
Rent	800	
Taxes and Insurance	400	
Customers and Suppliers a/c	15,200	12,000
Bills Receivable and Payable	4,800	3,000
Commission received		600
Interest received		200
Investments	6,000	
Carriage	2,000	
Printing and Stationary	1,000	
Advertisement	600	
Cash in hand	5,000	
	<u>1,73,800</u>	<u>1,73,800</u>

Adjustments

- Closing Stock valued at Rs.25, 000
- Depreciate Plant and Machinery at 5% and building at 3%
- Outstanding liabilities where salary Rs.400 and Rent Rs.300
- Insurance Prepaid to the extend of Rs.150
- Make a Provision for doubtful debts at 5%
- Write off Rs.300 as bad debts.

(9 marks)

OR

16. Prepare a Cash Book from the following:-

01-05-2007	Opening Balance	36,000
02-05-2007	Paid to petty cashier	5,000
03-05-2007	Sold Goods for cash	3,500
03-05-2007	Paid to Arun	7,500
05-05-2002	Received cash from Robert	9,000
08-05-2007	Received cheque from javed	12,000
10-05-2007	Purchased goods for cash	5,000
10-05-2007	Paid rent by cheque	5,000
15-05-2007	Sold goods for cash	7,500
16-05-2007	Purchased stationary for cash	2,000
18-05-2007	Sold Goods for cash	13,500

19-05-2007	Withdrew cash for personal use	3,000	
25-05-2007	Paid Salaries	18,000	(9 marks)

17. Explain the structure of a COBOL program (9 marks)

OR

18. a) What are figurative constants. Explain with examples (5 marks)

b) Write a COBOL program to calculate the Simple Interest using the formula Simple Interest = Principal Amount * No or Year * Rate of Interest (4 marks)

19 Explain the arithmetic verbs in COBOL. (9 marks)

OR

20 An institution decided to increase the pay of employees as follows.

For pay <= Rs.5000 , 15% increase

Pay <=1500, 10% increase

Pay >1500, No increase

Write a COBOL program which accept, employee no, name and Basic Pay and to display the increased pay as per the above rule. (9 marks)

21. Describe SORT and MERGE verbs in COBOL with syntax and examples.(9 marks)

OR

22. An inventory file consists of following details: Item code, description, quantity on hand and price. Write a COBOL program to print a Reorder report contains details of item in which quantity on hand is less than 400 units. (9 marks)

BCA 204 DATA STRUCTURES

Model Question Paper

(2007 Admission onwards)

Time : 3 hrs

Marks: 75

Part A

(Answer any 10 Questions)

1. Define data structures
2. What is the complexity of algorithms?
3. What is a sparse matrix?
4. What is the use of stack in real life?
5. What is a dequeue?
6. What is garbage collection?
7. Explain dynamic data structures.
8. What is Binary Tree? Explain with example.
9. Explain inverted files
10. Explain tree traversal.
11. Explain Multi stacks
12. What is compaction?

10*3=30 marks

Part B

(Answer all questions)

13. a)What is an array? What is Bubble sort? Explain with example
or
b)Explain Binary search and Linear Search
14. a)What is a Stack? Explain the algorithm to create and delete items in stacks.
or
b)What is a queue? Explain the algorithm to create and delete items in queue
15. a)What is linked list? Explain insertion and deletion of items in linked list using pointers.
or
b)Explain circular linked list with example
16. a)What is a tree? Explain the various traversing methods in trees

or

b)What is multi threaded binary trees? Explain with example.

17 a)Explain various file organizations

or

b)What is Linked file organization? Explain inverted files and hashing.

5*9=45 marks

BCA 205 Fundamentals of Digital Systems
Model Question Paper

(2007 Admission onwards)

Time : 3 hrs

Max Marks : 75

Part A

Answer any **ten** questions.

1. Explain the concept of base of a number system. Give examples. What is the significance of binary number system in designing computer memory?
2. Explain the significance of complements in binary number system. Distinguish between 1's complement and 2's complement.
3. State and prove De-Morgan's theorem.
4. Write short note on BCD number system using the principle of BCD addition, perform $26 + 37$
5. Write short note on the concept of universal gates. Why NAND gate is called a universal gate/
6. Write short note on the Min terms and Max terms. What do you mean by SOP and POS?
7. What is a flip flop? Why flip flops are considered to be the building block of computer memory?
8. With the help of a neat diagram, explain the working of an RS flip flop.
9. Explain the concept of half adders, explain the need for full adder.
10. What is a register? Explain different methods of data input to registers.
11. Compare and contradict synchronous and asynchronous counters.
12. Explain the concept of parity in data transfer. (3x 10 = 30 marks)

Part B
Answer All Questions

13. Convert the following $(327.30)_{10} = ()_2 = ()_8 = ()_{16}$

OR

14. Using the principle of 1's or 2's complement perform

(i) $(63)_{10} - (27)_{10}$

(ii) $(36)_{10} - (68)_{10}$

(iii) $(101101)_2 - (10101)_2$

15 Simplify using K- map (i) $Y = \sum_m (0,3,7,9,11,13)$

$$(ii) Y = \sum_m (1,3,6,7,9,15) + \sum_d (2,8,12)$$

OR

16. (i) State and prove distributive property of Boolean Algebra.

(ii) Draw the circuit diagram of XOR gates. How it is implemented using NAND gates?

(iii) Explain the significance of duality theorem.

17. Explain the working of JK flip flops with a neat diagram. Explain its advantage over RS flip flop.

OR

18. (i) Write short notes on encoders and decoders.

(ii) Explain the working principle of multiplexers.

19. (i) Explain the need for registers. Explain the significance of MAR and MDR in data storage.

(ii) Explain the organization of RAM by taking 64 K 8 bit system as an example.

OR

20. (i) What are the important classification of read only memories?

(ii) Compare and contradict the working of SRAM and DRAM.

21. Explain the need for data transfer. What are the possible errors in data transfer? How hamming codes are useful in detection of errors in data transfer?

OR

22. What do you mean by A to D and D to A converters? Explain A to D converters in detail with the help of a neat diagram

(5x 9 =45 marks)