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**Bachelor of Computer Applications (BCA)**  
**(Part- I)(Semester-II) Examination - 2026**  
**DSCC - BCA - 202**  
**Discrete Mathematics**

Duration of Examination: 3 Hours

Max. Marks: 70

परीक्षा की अवधि: 3 घण्टा

पूर्णांक: 70

Instructions to the Candidates:*Note:- The question paper is divided into 02 Parts: Part - A & Part-B.***Part-A**

*Part A will consist of 10 compulsory questions. Answer to each question shall be limited upto 50 words. Each question will carry 02 marks. Total 20 Marks.*

(Marks-10×2=20)

**Part-B**

*Part B -Will consist of 10 questions. Student will have to answer 05 questions, selecting at least one questions from each unit. The answer to each question shall be limited upto 400 words. Each question carries 10 marks. Total 50 Marks.*

(Marks-5×10=50)

**Part-A**

- 1- Define a recursive set with one example.
- 2- If  $A=\{1,2,3\}$  and  $B=\{2,3,4\}$  find  $A \cup B$  and  $A \cap B$ .
- 3- Define the floor function and evaluate  $\lfloor 3.89 \rfloor$  and  $\lfloor -2.4 \rfloor$
- 4- State the Pigeonhole Principle with example.
- 5- Construct the Boolean matrix for the relation  $R=\{(1,2), (2,3)\}$  on the set  $\{1,2,3\}$ .
- 6- Determine whether the relation  $R=\{(1,1), (2,2), (1,2)\}$  is symmetric. Justify your answer.
- 7- State the Division Algorithm with example.
- 8- Test whether 130 is divisible by 5 and 13. Show calculations.
- 9- Define a bipartite graph. Give one example.
- 10- What is a spanning tree? State its properties.

**Part- B****Unit-I**

- 11- Explain the different types of sets, set operations, partition of a set and cardinality. Give suitable examples for each.  
Also evaluate
  - (a)  $A=\{1,2,3,4\}$ ,  $B=\{3,4,5\}$  find  $A-B$ ,  $A \times B$
  - (b) If  $f(x) = |x-2|$ , compute  $f(-3)$ ,  $f(0)$ ,  $f(5)$ .
- 12- Discuss polynomial, exponential, logarithmic, floor, ceiling, mod and div functions. Explain countable



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and un-countable sets also.

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13-

Explain binary relations, Boolean matrices, properties of relations and equivalence relations.

Construct the Boolean matrix for  $R = \{(1,2), (2,3), (3,1)\}$  over  $\{1,2,3\}$ .

Apply Warshall's Algorithm to find the transitive Closure.

### Unit-II

14-

Explain vacuous, trivial, direct, indirect (contrapositive and contradiction). Constructive and non-constructive proofs. Provide suitable examples for each.

15-

Explain the principle of Mathematical Induction and its second principle. Also Prove using induction  $1+3+5+\dots+(2n-1) = n^2$

16-

Define partial correctness and loop invariant. Test the partial correctness of:

(a) Linear Search Algorithm.

(b) Binary Search Algorithm.

### Unit-III

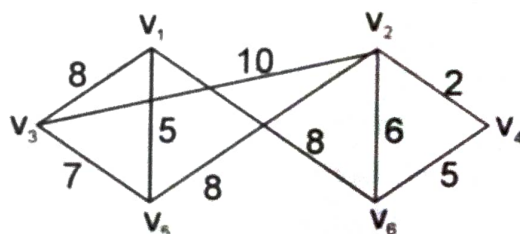
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17-

Explain graphs, directed & undirected graphs, degree of vertex, subgraph, complete graph, cycle graph, wheel graph and weighted graph with proper examples and diagrams.

18-

Write and apply Kruskal's algorithm to determine a minimum spanning tree for the weighted graph.

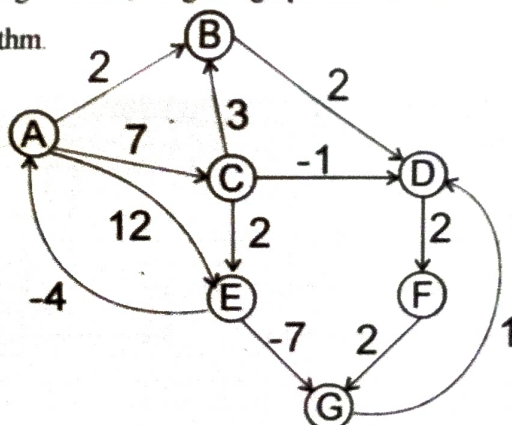


19-

Prove that a simple graph with  $n$  vertices must be connected if it has more than  $\frac{(n-1)(n-2)}{2}$  edges.

20-

Consider the following directed, weighted graph and find shortest path from source to destination using Dijkstra algorithm.





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**BCA (Part- I)(Semester-II)**  
**Examination - 2026**  
**DSCC - BCA - 203**  
**Data Structure Using C++**

Duration of Examination: 3 Hours

परीक्षा की अवधि: 3 घण्टा

Max. Marks: 70

पूर्णांक: 70

Instructions to the Candidates:*Note:- The question paper is divided into 02 Parts: Part - A & Part-B.***Part-A**

*Part A will consist of 10 compulsory questions. Answer to each question shall be limited upto 50 words. Each question will carry 02 marks. Total 20 Marks.*

**(Marks-2×10=20)****Part-B**

*Part B -Will consist of 10 questions. Student will have to answer 05 questions, selecting at least one questions from each unit. The answer to each question shall be limited upto 400 words. Each question carries 10 marks. Total 50 Marks.*

**(Marks-10×5=50)**

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**Part-A**

- 1- What is operator overloading?
- 2- What is time and space complexity?
- 3- Implement a stack using an array or a linked list and write a function to check if the stack is empty.
- 4- Define the scope resolutions.
- 5- Given a binary tree, write a function to perform an in-order traversal and print the elements.
- 6- What is the static data member?
- 7- Elaborate function prototyping with the help of an example.
- 8- Define the friend function with the help of an example.
- 9- Differentiate linear and non linear data structure.
- 10- Define the concepts of binary search tree.



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## Part- B

### Unit-I

- 11- Explain the binary tree traversing (pre order and post order) with suitable example.
- 12- Implement a function in your preferred programming language to reverse a linked list.  
Explain the algorithm's approach and analyze its time and space complexity. Provide a step-by-step explanation of the code.
- 13- Write an algorithm for postfix to infix conversion. Consider the following arithmetic expression P, written in postfix notation: P: 12, 7, 3, -, /, 2, 1, 5, +, \*, +. Translate P into infix expression using stack operations.

### Unit-II

- 14- Explain the representation of linked lists in memory with suitable example.
- 15- Write a function to detect if a linked list has a cycle. If a cycle is present, return the node where the cycle starts.
- 16- Explain depth first search and breadth first search with suitable example.
- 17- Write a complete program to create a singly linked list. Write function to Delete the first node with suitable example.

### Unit-III

- 18- Given the following inorder and preorder traversal reconstruct a binary tree.  
Inorder- D, G, B, E, A, F, I, C  
Preorder - A, B, D, E, H, C, F, I
- 19- What are queues? Write down algorithm for inserting and deleting elements from a queue implemented using arrays.
- 20- Explain the passing objects to function and discuss how to returning object with suitable example.



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**Bachelor of Computer Applications (BCA)**  
**(Part- I)(Semester-II) Examination - 2026**  
**DSCC - BCA - 204**  
**(Database Technology)**

*Duration of Examination: 3 Hours*

*परीक्षा की अवधि: 3 घण्टा*

*Max. Marks: 70*

*पूर्णांक: 70*

**Instructions to the Candidates:**

**Note:- The question paper is divided into 02 Parts: Part - A & Part-B.**

**Part-A**

**Part A** -Will consist of 10 compulsory questions. Answer to each question shall be limited upto 50 words. Each question will carry 02 marks. Total 20 Marks. **(Marks-10×2=20)**

**Part-B**

**Part B** -Will consist of 10 questions. Student will have to answer 05 questions, selecting at least one questions from each unit. The answer to each question shall be limited upto 400 words. Each question carries 10 marks. Total 50 Marks. **(Marks-5×10=50)**

**Part-A**

- 1- ✓ What is DML? Give two examples of DML commands.
- 2- ✓ What is foreign key?
- 3- ✓ Explain weak and strong entity set?
- 4- Difference between schema and instance in Data base technology.
- 5- ✓ What is the cartesian product in Relational algebra?
- 6- ✓ Define third normal form (3Nf).
- 7- What is functional dependency?
- 8- ✓ what is the use of the DISTINCT keyword in mySQL?
- 9- Write the syntax to join two tables in MySQL.
- 10- What is the use of the LIKE operator in MySQL.



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**Part- B**

**Unit-I**

- 11- Explain different type of data models. Describe advantage of relational model.
- 12- Explain all DDL and DML commands with proper syntax and examples.
- 13- Explain the components of the entity. Relationship (ER) model. Draw an ER diagram for a library management system and explain entities, attributes, keys and relationships.

**Unit-II**

- 14- Explain role of database administrator (DBA).
- 15- What is Normalization? Explain 1NF, 2NF, 3NF and BCNF with suitable example of a table.
- 16- What are relational algebra operators? Explain all relational operator with example.

**Unit-III**

- 17- Explain functional dependency in detail. Discuss the types of functional dependency.
- 18- Explain the concept of retrieving data from more than one table. Describe inner join and outer join with syntax and example in MySQL.
- 19- What is pattern matching in MySQL? Explain the use of the LIKE operator with suitable example.
- 20- Create a table named employee with fields (emp-id, name, department, salary).
- Write SQL queries for the followings:-
- (a) insert 5 records into table.
  - (b) Display detail of employees whose salary is greater than 50,000.
  - (c) Display the list of employees working in the "IT" department.
  - (d) Display the records sorted by name in ascending order.



9452

**B.Sc. / B.Com. / Hons. / BCA (Part-I) (Semester-II)**  
**Examination - 2026**  
**AEC- (General English)**  
**English and Communication**  
(Held in Aug. / Sep. 2026)

Duration of Examination: 3 Hours

परीक्षा की अवधि: 3 घण्टा

Max. Marks: 70

पूर्णांक: 70

Instructions to the Candidates:

परीक्षार्थी के लिए निर्देश:-

Note:- The question paper is divided into 02 Parts: Part - A & Part-B.

**Part-A**

Part A will consist of 10 compulsory questions. Answer to each question shall be limited upto 50 words. Each question will carry 02 marks. Total 20 Marks. (Marks-10×2=20)

**Part-B**

Part B -Will consist of 10 questions. Student will have to answer 05 questions, selecting at least one questions from each unit. The answer to each question shall be limited upto 400 words. Each question carries 10 marks. Total 50 Marks. (Marks-5×10=50)

1752

**Part-A (Compulsory)**

- 1- How do you think a disabled child should be treated?
- 2- Why did the sensei give his shoes to the author and then want them back?
- 3- What was Kuruman doing under the Champaka tree?
- 4- What was the writer's view about middle aged pen friendships?
- 5- Fill in the blanks with correct question tags.
  - (i) Sita will dance.....?
  - (ii) He wrote a poem.....? 1752
  - (iii) The bird flies in the sky.....?
  - (iv) The children are playing football.....?



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- 6- Give the correct meaning of the given proverbs
- (i) Once in a blue moon.
- (ii) Feel under the weather.
- 7- Name the correct tense <sup>1752</sup> used in the given sentences.
- (i) The sun rises in the east.
- (ii) The police caught the thief yesterday.
- 8- Rewrite the given sentences correcting the errors.
- (i) Ram and Rahul is good friends.
- (ii) She studies in an university.
- 9- Rewrite the jumbled sentences in correct manner.
- (i) to / yesterday / went / Jaipur / I
- (ii) picnic / we / for / a / next week / shall / go
- 10- What is the full form of CV and for what it is used? <sup>1752</sup>

### Part- B

#### Unit-I

- 11- What are the reasons for brain drain?
- 12- What are the main ideas expressed in the short narrative 'Between the mosque and the Temple'?
- 13- What is green revolution? How it contributes to ecological balance?
- 14- Summarize the ideas expressed in the fable 'from the Panchtantra'.

#### Unit-II

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- 15- Govt. college Nagaur recently organised a workshop on the topic 'Nasha Mukta Rajasthan'
- Write a report on the event in about 100-125 words.
- 16- Fill in the blanks with correct forms of the words :
- (i) The train.....(depart) from the station before we reached the station.



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- (ii) Our annual exam.....(start) from next week.  
(iii) People.....(Speak) English all over the world.  
(iv) Seema.....(dance) at the moment.  
(v) He.....(live) in this city since 2010. 1752  
(vi) The thief.....(catch) by the police yesterday.  
(vii) We.....(complete) the task by July, 2026.  
(viii) Did you..... (pass) the exam?  
(ix) Do the dogs.....(bark) at night?  
(x) She seldom.....(come) on time to the office.

17- Use the following proverbs and idioms in sentences to make their meaning clear :

- (i) Golden Handshake 1752  
(ii) Icing on the cake  
(iii) Piece of cake  
(iv) To add insult to injury  
(v) Last straw

18- You are Meena. Write a job application with CV to offer your services as an Assistant Professor, English to Patni college, Kishangarh, Ajmer.

Or

You are Amita, a website designer. Write a job application with CV to offer your services to Sai Infotech, New Delhi. 1752

19- You are Vivek. You purchased a washing machine last week from Gupta Electricals Jaipur, but is not working properly. Write a complaint letter to the dealer to replace it.

Or



You are Reenu. The unsanitary conditions in your locality are causing diseases for the residents. Write a complaint letter to the Municipal Commissioner to take necessary actions regarding the same.

20-

Read the passage given below and answer the questions that follows.

1752

Artificial Intelligence, commonly known as AI, refers to the ability of machines to perform tasks that normally require human intelligence. These tasks include learning from experience, recognizing patterns, solving problems and making decisions. Over the years, AI has grown rapidly and become a powerful part of modern technology. Today, AI is present in many devices around us - smartphones, computers, cars, and even home appliances. AI plays a major role in our daily lives. Voice assistants like Siri and Alexa help us search for information and complete tasks using simple voice commands. Online platforms use AI to recommend movies, music, and products based on our preferences. In education, AI tools help students understand difficult topics by providing personalized explanations and practice exercises. Teachers also use AI to check assignments and track student's progress more efficiently. However, with its many advantages, AI must be used carefully. It is important to ensure that AI is fair, transparent, and safe so that it benefits society without causing harm.

1752

- (i) What does AI refer to?
- (ii) Name two tasks that AI can perform like humans.
- (iii) Give two examples of how AI is used in our daily lives.
- (iv) How is AI helpful in the field of education?
- (v) Why is it important to use AI responsibly?

1752