

Name:
Reg. No.:

Rajagiri College of Social Sciences (Autonomous)
Third semester MCA Degree Examination
October, 2023
(Regular – 2022 admissions)

Code: 4750
Sub: (MCA332) Web and Database Security

Max. Marks: 75
Duration: 3 Hrs

SECTION A

*Answer any **TEN** questions.
(Each question carries 3 marks)*

[10 X 3 = 30]

- 1 How would you justify the selection of biometric authentication over physical authentication?
- 2 List and explain the possible issues with privacy.
- 3 How would hardening network devices ensure security?
- 4 Discuss the three main aspects of Database security with suitable examples.
- 5 WhatsApp is protected with end-to-end encryption. How is it protected from vulnerabilities?
- 6 Explain SQL injection with an example.
- 7 Explain the counter measures against web server attacks.
- 8 List any four principles for writing secure scripts.
- 9 Differentiate between eavesdropping and masquerading.
- 10 Explain how information leakage affects web security.
- 11 How does user-authentication to a database ensure secure access?
- 12 Interpret the working of web crawlers in WWW.

SECTION B

*Answer **ALL** questions.
(Each question carries 9 marks)*

[5 X 9 = 45]

- 13 (a) List and explain the various types of web server attacks.
[OR]
(b) Summarize the different classes of threats.
- 14 (a) Evaluate the effectiveness of measures to ensure host security for servers?
[OR]
(b) DNS logs provide data regarding the information flow within a network.

Demonstrate how does this will assist the network admin in securing the network?

15 (a) Dynamic web pages are more vulnerable to attacks than static web pages.

Justify the statement with evidence.

[OR]

(b) Network devices are as vulnerable as computer systems are to exploits. Justify the statement.

16 (a) Imagine you are a software architect responsible for designing a mission-critical database application for a healthcare organization. The application will store and manage patient records, including sensitive medical information. In an essay, outline the key considerations and best practices for developing a secure and efficient database application program. Discuss how you would address data security, access control, data integrity, and performance optimization in your design. Provide concrete examples and case studies to illustrate the effectiveness of your proposed solutions.

[OR]

(b) Discuss the role of LDAP protocols in user authentication.

17 (a) Explain impact of Trojan on web and database security.

[OR]

(b) How does the Two-Factor Authentication works on Facebook? Explain.

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Third semester MCA Degree Examination
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Code: 4746
Sub: (MCA303) Data Mining

Max. Marks: 75
Duration: 3 Hrs.

SECTION A

*Answer any **TEN** questions.
(Each question carries 3 marks)*

[10 X 3 = 30]

- 1 Visual classification: an interactive approach to decision tree construction. Draw a flowchart to explain in detail all the main steps of visual classification
- 2 Define classification and prediction.
- 3 Draw the contingency table for binary variables.
- 4 List out and briefly explain the different interestingness measures.
- 5 What are unstructured data. Give examples.
- 6 Differentiate between dimension table and fact table.
- 7 How is Minkowski, Manhattan and Euclidean distance related to each other?
- 8 Discuss various approaches to improve the efficiency of Apriori Algorithm.
- 9 What are the pre-processing steps to be done on the data before classification and prediction?
- 10 Differentiate between single linkage clustering algorithm and complete linkage algorithm.
- 11 What is sampling? Explain sampling with or without replacement.
- 12 How can we calculate the dissimilarity between objects described by categorical variables?

SECTION B

*Answer **ALL** questions.
(Each question carries 9 marks)*

[5 X 9 = 45]

- 13 (a) Explain multidimensional data model? Discuss the schemas for multidimensional databases.
[OR]
(b) Detail data cleaning as a pre-processing step.
- 14 (a) Simulate a scenario where you overcome overfitting in the decision trees.
[OR]
(b) What is Sequential Covering algorithm? Explain with example.

15 (a) Write the Apriori Algorithm for discovering frequent item sets of mining single dimensional Boolean association rule.

[OR]

(b) Discuss the advantages of FP-tree Algorithm for finding frequent patterns.

Construct the FP-tree for the following transactions; -

T1 – {E, K, M, N, O, Y}

T2 – {D, E, K, N, O, Y}

T3 – {A, E, K, M}

T4 – {C, K, M, U, Y}

16 (a) Explain the typical requirements of clustering in datamining.

[OR]

(b) List and explain four distance measures to compute the distance between a pair of points and find out the distance between two objects represented by attribute values (1,6,2,5,3) and (3,5,2,6,6) by using any two of the distance measures.

17 (a) Every business industry is memorized for perpetuity. Such transactions are usually time-related and can be inter-business deals or intra-business operations. Justify how data mining techniques helps to analyse these business transactions and identify marketing approaches and decision-making.

[OR]

(b) A network intrusion refers to any unauthorized activity on a digital network. Network intrusions often involve stealing valuable network resources. Explain the role of Data mining in identifying intrusions.

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Third semester MCA Degree Examination
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Code: 4747
Sub: (MCA 304) Information Security

Max. Marks: 75
Duration: 3 Hrs.

SECTION A

*Answer any **TEN** questions.
(Each question carries 3 marks)*

[10 X 3 = 30]

- 1 What are the various attack on MAC?
- 2 Demonstrate that the set of polynomials whose coefficients form a field is a ring.
- 3 Discuss the advantages of elliptic curve cryptography.
- 4 Verify Euler's theorem for $a=3$ and $n=10$.
- 5 What is the difference between link and end-to-end encryption?
- 6 Discuss the concept of polynomial ring.
- 7 How to check whether two numbers are relatively prime?
- 8 What is avalanche effect?
- 9 Explain whether the Diffie Hellman key exchange protocol is vulnerable?
- 10 What two levels of functionality comprise a message authentication?
- 11 Verify Fermat's theorem for $a=7$ and $p=19$.
- 12 What requirements should a digital signature scheme satisfy?

SECTION B

*Answer **ALL** questions.
(Each question carries 9 marks)*

[5 X 9 = 45]

- 13 (a) Compare commutative group and cyclic group. Give suitable example.
[OR]
(b) Calculate the multiplicative inverse of 50 in Z_{71} .
- 14 (a) With the help of a suitable example explain Chinese remainder theorem.
[OR]
(b) State and prove Euler's theorem.
- 15 (a) Explain AES algorithm.
[OR]
(b) Compare block cipher with stream cipher. Explain the working of RC4.

16 (a) Discuss elliptic curve cryptography.

[OR]

(b) Discuss the principles of public-key cryptosystems.

17 (a) Discuss hash based message authentication code (HMAC) in detail.

[OR]

(b) Explain SHA-512 in detail.

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Third semester MCA Degree Examination

October, 2023

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Code: 4748

Sub: (MCA311) Deep Learning

Max. Marks: 75

Duration: 3 Hrs.

SECTION A

*Answer any **TEN** questions.
(Each question carries 3 marks)*

[$10 \times 3 = 30$]

- 1 Explain various datatypes used in Tensors.
- 2 List out the applications of Convolutional Neural Networks.
- 3 Discuss Perceptron Learning Algorithm.
- 4 Explain the basic concept of Recurrent Neural Network.
- 5 Illustrate the steps to install TensorFlow and validate the confirmation of the installation of TensorFlow.
- 6 Explain the working of LSTM.
- 7 Illustrate Biological neuron and Artificial neuron.
- 8 Describe the different networks used in RNN.
- 9 Briefly explain Optimizers and its types used in neural networking.
- 10 Discuss the benefits of using TensorFlow in deep learning model.
- 11 Justify how FNN differs from RNN.
- 12 How to Reduce Overfitting with Dropout?

SECTION B

*Answer **ALL** questions.
(Each question carries 9 marks)*

[$5 \times 9 = 45$]

- 13 (a) Explain Perceptron Learning Algorithm and its types in detail.
[OR]
(b) Demonstrate convergence theorem for Perceptron Learning Algorithm.
- 14 (a) Explain Linear Regression using Tensor Flow with a suitable example.
[OR]
(b) Differentiate tf. variable and tf. placeholder in TensorFlow with an example.
- 15 (a) Give the benefits of using convolutional layers instead of fully connected ones for visual task.
[OR]
(b) Explain backpropagation with a suitable example.

16 (a) Depict two issues of Standard RNNs and how can it be solved?

[OR]

(b) Explain the training process of RNN.

17 (a) Write the 5-Step life-cycle model for developing a Deep Learning model.

[OR]

(b) Discuss RNN in detail.

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Code: 4749

Sub: (MCA322) Microsoft .NET Framework using C#

Max. Marks: 75

Duration: 3 Hrs

SECTION A

*Answer any **TEN** questions.
(Each question carries 3 marks)*

[10 X 3 = 30]

- 1 What is the need of using namespace in a class? Explain with the help of an example.
- 2 Explain the concept of properties with examples.
- 3 Explain the functionality of Checkbox.
- 4 Differentiate DataSet model and DataReader Model.
- 5 What do you mean by query string? Also write the syntax.
- 6 Explain deserialization with example.
- 7 Explain the use of abstract class with example.
- 8 Name any three functions of ListBox.
- 9 What do you mean by Exception in C#?
- 10 What is a web server? Name the web server used for ASP.NET application and discuss its advantages.
- 11 Discuss .net Remoting Versus DCOM.
- 12 Discuss the various types of Inheritance with an example.

SECTION B

*Answer **ALL** questions.
(Each question carries 9 marks)*

[5 X 9 = 45]

- 13 (a) Analyze and compare partial classes and partial methods.
[OR]
(b) Explain various control structures available in C#.
- 14 (a) Illustrate exception handling in c#.
[OR]
(b) Write a program to copy the content from a source file to destination file.
- 15 (a) Write a program for saving and reading the content of a file using BinaryReader and BinaryWriter.
[OR]
(b) What is a socket? How they are used for client-server programming? Explain with the help of an example.

16 (a) Explain any ten Form properties.

[OR]

(b) Create a program to store the details of employees in database and display the details in a GridView.

17 (a) Illustrate MVC architecture of ASP.NET.

[OR]

(b) Differentiate Session and Cookie. Explain with example program.

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Code: 4751
Sub: (MCA301) Business Management and Financial Accounting

Max. Marks: 75
Duration: 3 Hrs.

SECTION A

*Answer any **TEN** questions.
(Each question carries 3 marks)*

[10 X 3 = 30]

- 1 What do you mean by Organizational Culture? Give examples.
- 2 Describe the role of recognition and rewards in motivating employees.
- 3 Who are the major users of Accounting?
- 4 Write notes on:- i) Pass Book ii) Cash Book
- 5 Describe balance sheet and its role in summarizing a company's financial position.
- 6 What is a Trial Balance? State the purpose for which a Trial Balance is prepared.
- 7 Define Accounting. State the most important characteristics of accounting.
- 8 What you mean by planning? Discuss the importance of planning.
- 9 Define employee performance appraisal and explain its significance in performance management.
- 10 Define Management. What are the functions of Management?
- 11 What are the different types of communication?
- 12 Write notes on:- i) Money measurement concept ii) Cost concept.

SECTION B

*Answer **ALL** questions.
(Each question carries 9 marks)*

[5 X 9 = 45]

- 13 (a) What are the different levels of management? Discuss various roles and responsibilities of each level of management?
[OR]
(b) What is the purpose of delegation in management, and how does it contribute to organizational efficiency?
- 14 (a) Define Leadership. Discuss the different theories of Leadership.
[OR]
(b) What do you mean by training and development? Explain different training methods adopted by Organizations.

P.T.O

15 (a) Explain the primary purpose of accounting in business.

[OR]

(b) Prepare Journal, ledger, and trial balance for the given information.

- I. Mr. Alex, begins business with a capital of Rs.5,00,000
- II. Sold goods for cash to Mr. Govind Rs. 1,50,000
- III. Goods purchased worth Rs. 60,000
- IV. Salary paid as cash Rs. 15,000
- V. Rent received from business premises Rs.10,000
- Vi. Electricity bill paid Rs. 30,000

16 (a) Prepare a three columnar cash book from the information given below:

2022	
Jan. 1	Cash in hand ₹ 57,900 and cash at bank ₹ 93,900.
Jan. 4	Purchased goods for ₹ 26,000 and paid by cheque.
Jan. 6	Received from Anil &Co. ₹ 19,300 by cheque and allowed discount ₹ 700.
Jan. 9	Paid into bank ₹ 25,000.
Jan. 12	Paid to Riya &Co. ₹ 38,600 by cheque and received discount ₹ 1,400.
Jan. 18	Paid Salary ₹ 10,400 by cheque
Jan. 19	Paid Rent to landlord ₹ 6,000.
Jan. 23	Received from Raju ₹ 14,600 and allowed discount ₹ 400.
Jan. 28	Paid to Thomas ₹8,700 and received discount ₹ 300.
Jan. 31	Received Commission ₹ 1,250.

[OR]

(b) Explain how accounting aids in decision-making for solving Business problems.

17 (a) What information is presented in a Balance Sheet, and why is it important for stakeholders?

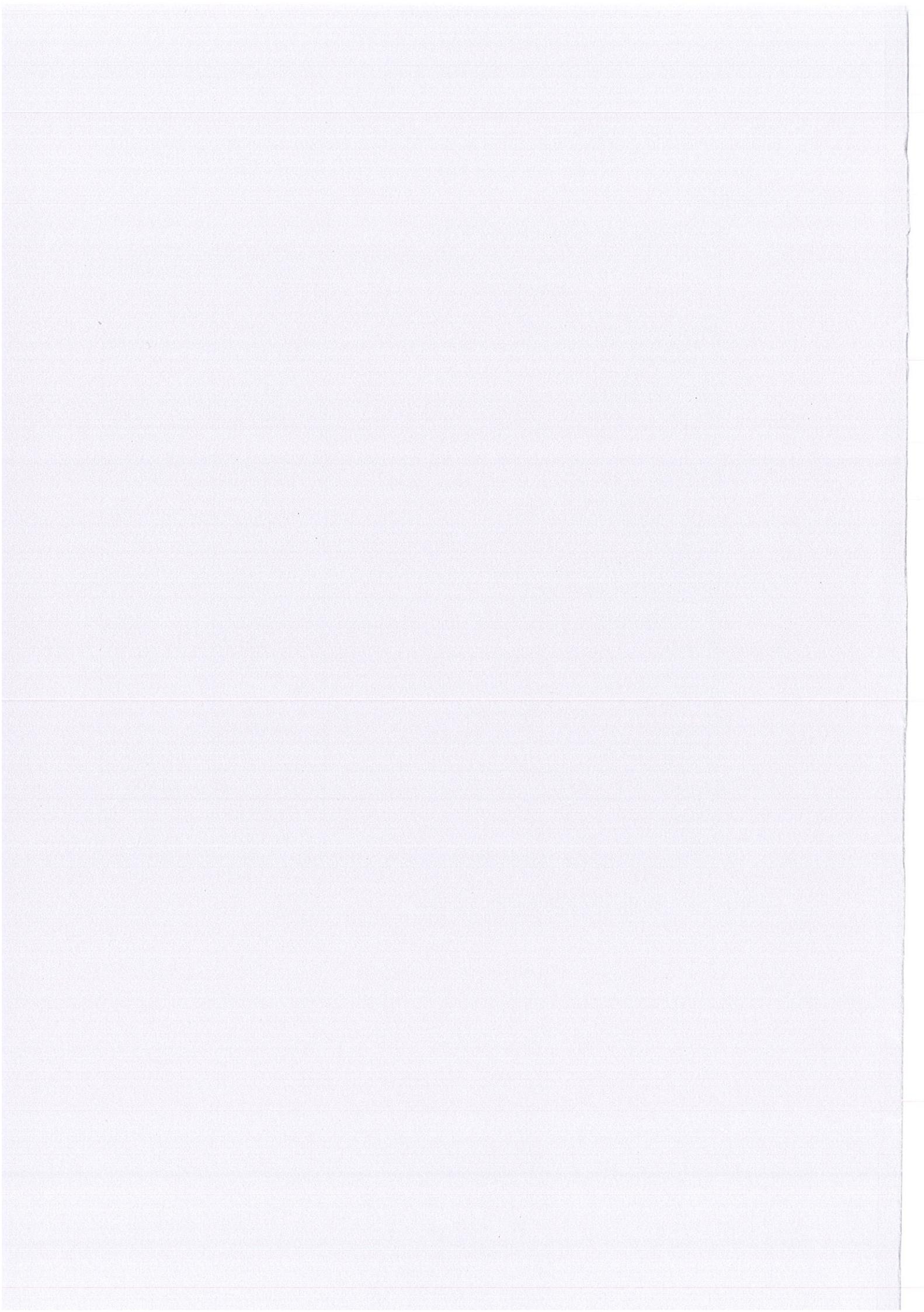
[OR]

(b) From the following Trial Balance of M/s. TATA Ltd, prepare trading and profit and loss account for the year ending on 31st March 2022 and the balance sheet as on the date:

Trial Balance as on 31st March 2023

Particulars	Debit	Credit
	Rs.	Rs.
Opening Stock (1.4.2021)	5,000	
Purchases	16,750	
Discount allowed	1,300	
Wages	6,500	
Sales		30,000
Salaries	2,000	
Travelling expenses	400	
Commission	425	
Carriage inward	275	
Administration expenses	105	
Trade expenses	600	
Interest	250	
Building	5,000	
Furniture	200	
Debtors	4,250	
Creditors		2,100
Capital		13,000
Cash	2,045	
Total	45,100	45,100

Stock on 31st March 2023 was Rs. 12,000.



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Code: 4745
Sub: (MCA302) Theory of Computation and Compilers

Max. Marks: 75
Duration: 3 Hrs.

SECTION A

*Answer any **TEN** questions.
(Each question carries 3 marks)*

[10 X 3 = 30]

- 1 What is the relevance of sentinels in lexical analysis?
- 2 Prove by Contradiction that $\sqrt{2}$ is irrational.
- 3 What is syntax directed translation?
- 4 Describe the Regular Expression for a language $\Sigma = \{p,q\}$, which can contain strings whose length is divisible by 3.
- 5 Explain the DAG representation of a basic block.
- 6 Discuss on handle pruning.
- 7 Differentiate between decidable and undecidable problems.
- 8 What is the role of a lexical analyser?
- 9 How is Non-Determinism introduced in an Automaton?
- 10 Explain the role of interchanging statements in the compiler.
- 11 Describe FIRST() function in parsers.
- 12 Construct a State Transition Diagram over $\Sigma = \{0,1\}$ which accepts set of all strings ending with '0'.

SECTION B

*Answer **ALL** questions.
(Each question carries 9 marks)*

[5 X 9 = 45]

- 13 (a) Prove that $A = \{a^n b^n \mid n \geq 0\}$ is not regular.

[OR]

- (b) Prove by Induction that the sum of squares of 'n' natural numbers is $n(n+1)(2n+1)/6$.

- 14 (a) For any palindrome for $\Sigma = \{a,b\}$, construct the following:-

- i) Non Deterministic PushDown Automata (NPDA).
- ii) Context Free Grammar Prove the result.

[OR]

- (b) For a regular language $L = \{a^n b^{2n} \mid n \geq 1\}$, construct a PushDown Automaton. Detail the transition function(δ) for the same.

15 (a) Discuss the Analysis - Synthesis mode of compilation.

[OR]

(b) With relevant examples, explain a lexeme, token, pattern and identifier?

16 (a) Describe the construction of an SLR parser.

[OR]

(b) How can a bottom up parse tree be constructed with the help of a parser.

17 (a) Explain in detail the concept of backpatching, using algorithm.

[OR]

(b) What are the different representations of Intermediate Code?