D 11994 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

B.C.A.

BCA 3C 06—THEORY OF COMPUTATION

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer atleast **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall ceiling 24.

1. What is Set and explain various ways of describing a set ?
2. What is a mealy machine ?
3. Explain relations. What are its properties ?
4. Define one-to-one function with example.
5. Define Grammar.
6. Explain parse tree in detail.
7. Define top down parsing.
8. Define Pushdown automata.
9. If $n \geq 1$, show that $1.1! + 2.2! + \ldots + n.n! = (n+1)! - 1$.
10. What are the identities for regular expression ?
11. What is a transition system ?
12. Show that $f : \mathrm{R} \to \mathrm{R} - \{1\}$ given by $f(x) = (x+1)/(x-1)$ is onto.

$(8 \times 3 = 24$ marks)

Section B

Answer atleast **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall ceiling 25.

13. Show that a connected graph G with n vertices and $n-1$ edges $(n \geq 3)$ has at least one leaf.
14. Explain Chomsky classification of languages.

Turn over

15. Explain tree and its properties.

16. Explain ambiguous grammars. If G is the grammar $S \rightarrow SbS \mid a$, check G is ambiguous or not.

17. Explain Normal Forms for Context free Grammars.

18. Prove the theorem by induction : A tree with n vertices has $(n - 1)$ edges.

19. Define Turing Machine.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
Each question carries 11 *marks.*

20. Prove that the theorem, if L is then there set accepted by NDFA, then there exists a DFA which also accepts L.

21. Define Chomsky normal form. Find a grammar in CNF equivalent to :

$S \rightarrow aAD$, $A \rightarrow aB \mid bAB$, $B \rightarrow b$, $D \rightarrow d$.

(1 × 11 = 11 marks)

15. From the following data of values of x and y, Find the regression equation of y on x :

X	2	3	4	5	6
Y :	3	5	4	8	9

16. Compare Mean, Median and Mode.

17. From the following table find the value of $x = 31.5$:

X :	31	32	33	34	35	36
Y :	2.49	2.50	2.51	2.53	2.54	2.56

18. Define the terms : (1) Mutually Exclusive Event ; (2) Exhaustive Events and (3) Dependent Events.

19. What are the merits and demerits of harmonic Mean ?

(5 × 5 = 25 marks)

Section C

Answer any **one** *questions.*
Each question carries 11 *marks.*

20. From the following table of marks obtained by two students A and B in 10 tests of 100 marks each, Find out who is more intelligent and who is more consistent.

A :	25	50	45	30	70	42	36	48	34	60
B :	10	70	50	20	95	55	42	60	48	80

21. Find the root of the equation $x - \cos x = 0$ by Bisection Method.

(1 × 11 = 11 marks)

D 11992 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

B.C.A.

BCA 3B 04—DATA STRUCTURES USING C

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer atleast **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall ceiling 24.

1. Why we use data structure ? Explain.
2. What are the various operations that can be performed on different Data Structures ? Explain.
3. What is column major order ?
4. Define sparse matrix.
5. Define circular linked list.
6. When stack is said to be underflow ? Explain.
7. List out limitation of linear queue.
8. What are binary search tree ? Explain.
9. What is an expression tree ?
10. Define binary search.
11. What is undirected graph ? Explain.
12. Explain Folding Method in hashing.

(8 × 3 = 24 marks)

Turn over

Section B

Answer atleast **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall ceiling 25.

13. Explain algorithms complexity and time-space trade off with examples.

14. Define Pattern matching algorithms. Explain with examples.

15. What is an array ? Which operations can be performed on Array ? Explain with example.

16. What is a queue ? Write a program to insert more than one element into a queue. Check all validations and use user defined functions and pass parameters.

17. Write a menu driven program to implementation (operations) of stack using linked list.

18. Which sorting techniques are an example of divide and conquer ? Write an algorithm for sort a list of number using that sorting technique.

19. What is strictly binary tree ? Explain array representation of binary tree with example.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
Each question carries 11 *marks.*

20. (a) How to represent linear array in memory ? Explain.

    (b) Write algorithms of tree traversals without recursion. Explain with example.

21 (a) Write a program to add two sparse matrices, use user defined functions and pass parameters.

    (b) Explain any five String operations with examples.

(1 × 11 = 11 marks)

D 11812 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

BCA

BCA 3C 06—THEORY OF COMPUTATION

(2017—2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Define power set.
2. Define set difference operation.
3. Define complement of a language.
4. Define recursive sets.
5. Define automata.
6. Define Regular expressions.
7. Define context free language.
8. Define Greibach Normal form.
9. Define Pushdown Automata.
10. Define Instantaneous description (PDA).

(10 × 1 = 10 marks)

Part B

Answer **all** *questions.*
Each question carries 2 *mark.*

11. Explain proof by contradiction.
12. Explain the Pigeonhole principle.

13. Differentiate Mealy and Moore machines.

14. Differentiate DFA and NFA.

15. Explain derivation tree with an example.

16. Compare NFA and PDA.

17. Define Turing machine.

18. Convert the following grammar to Chomsky Normal Form.

S $\rightarrow$ aSa | bSb | c.

(8 × 2 = 16 marks)

Part C

Answer any **six** *questions.*
Each question carries 4 *mark.*

19. Prove by induction :

$$\sum_{i=1}^{n} i^2 = \frac{n(n-1)(2n+1)}{6}, n \geq 0.$$

20. Identify the relation between languages and automata citing suitable example(s).

21. Draw a DFA to accept all strings containing odd number of 0s and even number of 1s (with 0 and 1 as terminals).

22. Draw an NFA to accept all strings that ends in *bba* (with *a* and *b* as terminals).

23. Explain ambiguity in Context Free Grammar with an example.

24. Give a regular expression for the language L = $\{a^m b^n \mid m \geq n, n \geq 1, nm \geq 3\}$.

25. Discuss closure properties of regular languages.

26. Define Push Down Automata. Differentiate between deterministic and nondeterministic PDAs. Explain acceptance of a string by a PDA.

27. Illustrate with an example how an automaton is converted to regular expression.

(6 × 4 = 24 marks)

Part D

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

28. Discuss Chomsky classification of Languages.

29. Simplify the following CFG and convert it into CNF.

$S \rightarrow AaB \mid aaB.$

$A \rightarrow \varepsilon.$

$B \rightarrow bbA \mid \varepsilon.$

30. Obtain PDA for the following languages :

(i) $L = \{ w \mid w \in (a, b)^* \text{ and } n_a(w) > n_b(w)\}$

(ii) $L = \{ww^R \mid w \in (a, b)^*\}$ (W^R implies the reverse of W).

31. Explain minimization of automata with an example.

32. Explain Turing machine model. Obtain a Turing machine to accept the language

$L = \{0^n1^n \mid n \geq 1\}.$

(3 × 10 = 30 marks)

D 11811 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

B.C.A.

BCA 3C 05—COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS

(2017—2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. List the main sources of errors in numerical computation.
2. What do you mean by interpolation ?
3. Give the formula used in Trapezoidal method.
4. Define Mean Deviation.
5. Define Geometric mean.
6. Define quartile deviation.
7. What is correlation analysis ?
8. Define random experiment.
9. What is a discrete random variable ?
10. Sketch the normal distribution.

(10 × 1 = 10)

Part B

Answer **all** *questions.*

Each question carries 2 *marks.*

11. Perform the following floating point operations :

    (i) $0.123.10^4 + 2.451.10^{10}$.

    (ii) $0.12.10^4 \times 0.45.10^{10}$.

12. Construct a forward difference table for the following data :

X	0	10	20	30
Y	0	0.15	0.28	0.46

13. Identify advantages and disadvantages of Simpson's 1/3 rule.

14. Compute mean deviation (using mean) and standard deviation of the following data :

[5, – 12, 10, 8, – 4, 2, 0].

15. Compute arithmetic mean and geometric mean of the following data :

[4, 6, 7, 8, 12].

16. Explain sample space with examples.

17. Explain principle of least square.

18. Explain probability density function.

(8 × 2 = 16)

Part C

Answer any **six** *questions.*
Each question carries 4 *marks.*

19. Explain bisection method.

20. Explain Newton Raphson method.

21. Solve the following using Simpson's 1/3 rule with $n = 2$.

22. Explain Lorenz curve.

23. Find the quartile deviation for the following data :

Age	20–24	25–29	30–34	35–39	40–44	45–49
Number of customers	10	12	8	20	7	3

24. Explain Union, intersection and complement of events with suitable examples.

25. Explain the fitting of a straight line by the method of least squares.

26. Explain the properties of Probability Density Functions.

27. Write a note on regression analysis.

(6 × 4 = 24)

Part D

Answer any **three** *questions.*
Each question carries 10 *marks.*

28. Explain false position method. Solve the following using false position method :

$f(x) = x^3 - x - 1$.

29. Explain Lagrange interpolation. Using Lagrange's interpolation formula find $f(11)$ using the following table :

X	5	7	10	12
Y	10	12	15	18

30. Explain Pearson correlation. Marks obtained by 6 students in Mathematics and Programming is given below. Calculate the Pearson Corrleation coefficient.

Mathematics :	45	40	70	30	90	50	60
Programming	56	60	80	40	70	45	65

31. Given the ranks of 8 students in Mathematics and Computer Science, calculate rank correlation :

Rank in Mathematics	1	2	3	4	5	6	7	8
Rank in Computer Science	4	6	1	3	2	5	8	7

32. Let a continuous random variable X has probability density function $f(x)$ given by :

(i) Show that $k = -6$.

(ii) Sketch $f(x)$.

(iii) Find Var (X).

(3 × 10 = 30)

D 11810 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

B.C.A.

BCA 3B 04—DATA STRUCTURE USING C

(2017—2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Write short answer on **all** *questions.*
Each question carries 1 *mark.*

1. Name a LIFO and FIFO data structure.
2. What is a complete binary tree ?
3. What is a cycle in a graph ?
4. What is a hash table ?
5. What is strcpy() and strcat() ?
6. Mention *two* advantages of using a sparse matrix.
7. What do you mean by recursion ?
8. What is a priority queue ?
9. What is Big O notation ?
10. What do you mean by height of a tree ?

(10 × 1 = 10 marks)

Part B

Write a paragraph on **all** *questions.*
Each question carries 2 *marks.*

11. Explain any *two* advantages of data structures.
12. What do you mean by time complexity of an algorithm ?
13. How can you declare a linked list in C ?
14. Explain with a diagram, circular singly linked list.

Turn over

15. Give any *four* application of queues.

16. What is an expression tree ? Give example.

17. What is linear hashing ?

18. What do you mean by a connected graph ?

(8 × 2 = 16 marks)

Part C

Write short essay on any **six** *questions.*
Each question carries 4 *marks.*

19. Explain the advantages and disadvantages of linked list over arrays.

20. Write the algorithm for searching in a singly linked list.

21. Write a C function to implement POP operation when stack is implemented as a linked list.

22. Write the algorithm to convert an infix expression to polish (prefix) notation.

23. Explain the algorithm to insert an element in a circular queue.

24. Create the binary search free using the following data elements. 43, 10, 79, 90, 12, 54, 11, 9, 50. Draw the tree in each step.

25. Write a C program to implement linear search.

26. Write the algorithm for Depth First Search.

27. Write a C program to implement selection sort.

(6 × 4 = 24 marks)

Part D

Write essays on any **three** *questions.*
Each question carries 10 *marks.*

28. Explain the concept of arrays and write algorithms for insertion and deletion in arrays.

29. Explain the insertion and deletion operation in Queues.

30. Explain the different binary tree traversals.

31. Write a C program to implement quick sort algorithm.

32. Explain binary search algorithm with an example.

(3 × 10 = 30 marks)

D 11809 **(Pages : 4)** **Name.....**

Reg. No.....

THIRD SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

B.C.A.

BCA 3C 06—OPERATIONS RESEARCH

(2014 – 2016 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. A surplus variable always have :
   (a) Positive values. (c) Negative values.
   (b) Either positive or negative. (d) None of these.
2. In simplex method, the initial basic feasible X_B is an optimum basic feasible solution, if :
   (a) All $Z_j - C_j = 0$. (c) All $Z_j - C_j \leq 0$.
   (b) All $Z_j - C_j \geq 0$. (d) Not all $Z_j - C_j = 0$.
3. The necessary and sufficient condition for the existence of feasible solution to the general transportation problem is that,
   (a) $\sum_{i=1}^{m} a_i = \sum_{j=1}^{n} b_j$. (c) $\sum_{i=1}^{m} a_i \neq \sum_{j=1}^{n} b_j$.
   (b) $\sum_{i=1}^{m} a_i > \sum_{j=1}^{n} b_j$. (d) $\sum_{i=1}^{m} a_i < \sum_{j=1}^{n} b_j$.
4. The value of the decision variables in assignment problem are,
   (a) 0. (c) 1.
   (b) Neither (a) or (b). (d) Either (*a*) or (*b*).
5. The network models have advantages in terms of project,
   (a) Planning. (c) Scheduling.
   (b) Controlling. (d) All the above.
6. The slack for an activity is equal to, :
   (a) Latest Finish- Latest start. (c) Latest Start - Earliest Start.
   (b) Earliest Finish - Earliest Start. (d) None of these.

Turn over

7. In sequencing, the time involved in moving jobs from one machine to another is,

   (a) Negligible. (c) Significant.

   (b) Positive value. (d) None of these.

8. In replacement model, if the probability of failure in the beginning of the life of an item is more, but as time passess the chances of its failure become less, then such failure is said to be :

   (a) Progressive failure. (c) Retrogressive failure.

   (b) Random failure. (d) None of these.

9. A point in time at which a order is placed to replenish goods in inventory :

   (a) Order point. (c) Order quantity.

   (b) Lead time. (d) None of these.

10. Which is not a type of inventory ?

   (a) Work in progress. (c) None of these.

   (b) Raw material. (d) Finished goods.

(10 × 1 = 10 marks)

Part B

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

11. What are the components of linear programming problem ?
12. Write with an example an unbalanced assignment problem.
13. Define total float and free float.
14. Define replacement model.
15. What are the costs involved in the inventory model ?

(5 × 2 = 10 marks)

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. Using the following primal problem prove that dual of the dual is primal

Minimize $Z = 4x_1 + 2x_2 + x_3$

subject to constraints

$$x_1 + x_2 \leq 10$$
$$3x_1 + x_2 + x_3 \geq 23$$
$$7x_1 - x_3 \geq 6 \text{ and } x_1, x_2, x_3 \geq 0.$$

17. Solve graphically the following LPP

Maximize $Z = 3x_1 + 2x_2$

subject to constraints, $x_1 - x_2 \leq 1$

$x_1 + x_2 \geq 3$ and $x_1, x_2 \geq 0$.

18. Obtain the initial basic feasible solution for the following transportation problem by North West Corner rule :

	D_1	D_2	D_3	Supply
O_1	2	7	4	5
O_2	3	3	1	8
O_3	5	4	7	7
O_4	1	6	2	14
Demand	7	9	18	

19. Distinguish PERT and CPM.

20. Define inventory model. What are the deterministic and probabilistic inventory models ?

21. Write down the procedure for solving problems of sequencing with two machines.

22. Define ABC analysis. What are the limitations of it ?

23. The cost of machine is Rs. 6,100 and its scrap value is Rs.100, the maintenance cost found from experience are :

Year	1	2	3	4	5	6	7	8
Experience	100	250	400	600	900	1200	1600	2000

When should the machine be replaced ?

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. Solve the following LPP by simplex method.

Minimize $Z = x_1 - 3x_2 + 2x_3$

subject to constraints

$$3x_1 - x_2 + 2x_3 \leq 7$$
$$-2x_1 + 4x_2 \leq 12$$
$$-4x_1 + 3x_2 + 8x_3 \leq 10 \text{ and } x_1, x_2, x_3 \geq 0.$$

25 Obtain an initial basic feasible solution to the following TP using Vogel's approximation method :

Origin \ Destination	D_1	D_2	D_3	D_4	Availability
A	5	1	3	3	34
B	3	3	5	4	15
C	6	4	4	3	12
D	4	1	4	2	19
Requirements	21	25	17	17	

26. (i) Define assignment problem. How it will be differ from transportation problem ?
(ii) Explain a method of solving assignment problem.

27. Explain the procedure of PERT in networking.

28. What do you mean by lot size and back order ? Find the economic lot size that associates with total cost and the length of time between two orders, given that the setup cost is Rs.100 daily holding cost per unit of inventory is 5 paisa and daily demand is approximately 30 units.

29. Theutility data for a network are given below. Determine the total float, free float and independent float and identify critical path :

Activity	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Duration	2	8	10	6	3	3	7	5	2	8

30. Find the optimal replacement policy when value of money does not change with time.

31. Derive the formula for economic order quantity for the manufacturing inventory model without shortage.

(5 × 8 = 40 marks)

D 11808 **(Pages : 6)** **Name**.....

Reg. No.....

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

B.C.A.

BCA 3C 05—FINANCIAL AND MANAGEMENT ACCOUNTING

(2014—2016 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. In financial accounting, investors, banks, suppliers and government agencies are classified as :

   a) External Parties. b) Internal Parties.

   c) Environmental Parties. d) Transactional Parties.

2. Using the marginal costing method, contribution is equal to total sales revenue less _____.

   a) Fixed Costs. b) Variable Costs.

   c) Total Costs. d) Direct Labour Costs.

3. Which of the following is not a part of Master Budget ?

   a) Projected Balance Sheet. b) Capital Expenditure Budget.

   c) Operating Budgets. d) Budget Manual.

4. Which of the following is not shown in Cash Budget ?

   a) Proposed Issue of Capital. b) Loan Repayment.

   c) Interest on loan. d) Depreciation.

5. The assets held by a business which can be converted in the form of cash, without disturbing the normal operations of a business :

   a) Tangible assets. b) Intangible assets.

   c) Fixed assets. d) Current assets.

Turn over

6. ---------- can be defined as a system which intends to control the cost of each unit through prior determination of what should be the cost and then its comparison with actual cost.

a) Standard costing. b) Absorption costing.

c) Marginal costing. d) None of the above.

7. The first step of accountancy is :

a) Journal Entry. b) Ledger Posting.

c) Balancing of Accounts. d) Trial Balance.

8. Transfer to General Reserve is a charge against :

a) Trading Account.

b) Profit and Loss Account.

c) Profit and Loss Appropriation Account.

d) Balance Sheet.

9. What is an imprest system ?

a) Records the use of a company's seal.

b) Helps to reconcile the cash book with the bank statement.

c) Helps to control petty cash.

d) Is part of computerized accounting.

10. In the context of Funds Flow Analysis, the word "funds" is used to define :

a) Net Working Capital. b) Total current assets-Total current liabilities.

c) Both (a) and (b). d) None of the above.

(10 × 1 = 10 marks)

Part B (Short Answer Questions)

Answer **all** *questions from the following.*
Each question carries 2 *marks.*

11. What do you mean by Profit and Loss account ?

12. Explain the advantages of Double Entry System ?

13. What is Trend Analysis ?

14. What do you mean by solvency ratio ?

15. What is marginal costing ?

(5 × 2 = 10 marks)

Part C (Short Essay Questions)

Answer any **five** *questions.*
Each question carries 4 marks.

16. A Ltd has a current ratio of 4.5 : 1 and liquidity ratio of 3 : 1. If the merchandise inventory is Rs. 24,000, find out the total current liabilities.

17. Following details are available :

Sales units	=	15,000
Fixed cost	=	Rs. 34,000
Sales value	=	Rs. 1,50,000
Variable cost	=	Rs. 6/unit

Find out Contribution, P/V ratio and Break-even sales.

18. Journalise the following transactions :

(i) Started business with cash Rs. 50,000, Stock Rs. 10,000.

(ii) Purchased machinery from Arun Rs. 15,000.

(iii) Goods purchased Rs. 34,500.

(iv) Sales to Raju Rs. 8,900 and Murali for cash Rs. 14,000.

(v) Sales return from Raju Rs. 500.

19. Distinguish between Fund flow statement and Cash flow statement.

20. A company has capital of Rs. 10, 00,000, its turnover is 3 times the capital and the margin on sales is 6 %. What is the return on investment ?

21. The bank balance of a business firm has increased during the last financial year by Rs. 1,50,000. During the same period it issued shares of Rs. 2,00,000 and redeemed debentures of Rs. 1,50,000. It purchased fixed assets for Rs. 40,000 and charged depreciation of Rs. 20,000. The working capital of the firm, other than bank balance, increased by Rs. 1,15,000 during the period. Calculate the profit of the firm for the year.

22. A chemical company has net sales of Rs. 50 lakhs, cash expenses (including taxes) of Rs. 35 lakhs and depreciation expenses of Rs. 5 lakhs. If debtors decrease over the period by Rs. 6 lakhs, what is its cash from operations ?

23. Classify the different Material Cost Variance under the standard costing.

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. On April 1, 2017, Hassan Sajjad Store Cash Book showed debit balances of Cash Rs. 1,550 and Bank Rs. 13,575. During the month of April following business was transacted. You are required to prepare Cash Book ?

April 2017

02 Purchased Office Type-Writer for Cash Rs. 750 ; Cash Sales Rs. 1,315.

07 Deposited Cash Rs. 500 to bank.

10 Received from A. Hussain a cheque for Rs. 2,550 in part payment of his account (not deposited).

16 Paid by cheque for merchandise purchased worth Rs. 1,005.

20 Deposited into Bank the cheque received from A. Hussain.

22 Received from customer a cheque for Rs. 775 in full settlement of his accounts (not deposited).

24 Sold merchandise to sweet Bros. for Rs. 1,500 who paid by cheque which was deposited into bank.

26 Paid creditor a Salman Rs. 915 by cheque.

28 Deposited into Bank the cheque of customer of worth Rs. 775 was dated 22nd April.

29 Paid wages by cash Rs. 500 and salary Rs. 1,000 by bank.

30 Drew from Bank for Office use Rs. 250 and Personal use Rs. 150.

25. From the following balance sheets of XYZ Co. Ltd., prepare funds flow statement :

Liabilities	2015	2016	*Assets*	2015	2016
Equity share capital	600	800	Goodwill	230	180
Preference capital	300	200	Land and buildings	400	340
General reserve	80	140	Plant and machinery	160	400
Profit and Loss a/c	60	96	Debtors	320	400
Proposed dividend	84	100	Stock	154	218
Creditors	110	166	Bills receivable	40	60
Bills payable	40	32	Cash	30	20
Tax provision	80	100	Bank	20	16
	1,354	1,634		1,354	1,634

Additional Information :

(i) Proposed dividend made during 2015 has been paid during 2016.

(ii) Depreciation (a) Rs. 20,000 on plant and machinery ; and (b) Rs. 40,000 on land and buildings.

(iii) Interim dividend has been paid Rs. 40,000 in 2016.

(iv) Income-tax Rs. 70,000 has been paid during 2016.

26. What are the different utilities of Financial Accounting ?

27. Discuss the following terms :

(a) Capital ; (b) Liabilities ; (c) Journal ; (d) Outstanding Expenses ; (e) Accrued Income ; and (f) Gross profit.

28. Briefly explain the different ratios under :

(a) Liquidity ; (b) Leverage ; (c) Turnover ; and (d) Profitability.

29. Explain the rules of account ? Also explain the rules regarding posting of transactions in the ledger.

30. Assuming that the cost structure and selling prices remain the same in periods I and II, find out

(a) P/V ratio ;

(b) Fixed cost ;

(c) Break-even sales ;

(d) Profit when the sales are Rs. 1,00,000 ;

(e) Sales required for earning a profit of Rs. 20,000 ; and

(f) Margin of safety at a profit of Rs. 15,000.

Period	Sales (Rs.)	Profit (Rs.)
I	1,20,000	9,000
II	1,40,000	13,000

31. The following trial balance has been taken out from the books of XYZ as on 31st December 2019 :

Particulars	Dr.	Cr.
Plant and Machinery	1,00,000	
Opening stock	60,000	
Purchases	1,60,000	
Building	1,70,000	
Carriage inward	3,400	
Carriage outward	5,000	
Wages	32,000	
Sundry debtors	1,00,000	
Salaries	24,000	
Furniture	36,000	
Trade expense	12,000	
Discount on sales	1,900	
Advertisement	5,000	
Bad debts	1,800	
Drawings	10,000	
Bills receivable	50,000	
Insurance	4,400	
Bank balances	20,000	
Sales		4,80,000
Interest received		2,000
Sundry creditors		40,000
Bank loan		1,00,000
Discount on purchases		2,000
Capital		1,71,500
...	7,95,500	7,95,500

Closing stock is valued at Rs. 90,000. Prepare the Trading and Profit and Loss account of the business for the year ended 31.12.2019.

(5 × 8 = 40 marks)

D 11807 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

B.C.A.

BCA 3B 04—DATA STRUCTURES USING C++

(2014—2016 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *the questions.*
Each question carries 1 *mark.*

1. ———— is an example of non-primitive data structures.
2. The tool for specifying the logical properties of a data is the ———— data types.
3. An array is a collection of ———— type of data elements.
4. The matrices having high ratio of zero elements are called ———— matrices.
5. ———— is called LIFO type list.
6. The minimum number of fields with each node of a doubly linked list is ————.
7. The processing of allocating the first suitable block in dynamic memory management is called ———— allocation.
8. The items can be inserted arbitrarily and from which only the smallest item can be removed is called ———— queue.
9. ———— is the minimum number of nodes in a complete binary tree with depth three.
10. ———— is the worst case time complexity of insertion sort algorithm to sort N elements.

(10 × 1 = 10 marks)

Part B

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

11. What is O-Notation in algorithm performance evaluation ?
12. What are the limitations of an array ?
13. What are the advantages of a linked list ?

Turn over

14. Define a complete graph.

15. What are hash tables in hashing process ?

(5 × 2 = 10 marks)

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. What are the characteristics of a good algorithm ?

17. What is recursion ? Which are various types of recursions ?

18. What is an array ? Differentiate between one dimensional array and two dimensional array memory allocation.

19. Develop an algorithm to evaluate a postfix expression.

20. What are the allocation strategies in memory management ? Explain.

21. Prepare a short note about the double ended queues or deques.

22. Discuss the basic terminology of the graph with example.

23. What is linear search ? Discuss its procedure and time complexity.

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. Discuss top-down and bottom-up approaches in algorithm design with example.

25. Discuss the multidimensional array representation in memory.

26. What is stack memory ? Explain various operations performed on stack with suitable algorithm.

27. What is circular linked list? Write the algorithms to insert and delete a node in this list.

28. What is circular queue ? Develop the algorithms for insertion and deletion processes.

29. Discuss any *two* graph representation methods with suitable example.

30. Explain the quick sort procedure and specify its complexity.

31. What is hashing ? Explain various hash functions.

(5 × 8 = 40 marks)

D 11806 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

B.C.A.

BCA 3B 03—DATABASE DESIGN AND RDBMS

(2014—2016 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. ———— is a collection of interrelated data and a set of programs to access those data.
2. Entities are described in a database by a set of ————.
3. Expand BCNF.
4. A transaction that completes its execution successfully is said to be ————.
5. The overall design of the database is called the database ————.
6. The ———— clause corresponds to the projection operation of the relational algebra.
7. A relational database must always have one and only one ———— key
8. When a column is defined as ————, then that column becomes a mandatory column.
9. If a user wishes to access any of the objects belonging to another user, the owner of the object will have to give permission for such access is called ————.
10. Oracle uses a method called ———— to implement concurrency control when multiple users accessing a table to manipulate its data at the same time.

(10 × 1 = 10 marks)

Part B

Answer **all** *questions.*

Each question carries 2 *marks.*

11. What is DML ?
12. What is super key ?

13. What do you mean by 1NF ?

14. Explain the syntax of ALTER TABLE command.

15. Define View.

(5 × 2 = 10 marks)

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. What is schema ? What is the difference between physical schema and logical schema ?

17. What are the functions of DBA ?

18. What is the difference between total participation and partial participation ?

19. Write a short note on BCNF.

20. What are the states of transaction ? Explain.

21. How to modify the structure of tables ?

22. Discuss the Equi joins concept with example.

23. What are database triggers ? How to apply database triggers ?

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. Explain E-R diagram with example.

25. Discuss about the basic concepts of E-R model.

26. Discuss data normal form with first three normal forms.

27. What are the desirable properties of the transaction to ensure integrity of data ?

28. Discuss the features of SQL DDL.

29. Explain the concept of grouping data from tables in SQL.

30. Discuss the security management using SQL.

31. What are the types of cursors used in SQL ? Explain.

(5 × 8 = 40 marks)