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V Semester B.C.A. Degree Examination, March/April - 2022

**COMPUTER SCIENCE**

**Java Programming**

**Paper : BCA 503T**

**(CBCS-Scheme)**

**Time : 3 Hours**

**Maximum Marks : 70**

***Instruction to Candidates:***

Answer all sections.

**SECTION - A**

Answer any ten questions.

**(10×2=20)**

1. Java is platform independent. Justify.
2. Write any two characteristics of Java.
3. What do you mean by command line arguments?
4. Differentiate between vector and array.
5. What is instance variable? Give an example.
6. Why do we need synchronization in Java?
7. Define Wrapper classes. Give an example.
8. What are the different access modifiers in Java.
9. What is Java API?
10. What is meant by unchecked and checked exception in Java?
11. How Java applets differ from Java applications?
12. What is an abstract class?

**[P.T.O.]**



## SECTION - B

Answer any five question.

(5×10=50)

13. a) Explain with examples the different data types in Java. (5)  
b) Write a note on type casting. (5)
14. a) Discuss the different access specifiers used in Java. (5)  
b) Explain final variables, final method and classes with an example. (5)
15. a) What is constructor overloading? Illustrate with a program. (6)  
b) Define inheritance. Explain any 2 types of inheritance with an example. (4)
16. a) Illustrate and explain the differences between method overloading and method overriding. (6)  
b) Explain the methods of string class with examples. (4)
17. a) Explain the implementation of interface with suitable example. (5)  
b) Write a note on exception handling. (5)
18. a) What is thread? Explain the various ways of creating threads in Java with example. (5)  
b) What is a package? Mention the steps to create and use Java packages with an example. (5)
19. a) Write a note on input stream and output stream. (4)  
b) Write a program that displays the number of characters, lines and words in a text file. (6)
20. a) Write a program to calculate the areas of different geometrical figures using abstract class. (5)  
b) Explain the life cycle of an Applet. (5)
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V Semester B.C.A. Degree Examination, April - 2022

**COMPUTER SCIENCE****DATA MINING****(CBCS Scheme)****Time : 3 Hours****Maximum Marks : 100****Instructions to Candidates:**

Answer all sections.

**SECTION - A**

- I. Answer any ten questions. Each question carries 2 marks. (10×2=20)
1. What is a Data Warehouse? What is its significance?
  2. State the two differences between a database system and a data warehouse.
  3. Differentiate between the star schema and snowflake schema.
  4. State the three tiers of the 3 tier data warehouse architecture.
  5. What is data marting?
  6. What are ROLAP servers?
  7. What is data preprocessing? What is its significance?
  8. What is data generalization?
  9. What are histograms?
  10. Differentiate between classification and prediction analysis.
  11. What are genetic algorithms? What is the purpose of using these algorithms.
  12. What is clustering? State any two clustering algorithms.

**SECTION - B**

- II. Answer any five questions. Each question carries 5 marks. (5×5=25)
13. What are data cubes? Explain with an example.
  14. Explain the concept of data aggregation with an example.

**[P.T.O.]**



15. What is a Data warehouse? Discuss Data warehouse turing and testing.
16. What is data mining? Discuss its relevance and functionalities.
17. What is Data Reduction? Discuss briefly the techniques for data reduction.
18. Discuss the steps involved in analysis of attribute relevance.
19. Explain the Decision tree classifier with an example.
20. What is Association mining? What is an Association rule? Discuss association rule mining from a transaction database.

### SECTION - C

III. Answer any three questions. Each question carries 15 marks. (3×15=45)

21. a. Explain the different schemas used for Data warehouse. (8)  
b. Explain the different OLAP functions and tools. (7)
22. a. Explain the MOLAP architecture. Where are its advantages and disadvantages? (8)  
b. What is data normalization? Explain any two techniques of data normalization with appropriate examples. (7)
23. a. Explain any two descriptive statistical measures for mining large databases. (8)  
b. Explain with example any two methods of measuring dispersion of data. (7)
24. a. Discuss the issues of classification and prediction. (8)  
b. What is classification by Back propagation. Briefly explain the back propagation algorithm. (7)
25. a. Explain k-nearest classifier with an example. (8)  
b. Explain different types of data used in cluster analysis. (7)

### SECTION - D

IV. Answer any one question. Each question carries 10 marks. (1×10=10)

26. Explain the Apriori algorithm with an example.
  27. Explain Data cleaning.
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V Semester B.C.A. Degree Examination, March/April - 2022

**COMPUTER SCIENCE**

**Software Engineering**

**(CBCS Scheme)**

**Paper : BCA 502T**

**Time : 3 Hours**

**Maximum Marks : 100**

***Instructions to Candidates:***

Answer all sections.

**SECTION - A**

**I. Answer any Ten of the following.**

**(10×2=20)**

1. Define software engineering.
2. Name two types of software products.
3. What is feasibility study?
4. Mention two advantages of prototype model.
5. What is coupling? Name two types of coupling.
6. Define object and class.
7. What are OOD and OOP?
8. Difference between fault and failure.
9. Define SRS.
10. Differentiate between verification and validation.
11. Define reliability. Mention its types.
12. What is a test case?

**[P.T.O.]**



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**SECTION - B**

II. Answer any **Five** of the following.

(5×5=25)

13. Explain waterfall model with its advantages and disadvantages.
14. Describe system procurement process.
15. Explain different phases of system design process with a neat diagram.
16. Explain Evolutionary and throw - away proto typing.
17. Differentiate between black box and white box testing.
18. Write a note on reliability growth modeling.
19. Describe different requirement validation checks.
20. Write a note on software quality assurance.

**SECTION - C**

III. Answer any **Three** of the following.

(3×15=45)

21. a) Explain the spiral model with neat diagram. (8)  
b) Explain IEEE structure of SRS document. (7)
22. Describe requirement engineering process. (15)
23. a) Explain different reliability metrics.  
b) Explain different styles of user system interaction. (8+7)
24. a) State the different types of cohesion with example.  
b) Explain different levels of testing. (8+7)
25. a) Describe clean room software development process.  
b) Write a note on different types of software maintenance. (8+7)

**SECTION - D**

IV. Answer any **one** of the following.

(1×10=10)

26. Explain COCOMO model in detail.
  27. Draw a neat 1st level DFD for Banking system. Label all the flow lines and briefly explain.
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V Semester B.C.A. Degree Examination, April - 2022

COMPUTER SCIENCE

Microprocessor & Assembly Language

Paper : BCA 505 T

(CBCS Scheme)

Time : 3 Hours

Maximum Marks : 70

*Instructions to Candidates:*

Answer all sections.

**SECTION - A**

Answer any Ten questions. Each question carries Two marks.

(10×2=20)

1. What is microprocessor.
2. Define program counter and stack pointer.
3. Mention compare instructions.
4. What is mnemonic. Give example.
5. What is the difference between MOV and MVI instructions.
6. Name any 4 addressing modes of 8085.
7. Briefly explain PUSH and POP instructions.
8. What is a counter? Mention its types.
9. What are handshake signals?
10. Explain SID and SOD pins of 8085.
11. What is memory interfacing?
12. What is DMA?

**SECTION - B**

Answer any Five questions. Each carries 10 marks.

(5×10=50)

13. Explain the architecture of 8085 with a neat diagram. (10)
14. a) Explain instruction set classification based on word size. (5)  
b) Explain any 5 data transfer operations. (5)

[P.T.O.]



15. a) Write a program to subtract two 16 bit numbers. (5)  
b) Explain conditional jump instructions. (5)
16. a) Write a program to find square root of a number using look up table. (5)  
b) Explain the different types of flags. (5)
17. a) Define subroutine. Explain CALL and RET instructions. (5)  
b) Write a short note on demultiplexing of address bus in 8085. (5)
18. a) Explain the following instructions. (5)  
1. XCHG  
2. LHLD  
3. ADC M  
4. INR R  
5. DCR M  
b) Compare memory mapped I/O and peripheral I/O. (5)
19. Explain the different addressing modes. (10)
20. a) Explain the different types of buses. (5)  
b) Briefly explain error checking methods. (5)
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V Semester B.C.A. Degree Examination, March/April - 2022

COMPUTER SCIENCE

Computer Architecture

(CBCS Scheme)

Paper : BCA 503T

Time : 3 Hours

Maximum Marks : 100

**Instructions to Candidates:**

Answer all the sections.

**SECTION - A**I. Answer any **Ten** of the following.

(10×2=20)

1. Draw logical diagram of the boolean function  $F = XY' + X'Y$ .
2. Subtract 145 from 245 using 9's compliment.
3. What is BCD? give an example.
4. State any two rules of Boolean Algebra.
5. What are sequential circuits? List any two.
6. What are three control inputs for registers?
7. Define opcode & operand.
8. Explain BSA instruction.
9. List any two memory reference instructions.
10. List types of interrupts.
11. What is serial data transmission?
12. Define associatives memory.

**SECTION - B**II. Answer any **Five** of the following.

(5×5=25)

13. Explain any five basic gates with logic symbols.
14. Solve using K-map  $f(W, X, Y, Z) = \sum(0, 5, 7, 8, 11, 13, 15)$ .
15. Explain the operations of instruction cycle with flow chart.
16. Explain any five register reference instructions.
17. Write a note on hamming code.

[P.T.O.]



18. Explain  $3 \times 8$  priority encoder.
19. Explain DMA controller with block diagram.
20. Explain levels of cache memory.

### SECTION - C

III. Answer any **Three** of the following. (3×15=45)

21. a. Explain construction of full adder using NAND gates. (8)  
b. Explain different types of K-Map based on number of variables. (7)
22. Explain Design of Basic computer with flow chart. (15)
23. a. Explain memory reference instructions with control format. (10)  
b. Explain types of CPU organisations. (5)
24. a. Explain Asynchronous data transfer using parallel mode. (10)  
b. Differential between Isolated I/O and memory mapped I/O. (5)
25. a. Explain hard disk with neat diagram. (8)  
b. What is a virtual memory? Explain address space and memory space in detail. (7)

### SECTION - D

IV. Answer any **One** of the following. (1×10=10)

26. a. Explain direct and indirect address instructions. (5)  
b. Differentiate between Von-neuman and Harvard architecture (5)
  27. a. Explain input - output configuration with a neat diagram. (8)  
b. List any two conditional instructions. (2)
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V Semester B.C.A. Degree Examination, March/April - 2022

COMPUTER SCIENCE

Analysis and Design of Algorithm

Paper : BCA 504T

(CBCS Scheme)

Time : 3 Hours

Maximum Marks : 70

*Instructions to Candidates:*

Answer all sections.

## SECTION - A

I. Answer any Ten questions.

(10×2=20)

1. Define Algorithm. Mention the characteristics of algorithm.
2. Distinguish between Debugging and profiling.
3. State the different efficiency classes.
4. Define Knapsack problem.
5. What is minimum cost spanning tree?
6. Define subgraph with an example.
7. How graph can be represented using adjacency matrix? Give an example.
8. What is flow shop scheduling?
9. Define complete Binary tree with an example.
10. What is Back tracking?
11. What is Graph coloring problem?
12. Define Hamiltonian cycle.

## SECTION - B

II. Answer any Five questions.

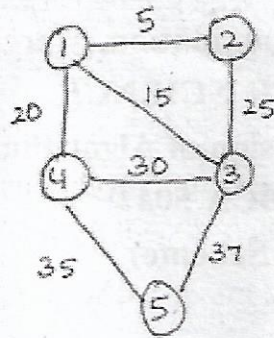
(5×10=50)

13. a. Explain time and space complexity of an algorithm with an example. (5)  
b. Explain different control structures. (5)
14. a. Write a recursive algorithm for binary search method. Derive its time complexity. (5)  
b. Trace the merge sort algorithm for the data : 40, 80, 10, 50, 30, 20, 70, 60. (5)

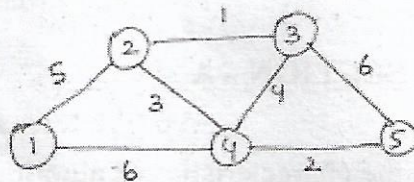
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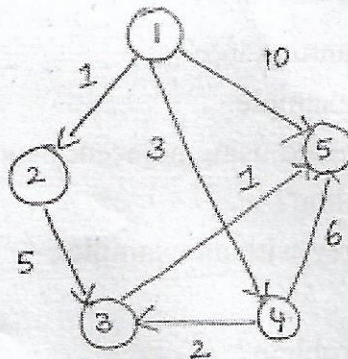
15. a. Apply Prim's algorithm for the following graph. (5)



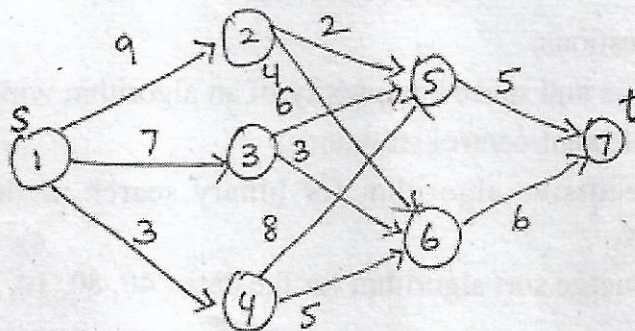
- b. Find minimum weight spanning tree by kruskal's algorithm. (5)



16. Write the Dijkstra's Algorithm and find the shortest path from node 1 to all other nodes. (10)

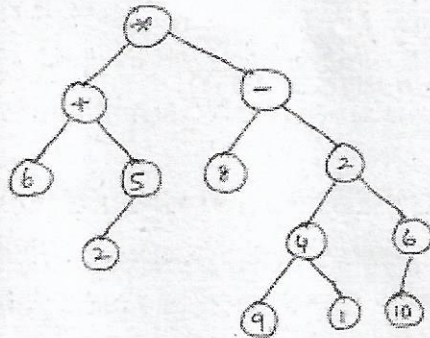


17. Find the minimum cost path from S to t in the multistage graph using forward approach. (10)

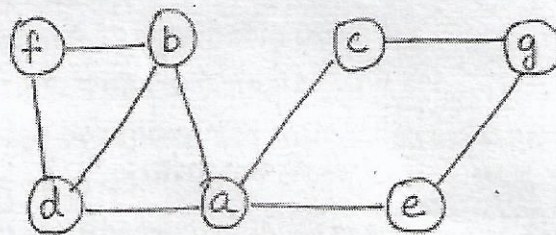




- 18. a. Draw and explain the state space tree for graph coloring when  $n = 3$ ,  $m = 3$  ( $n$  is a number of vertices and  $m$  is number of colors).
- b. Write a program to sort an array using Quick sort technique. State its efficiency.
- 19. a. Define Tree. Traverse the following tree in preorder, postorder and in order.(6)



- b. Write a short notes on 4-Queen's problem. (4)
- 20. Consider the graph starting at vertex a. Traverse the graph by DFS and BFS. Draw the DFS and BFS spanning trees.





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V Semester B.C.A. Degree Examination, March/April - 2022

**COMPUTER SCIENCE**

Artificial Intelligence

(CBCS - Scheme)

Paper : BCA 502 T

Time : 3 Hours

Maximum Marks : 100

**Instructions to Candidates:**

Answer all sections.

**SECTION - A**

Answer any Ten questions. Each question carries 2 marks.

(10×2=20)

1. Define heuristic function.
2. Define Means End Analysis.
3. Define Truth Maintenance System.
4. Draw the Semantic net for
  - Sree is a girl
  - She has black hairs
  - Girls are human beings
  - All human beings are animals
5. What is Propositional Logic?
6. List any four predicates used in Block world problem.
7. Define declobbering.
8. List the factors affecting learning performance.
9. What are perceptrons?
10. Define Artificial Neural Network.
11. What is syntactic analysis?
12. What is MYCIN?

**SECTION - B**

Answer any Five questions. Each question carries 5 marks.

(5×5=25)

13. Define Artificial Intelligence. Write briefly the four approaches to AI.
14. Write a note on informed and uninformed searching.

[P.T.O.]



15. Express the following English statements in FOPL.
- Rama had all kinds of weapons.
  - Rama was a ruler.
  - Rama is married to Sita.
  - Rama killed Ravana.
  - All people loved Rama.
16. What are frames? Explain with an example.
17. Write the Non linear planning algorithm.
18. Write a note on supervised and Un supervised learning.
19. Write the production rules and draw a parse tree for the statement "Jack slept on the table".
20. Explain the Recursive Transition Network method.

### SECTION - C

Answer any Three questions. Each question carries Fifteen marks. (3×15=45)

21. a. Define Neural Network. Explain different types of neural network. (8)
- b. Explain the Best First search method with an example. (7)
22. a. Write a note on Fuzzy logic. (7)
- b. What is a script? Write a script of visiting a doctor in a hospital. (8)
23. a. With an example, explain Goal - stack planning. (8)
- b. Briefly explain any two Robot architectures. (7)
24. a. With a neat diagram, explain the General Learning Model. (8)
- b. Briefly explain the steps involved in natural language processing. (7)
25. a. Explain Alpha - Beta pruning with suitable example. (8)
- b. Explain Block world problem. (7)

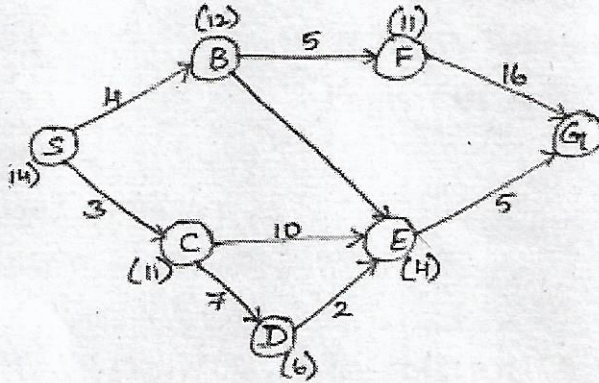


SECTION - D

Answer any One questions. Each question carries Ten marks.

(1×10=10)

26. Using A\* algorithm, find the optimal path for the following graph.



Where S is the initial state and G is the goal state

27. Explain the structure of Expert system with its limitations and applications.

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V Semester B.C.A. Degree Examination, March/April - 2022

COMPUTER SCIENCE

Data Communication & Networks

(CBCS Scheme)

Paper : BCA 501 T

Time : 3 Hours

Maximum Marks : 100

*Instructions to Candidates:*

Answer all sections.

SECTION - A

I. Answer any Ten questions. Each question carries 2 marks.

(10×2=20)

1. List out any two goals of a computer network.
2. Write any two differences between half - duplex and full - duplex transmission modes?
3. State the formula for maximum data rate of a noisy and noiseless channel.
4. Categorize the four basic topologies in terms of line configuration.
5. How does guided media differ from unguided media?
6. Distinguish between synchronous and statistical TDM.
7. Expand HDLC. State the different frame types.
8. Define piggybacking and its benefit.
9. What is ALOHA?
10. What is NIC and its use?
11. Write down any two differences between connection-oriented and connectionless network service.
12. What is a router?

[P.T.O.]



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**SECTION - B**

**II. Answer any Five questions. Each question carries 5 marks. (5×5=25)**

13. Define the term data communication. What are the characteristics of effective data communication system?
14. For the bit stream 01001110 sketch the waveforms for NRZ-L, NRZ-I, Bipolar AMI, Manchester. Differential Manchester. Assume that the signal level for the preceding bit for NRZ-I was high, the most recent preceding 1 bit (AMI) has a negative voltage.
15. Explain the characteristics of co-axial cable with neat diagram. What are the advantages of coaxial cable over the twisted pair cable?
16. Compare and contrast bit - stuffing and byte - stuffing.
17. Illustrate CSMA/CD method.
18. What is a bridge? Explain the different types of bridges.
19. Write Bellman Ford algorithm.
20. Discuss briefly about fragmentation.

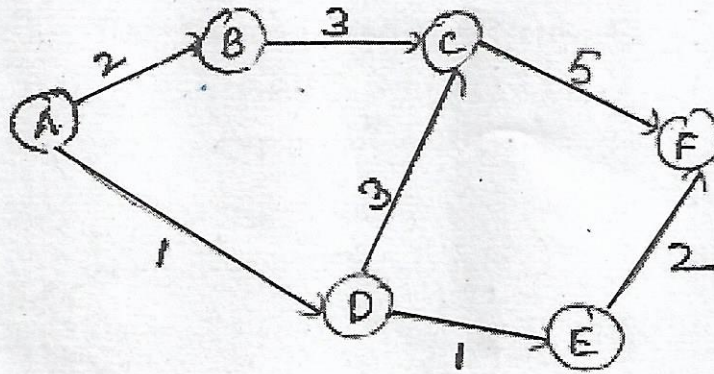
**SECTION - C**

**III. Answer any Three questions. Each question carries 15 marks. (3×15=45)**

21. a. Explain OSI reference model with a neat diagram. (8)  
b. Detect and correct the single error in the received Hamming code word 10110010111. Assume even parity system. (7)
22. a. Explain CRC method of error detection. Give an example. (8)  
b. Explain congestion control Algorithm. (7)
23. Draw the flow diagram of Stop - and - Wait protocol using the following scenario :
  - a. The frame is sent and acknowledged. (3)
  - b. The second frame is sent, but lost. After time-out it is resent. (4)
  - c. The third frame is sent and acknowledged, but the acknowledgment is lost. The frame is resent. Identify the problem with this scheme. How can this problem be corrected using sequence numbers and acknowledgement numbers? (8)
24. a. Describe FDDI. (7)  
b. Explain the working and frame format of Token Ring. (8)



- 25. a. Explain different types of packets switching methods. (7)
- b. What is shortest path routing? Find the shortest path between node A and node F for the following figure by applying Dijkstra's algorithm. (8)



SECTION - D

- IV. Answer any **One** question. Each question carries 10 marks. (1×10=10)
  - 26. What is a MODEM? Explain its types.
  - 27. Explain SONET.
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