

APRIL 2023

56781/PC43K

Time : Three hours ^{INTERNET OF THINGS} Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. Define the term IoT.
2. List out the various communication protocols in M2M.
3. Define the term middleware.
4. What are the key objectives of IoT-A consortium?
5. List out some WoT applications.
6. What is M2M communication network?
7. Define the term cloud middleware.
8. Differentiate between internet of things and cloud computing.
9. What industries can benefit from IoT?
10. What is meant by a smart city in IoT?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. Explain the panoramic view of IoT Applications.
12. Discuss the pillars of M2M.
13. Briefly explain the benefits of LBS.
14. Write short notes on SCADA and RFID protocols.
15. Compare and contrast WoT and IoT.
16. Explain the four deployment models of IoT.
17. Explain the Smart Parking Process using IoT.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Describe the important vertical IoT applications.
19. Describe in detail about M2M and WSN protocols.
20. Elaborate on platform middleware for WoT.
21. Describe in detail about unified multitier WoT architecture.

22. Discuss on mobile cloud computing.

23. Determine the IoT -levels for designing home automation IoT systems including smart lighting and intrusion detection.

APRIL 2023

56775/PC23A

MACHINE LANGUAGE

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. Write any two supervised learning algorithms.
2. What is offline or batch Learning?
3. What is MNIST dataset?
4. What is binary classification?
5. What is the difference between linear model and tree model?
6. What is a support vectors?
7. What are the key ideas of distance based model?
8. What is classification algorithm?
9. What is the aim of feature transformation?
10. What is meant by model ensemble?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. What is the difference between traditional approach and machine learning approach with neat diagram?
12. Explain the supervised learning algorithm with an example.
13. Write short notes on multi label classification.
14. Explain the two approaches of supervised rule learning.
15. Explain the k-means clustering algorithm with an example.
16. Write short notes on hierarchical clustering.
17. Explain the concepts of Categorical features with an example.
20. How to adapt decision trees to regression tasks with an example?
21. Write a generic learning procedure in decision tree.
22. Explain the naïve bayes model for classification with an example.
23. Briefly explain the process of Feature construction and selection.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. What are the main steps to perform machine learning project?
19. How to implement a cross-validation technique for binary-classification problem?

APRIL 2023

56765/PSG5A/PC22B

OOAD

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. What is Object-Oriented Design?
2. What is UML?
3. Define Requirements and mention its types.
4. What are Activity Diagrams?
5. How to Connect the UI Layer to the Domain Layer?
6. Who is creator?
7. What is Aggregation?
8. What are the tasks performed in elaboration?
9. What is GUI testing?
10. Write the issues in OO testing.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. Explain about object orientation in detail.
12. Describe about OOAD use case driven approach.
13. Illustrate with an example, the relationship between sequence diagram and use cases.
14. Explain in detail about Design axioms in OOAD.
15. Explain in detail about Refining attribute in OOAD.
16. Explain in detail about Designing view layer classes in OOAD.
17. Explain about user satisfaction testing and its performing with an example.
21. Explain the guidelines for finding Conceptual Classes with neat diagrams.
22. What is the purpose of a view layer interface explain it in detail?
23. Explain about Quality Assurance tests.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Explain in detail about OOAD Life Cycle.
19. Describe the basic activities in object oriented analysis and explain how use case modeling is useful in analysis.
20. Define attributes and explain the various types of attributes.

APRIL 2023

58403/MC41A

OPERATING

Time : Three hours

Sys.

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. What is operating system? Give example.
2. What do you understand by process?
3. What are basic gates?
4. What does De Morgan's law state?
5. What is a combinational circuit design?
6. What is Quine – Mccluskey method?
7. What are called counters?
8. What is called a flip flop?
9. Define ROM.
10. What is hard disk?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. Bring out the importance of operating system architecture.
 12. What are called schedulers? Discuss about its types.
 13. What is AND gate? Explain its operation with a neat structure.
 14. What is XOR gate? Discuss about its function with a neat structure.
 15. What is half adder? Give a brief explanation about it with its truth table.
 16. Write short notes on T counter with a neat structure.
 17. Write a brief note arithmetic logic unit with its structure.
 20. What is De Morgans law? Explain with an example about how to prove it.
 21. What are multiplexers? Discuss in detail about its working procedure with a neat structure.
 22. Explain in detail about JK flip flop with its structure and working procedure.
 23. What are I/O devices? Discuss in detail about various I/O control methods with its structure.
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PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Explain in detail with a neat structure about computer system architecture.
19. What is Interprocess communication? Discuss in detail about its types.

APRIL 2023

58103/IT21C/
MC21C

RDBMS

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer any TEN questions.

1. Define DBMS.
2. What is object-oriented data model?
3. What is relational schema?
4. What is an entity?
5. Define super key.
6. Write the transitivity rule in armstrong's axioms.
7. What is atomicity property?
8. Write the SQL statements used in transactions.
9. State the need of RAID.
10. What is Dense index?
11. Expand ODMG.
12. What is the use of information retrieval system?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. Explain database system applications in detail.
14. Discuss select and project operation of relational algebra with an example.
15. Elaborate on the attribute types in detail.
16. Explain 3NF in detail.
17. Elaborate on the steps to recover from deadlock in detail.
18. Discuss dynamic hashing in detail.
19. Elaborate DTD in XML document with an example.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

20. Elaborate on the database system architecture with neat sketch.
21. Elaborate on the significant differences between a file processing system and Database management system in detail.

22. A university academic office maintains data about the following entities:

- (a) courses, course number, title, credits, syllabus, and prerequisites
- (b) course offerings, course number, year, semester, section number, instructor(s), timings, and classroom;
- (c) students, student-id, name, and degree program;
- (d) instructors, including identification number, name, department, and title. Further, the enrolment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modelled. Construct an E-R diagram for the academic's office. Document all assumptions that you make about the mapping constraints.

23. Elaborate on the types of serializability in detail.

24. Discuss B⁺-tree file organization in detail.

25. Explain object based databases in detail.

APRIL 2023

56717/PSC4R/

SOFTWARE PROJECT MANAGEMENT
PC43A

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. Explain software project management.
2. What is project evaluation?
3. Define RAD.
4. What is forward pass?
5. Define Z values.
6. How to visualize the progress?
7. How can we manage contracts?
8. What is process quality?
9. What is internet crime?
10. Define surveillance.

APRIL 2023

58407/MC32A

WEB TECHNOLOGY

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions

1. What is meant by three-tier architecture in web development?
2. What is HTML5 Canvas?
3. What is CSS, and how is it used in web development?
4. How are JavaScript objects used in web development?
5. How are functions used in PHP?
6. What are PHP arrays, and how are they used in web development?
7. How are expressions used in AngularJS?
8. What are controllers and filters in AngularJS?
9. What are some common form elements used in web development?
10. What is the role of modules in web development?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions

11. Explain with examples the importance of audio and video elements in modern web applications.
12. Discuss the advantages and disadvantages of client-server architecture in web development.
13. Explain the use of JavaScript functions, objects, and arrays in web development. Provide examples and explain their purposes.
14. What is the significance of PHP in web development? Discuss its advantages and disadvantages.
15. Explain the MVC architecture and its use in AngularJS web development. Provide examples.
16. How are controllers and filters used in AngularJS web development to create reusable code?
17. Explain how data is fetched from a PHP server running MySQL in web development. Give examples of its use in retrieving and manipulating data in web applications.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions

18. Explain the use of HTML5 forms in web development. Discuss the advantages and disadvantages of using HTML5 forms over traditional HTML forms.
19. Discuss the different types of CSS selectors and their use in web development, provide examples of how they can be used to style HTML elements.
20. Explain the use of functions and objects in PHP and their role in creating reusable code. provide examples of how they are used in web development.
21. Discuss the importance of AngularJS in web development, including its advantages and disadvantages.
22. Explain the significance of the HTML DOM in web development. Discuss how it can be used to create dynamic and interactive web applications.
23. Write Library management system. Using HTML with MySQL

APRIL 2023

56780/PC43H

WEB APPLICATION

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. In which directory XML layout files are stored?
2. What is the name of the program that converts Java byte code into Dalvik byte code?
3. What are the methods present in activity lifecycle?
4. Communication between activities is performed using _____.
5. _____ is used to insert data into the listview.
6. _____ is referred as primary menus of Android.
7. Which object is used to access data in a content provider?
8. The permission required to send sms in android app is _____

9. JSON stands for_____
10. An android application can interact with java or net application using _____.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. Differentiate between native and hybrid applications.
12. Write in detail about android versions and API levels.
13. Discuss about action bar in Android.
14. Develop an Android application to display images.
15. Explain options menu in Android with an example program.
16. Describe the methods used to implement SMS application.
17. Discuss about relative layout in Android.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. How to create and publish an Android application? Explain.
19. Explain fragment lifecycle methods in Android.
20. Discuss in detail about webview in Android.
21. Narrate SQLite database in Android.
22. What are the procedures involved in accessing google maps in Android? Explain.
23. Elaborate on alert dialog in Android with an example.

(6 pages) **ACCOUNTING & FIN. MANAGEMENT**
APRIL 2023 **58402/MC31A**

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. What is Realisation?
2. Write a note on Money Measurement?
3. What is Account?
4. Write a note short on Posting?
5. What is cash Book?
6. What is meant by Ledger?
7. What is Gross Trial Balance?
8. What is Final account?
9. What is Trading Account?
10. What is Return on Investment?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. What are different types of Trial Balance?
12. Write short notes on :
 - (a) Adjustment
 - (b) Fixed Assets
 - (c) Floating Assets
13. What are the limitations of Balance Sheet?
14. What do you understand by 'Financial Management'?
15. Explain any three of the following :
 - (a) Accounting Rate of Return
 - (b) Payback Method
 - (c) Internal rate of return
16. Explain meaning of :
 - (a) Accounting concepts
 - (b) Accounting conventions
 - (c) Accounting principles

17. Calculate the stock turn-over ratios from the following data :

Opening stock Rs. 8,000,

Closing stock Rs. 10,000,

Sales Rs. 54,000 and Profit 20% on cost.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Discuss the principles of debit and credit of Accounts.

19. Journalise the following transactions in the books of Rahul for the month of March 2020.

- March 1 Rahul commenced business with cash Rs. 60,000.
- 2 Purchased furniture for Rs. 5,000.
- 4 Purchased goods for cash Rs. 2,000.
- 7 Bought goods from M/s. Arun & Co. for Rs. 4,000.
- 10 Sold goods costing Rs. 3,000 on cash.
- 15 Purchased stationery for office use Rs. 1,000.

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58402/MC31A

19 Received cash Rs. 1,250 from Mr. Karthick in full settlement of his account for Rs. 1,500.

20 Paid salaries by cheque Rs. 1,500.

25 Introduced additional capital Rs. 20,000.

27 Paid to Arun Rs. 3,250 in full settlement of Rs. 3,500

29 Sold goods for Rs. 15,000 to Mr. David.

31 Deposited Rs. 3,000 into the Bank.

20. Explain the advantages of Ratios Analysis.

21. Explain the Methods of preparation of Cash budget.

22. Distinguish between

(a) Book-Keeping and Accountancy

(b) Personal accounts and impersonal Accounts

(c) Real Accounts and Nominal Accounts

(d) Single entry system and double entry system.

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58402/MC31A

[P.T.O.]

23. Prepare a Trial balance from the following as on March 31st, 2020.

Particulars	Total
Stock	60,000
Purchases	1,50,000
Capital	70,000
Drawings	22,000
Sales	2,50,000
Travelling Expenses	1,320
Salaries	11,200
Rent, Taxes and insurance	5,600
Returns outwards	2,600
Advertising	840
Wages	7,000
Bank overdraft	20,000
General Trade Expenses	1,350
Returns Inwards	5,400

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58402/MC31A

Particulars	Total
Discount allowed	600
Interest and Commission paid	430
Bad debts	800
Sundry Creditors	60,000
Cash in hand	2,060
Sundry debtors	92,000
Furniture	10,000
Plant and Machinery	20,000
Buildings	12,000

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58402/MC31A

APRIL 2023

58106/IT41C/
MC22B

AGILE SOFTWARE ENGINEERING

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer any TEN questions.

1. State one difference between traditional model and agile model.
2. Give one simple example for agile documentation.
3. What is the drawback of Agile model?
4. State one method of lean production in Agile process.
5. Define Agile refinement.
6. What is meant by Agile information systems?
7. Describe the statement: RE using agile.
8. State the properties of abstraction model in Agile.
9. Define FDD.
10. How agility is used in quality assurance.
11. What is meant by extreme programming in Agile process?
12. Define agile principle.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. How agile can be used in document design and testing.
14. Explain in detail about SCRUM.
15. Explain about SMM in detail.
16. List out the advantages of agile environment in requirement management.
17. Elaborate Agile approach in global software development.
18. State the importance of knowledge management in software engineering.
19. How quality can be improved using agility and explain its properties.
22. What are all the challenges of migrating agile methodologies?
23. Elaborate Agile requirements modelling and generation with proper diagram.
24. Illustrate financial and production metrics in FDD.
25. Explain in detail about Agile in requirements elicitation.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

20. Elaborate Agile drivers, capabilities, values in detail with suitable example.
21. Draw a life cycle of Agile processes.

APRIL 2023

56773/PC22C

AI

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. What is AI?
2. Intelligent Agents features _____.
3. Search data structures purpose _____.
4. Give one steps to solve the problem in searching _____.
5. Optimization Problem defines _____.
6. Uses of AND-OR search trees _____.
7. Expansion of CSPs _____.
8. Constraint Propagation advantage of _____.
9. Classical planning disadvantage in _____.
10. Ontological Engineering means _____.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. Detail in about the concept of rationality.
 12. What are the characteristics of Heuristic Functions?
 13. Compare the Optimal Decisions in single player and multiplayer in games.
 14. Define the concept of Hill-climbing search.
 15. What is Effective Propositional Model Checking? Give detail.
 16. Explain the Interference in First-Order Logic.
 17. Briefly explain the concept of Algorithms of Classical Planning.
 21. Define the briefly in Constraint Satisfaction Problems.
 22. Elaborate the Bayes' Rule and its use.
 23. Define the categories and objects events in detail.
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PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Give detailed explanation of Intelligent Agent.
19. Explain the concept of Solving Agents with suitable example.
20. Write in detail about Evaluation functions of Heuristic Alpha-Beta Tree Search.

APRIL 2023

58101/IT21A/

MC21A

C++ & DATA STRUCTURES

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer any TEN questions

1. Define keyword.
2. What is pointer?
3. Write the types of parameter passing techniques.
4. What is destructor?
5. Define polymorphism.
6. Name the objects used to perform console I/O operations.
7. How to open and close a file?
8. Define asymptotic notation.
9. Draw the structure of circular queue.
10. Write the applications of doubly linked list.
11. Define graph.
12. Write the post order sequence of tree traversal.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions

13. Explain C++ tokens in detail.
 14. Discuss friend function with an example.
 15. Explain function overloading in detail.
 16. Write a program to write a character on to the file and read the character from the file.
 17. Elaborate on Command line arguments with an example.
 18. Elaborate on the applications of stack in detail.
 19. Elucidate breadth first search with an example.
 23. Elaborate the operations performed on array in detail.
 24. Explain singly linked list operations in detail.
 25. Elaborate the types of tree traversal in detail.
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PART C — (4 × 10 = 40 marks)

Answer any FOUR questions

20. Elaborate on the control structures in detail.
21. Define operator overloading. Discuss binary operator overloading with an example.
22. State the need of constructor. Elucidate the types of constructors with an example.

APRIL 2023

56770/PSGEJ/PC43E

CLOUD COMPUTING

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. What is cloud computing?
2. Name the cloud service providers.
3. What are web services?
4. List the features of Google App Engine.
5. What are the typical communication used in cloud computing?
6. Define Virtual Community.
7. List the task management applications in cloud.
8. Write the use of To-Do list.
9. What is cloud storage?
10. What is s blog?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. Explain the financial and security associated advantages of cloud storage.
12. What are the different types of cloud? Explain.
13. How to collaborate on contact lists in cloud computing environment? Discuss.
14. What are the benefits of web based word processors? Explain.
15. Explain any one project management application and its features.
16. Compare different mail services.
17. Explain the features of the social network facebook group.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Describe with neat diagram the NIST cloud computing architecture.
19. Discuss various types of cloud service development in detail.

20. How does the community group manage Group Projects and events related activities? Discuss.
 21. Explain about online planning in cloud service.
 22. Describe the cloud services using Calendar applications in detail.
 23. What are conferencing tools? Explain their features.
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APRIL 2023 INTROD. TO 58401/MC21B
COMPUTER ARCHITECTURE

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. Convert the decimal number 48.6175 into binary number.
2. What is called Hamming code?
3. Write down the truth table for 2 input XNOR gate.
4. What are called Boolean identities?
5. State De Morgan's Law.
6. What is the difference between Half adder and Full adder?
7. What is the function of Decoder?
8. What is PLA?
9. Define the term Flip flop.
10. Mention the various types of Shift registers.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. How will you represent the data using signed magnitude, one's complement and two's complement? Give an example for each.
12. Explain about error detecting and error correcting codes.
13. Explain the basic gates with truth table.
14. Explain Quine McClusky method.
15. Explain the working of Multiplexer with neat sketch.
16. Differentiate between synchronous and asynchronous counters.
17. Compare and contrast Hard disk and optical disk.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Describe the various number systems and explain their inter conversions, giving examples.
19. Simplify the following Boolean expression using K-map: $F = A'C + A'B + AB'C + BC$.

20. Outline the design of Full adder circuit and explain its functions.
21. Describe JK Master slave flip flop with neat sketch.
22. Explain the structure of ALU and memory.
23. Prove that the NAND and NOR gates are universal gates.

APRIL 2023

58404/MC22C

COMPUTER

NETWORKS

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

1. Define WAP.
2. What is Ethernet?
3. Define Magnetic Media.
4. Discuss Radio Transmission.
5. What are Frames?
6. Discuss Rate based flow control.
7. What is Flooding?
8. Define OSPF.
9. What is Addressing?
10. Define Wireless UDP.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. Explain about the design issues for the layers of Network.
12. Explain in detail about Electro Magnetic Spectrum.

13. Write short notes on SONET.
14. Explain about ADSL.
15. Briefly explain Shortest Path Routing.
16. Give notes on TCP Service Model.
17. Explain about one Time Pads in Network Security.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Describe about Network Architecture with neat diagram.
19. Explain about the protocol using Go Back N.
20. Describe about IP protocol.
21. Explain in detail about Routing Algorithms.
22. Give a detailed note on substitution ciphers in Cryptography.
23. Describe about the transport service carried in the transport layer

APRIL 2023

56759/PSG4A/

COMPUTER NETWORKS PC42A

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. Define LAN.
2. What is the purpose of physical layer?
3. Give a note on digital modulation.
4. List out the functions of data link layer.
5. What is ADSL?
6. What is LCP?
7. What are the goals need to provide service to transport layer?
8. What is meant by IP Address?
9. What is meant by ports?
10. What is UDP?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

11. Write short note on TCP/IP reference model.
12. Discuss about third generation mobile phone networks.
13. Describe about the local loop of public switched telephone networks.
14. Explain the elementary data link protocols.
15. Write short note on channel allocation problem.
16. Explain the following:
 - (a) Optimality principle
 - (b) Shortest path algorithm.
17. Discuss about congestion control.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

18. Elaborate on the network software.
19. Explain theoretical basis for data communication.

20. Illustrate digital modulation and multiplexing.
21. Explain about multiple access protocols.
22. Illustrate on congestion control algorithms.
23. Elaborate the Internet transport protocols (TCP).

APRIL 2023

58107/MC22A/IT22A

Time : Three hours *DESIGN ANALYSIS & ALGORITHMS* Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer any TEN questions.

1. Define the term algorithm.
2. What is meant by space complexity?
3. Mention the significance of primality testing.
4. State one advantage of minimum spanning tree.
5. Give an algorithm for solving the travelling salesman problem.
6. What is the worst-case time complexity of Quicksort algorithm?
7. Which type of problems can be solved using Dijkstra's algorithm?
8. Give an example for connected components.
9. What type of problems can be solved using non-deterministic polynomial algorithms?

10. State the technique followed in Strassen's matrix multiplication algorithm.

11. Define deadline.

12. Specify one advantage of branch and bound technique.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. Elaborate on Randomized algorithms and its types.

14. Discuss the operations defined for disjoint sets.

15. With suitable example explain Greedy Knapsack Problem.

16. Brief on job sequencing with deadlines.

17. What is Breadth First Search? Give an example.

18. Compare NP-hard and NP-completeness.

19. What is Minimum cost spanning tree? List some applications of it.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions.

20. Discuss the General plan for analyzing efficiency of Non recursive and Recursive algorithms.

21. Describe in detail 8-queens problem using back tracking.

22. Write the algorithm to compute 0/1 Knapsack problem using dynamic programming and explain it.

23. Elaborate on the strategy to prove that a problem is NP-hard.

24. Explain an algorithm for generating minimum cost spanning tree.

25. With suitable example explain how Matrix - chain Multiplication problem can be solved using dynamic programming.