I Semester M.Sc. Degree Examination, May/June 2023
(CBCS Scheme) (F + R)
COMPUTER SCIENCE
MSC101T : File Structures

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Answer any 5 from Section – A.*
2) *Answer any 4 from Section – B.*
3) *Answer all the Sections.*

SECTION – A

I. Answer **any five** of the following questions. **Each** carries **6** marks.　　(5×6=30)

1) Describe the fundamental file operations in detail.

2) Discuss the Unix file commands for file operations on files.

3) Explain in detail how Co-sequential processing is implemented.

4) Explain paged binary tree, AVL tree with neat diagram.

5) Explain how spaces can be reclaimed in files with suitable example.

6) Describe the following :
   a) Linear Hashing method.
   b) Extensible Hashing.

7) Define data compression. Explain any two data compression techniques.

8) Differentiate between internal sorting and external sorting mechanism.

SECTION – B

II. Answer **any four** of the following questions. **Each** carries **10** marks.　(4×10=40)

9) Illustrate the working of balanced merge and K-way merge algorithms with an example.

10) Given a B-tree of order 5 with leaf node capacity to hold 2 records, build B-tree for the following inputs 33, 9, 10, 50, 13, 15, 12, 40, 9, 8.

11) Explain the different Collision resolution techniques in detail.

12) What is meant by multi-level indexing ? Explain briefly the concept of B-trees in multi-level.

P.T.O.

13) Write a C++ program to read and write student objects with Variable-length records using any suitable record structure and to read from this file a student record using RRN.

14) Given the bucket size of 3 and the following diagram of hashing with a hashing function h(k) = k, insert the following records 9, 20, 26, 4, 24, 16, 6, 22, 10, 7, 31 using Extendible hashing.
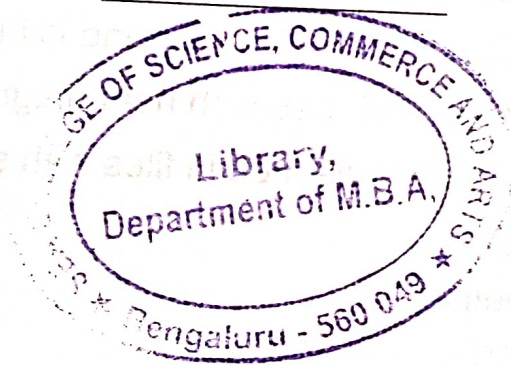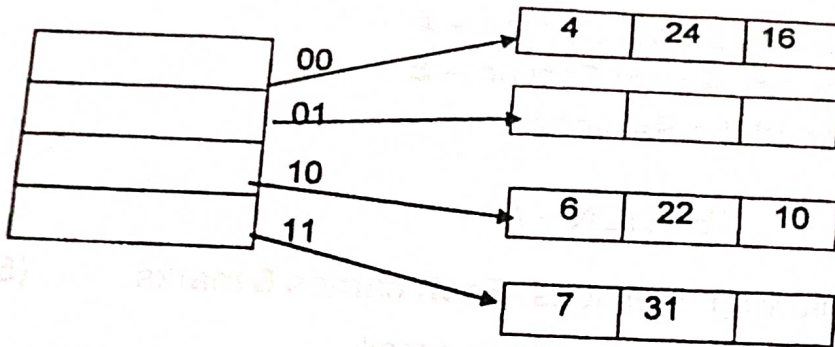
I Semester M.Sc. Degree Examination, May/June 2023
(CBCS Scheme) (F+R)
COMPUTER SCIENCE
MSC 102T : Advanced Database Management Systems

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **any 5** questions from Section – **A**.
2) Answer **any 4** questions from Section – **B**.
3) Answer **all** the Sections.

SECTION – A

I. Answer **any five** questions. **Each** question carries **6** marks. (5×6=30)

1) Explain the following Relational Algebra Operations with an example.
   a) Select
   b) Project
   c) Join
   d) Cartesian Product.

2) Discuss the main constraints in relational model with suitable example.

3) Write a note on 1NF, 2NF, 3NF and BCNF with suitable examples.

4) Construct an ER-Diagram for COMPANY DATABASE. The company keeps track of company's Employee, Project, and Department. A Department controls a number of projects and employee can work for any number of projects. The company keeps track of departments of each employee for insurance company.

5) Explain Optimistic and Time based concurrency control.

6) Explain the different commit protocols in DBMS.

7) Discuss about Spatial databases and Mobile databases.

8) What are the text mining techniques in data mining ?

SECTION – B

II. Answer **any four** questions. **Each** question carries **10** marks. (4×10=40)

9) What is a Data Model ? Explain the different categories of Data Models. **10**

10) Define Transaction. Discuss the different transaction states with a neat diagram. **10**

11) a) What is a view in SQL ? Create a View containing employee information, who withdraws Rs. 9,000 per month as salary ? 5

b) Explain the terms with respect to the object oriented database model.

i) Object and Class. 5

ii) Inheritance and Multiple Inheritances.

12) Define Locking. Explain different types of locking with example. 10

13) a) Discuss the problems of Deadlock handling during transaction processing. 5

b) Describe three Phase of the ARIES recovery methods. 5

14) Consider the following database schema. Write the SQL queries for the following :

a) Student (Sid, Sname, Marks, GPA)

b) Faculty (fid, Fname, Dept, Designation, Salary)

c) Course (Cid, Cname, Fid)

d) Enroll (Course_id, Sid, Grade)

i) List the names of all the students enrolled for course 'MSC'.

ii) List all the department having an average salary of above 10000/-.

iii) Give a 15% salary increment to all the faculties.

iv) List all the names of the faculties beginning with 'V'.

v) For each course, retrieve course id and number of students enrolled in each course. 10

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I Semester M.Sc. Examination, May/June 2023
(CBCS Scheme) (F + R)
COMPUTER SCIENCE
MSC 103T : Theory of Computation

Time : 3 Hours

Max. Marks : 70

Instruction : *Answer **all** the Sections.*

SECTION – A

I. Answer **any five** questions. **Each** question carries **6** marks. (5×6=30)

1) a) Define the following with example :

   i) String

   ii) Language

   iii) Alphabet

   b) Explain any three different applications of Finite Automata.

2) Show that the language L = { ww | w ∈ (a, b)*} is not regular.

3) Define ambiguous grammar. Show that the following grammar is ambiguous.

   S → aB / bA

   A → aS / bAA / a

   B → bS / aBB / b

4) Show that the regular languages are closed under union, concatenation and star.

5) Define Turing machine with its tuples.

6) Obtain a CFG for the following language :
   L = {w | n_a (w) = n_b(w)}.

7) Define Recursive and Recursively enumerable languages.

8) Write a note on halting problems in Turing machine.

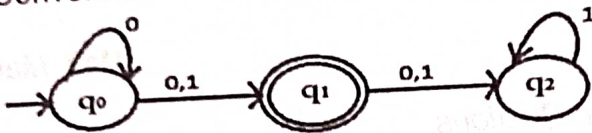# SECTION – B

II. Answer **any four** questions. **Each** question carries **10** marks.   (4×10=40)

9) Convert the following NFA to its equivalent DFA.   **10**

10) Minimize the following DFA.   **10**

States	Σ	
	0	1
→ A	B	F
B	G	C
*C	A	C
D	C	G
E	H	F
F	C	G
G	G	E
H	G	C

11) Define PDA. Obtain a PDA to accept the language L = {w | w ∈ (a + b)* and n_a (w) = n_b(w)} by a final state. Show the ID's for the strings aaabbb, aabbb.   **10**

12) Obtain a turing machine to accept the language L = {$0^n 1^n$ | n >= 1}.   **10**

13) a) Simplify the given grammar.   **5**

$S \to A11B / 11A$

$S \to AB / 11$

$A \to 0$

$B \to BB$

b) Convert the following grammar in to CNF.   **5**

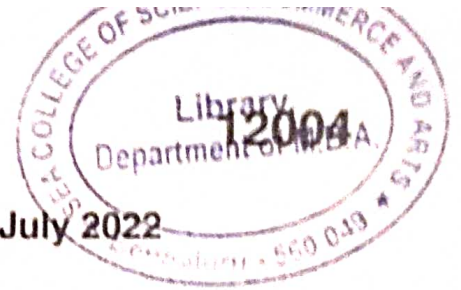$S \to 0A / 1B$

$A \to 0AA / 1S / 1$

$B \to 1BB / 0S / 0$

14) State and explain Cook's theorem.   **10**

First Semester M.Sc. Degree Examination, July 2022
(CBCS Scheme)
COMPUTER SCIENCE
Paper : MSC 104T – Advanced Architecture

Time : 3 Hours

Max. Marks : 70

Instruction : Answer **any five** questions from Part – **A**, **four** questions from Part – **B**.

PART – A

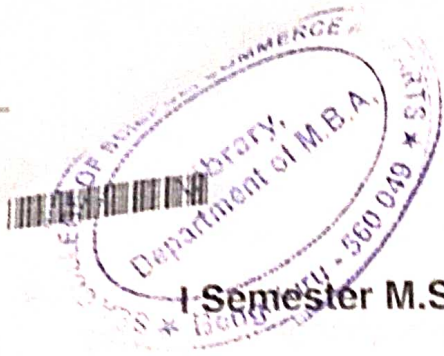Answer **any five** questions, **each** carries **6** marks.   (5×6=30)

1. Explain distributed memory multicomputers.

2. Explain different architectural development tracks.

3. Explain program flow mechanism.

4. Explain granurality and latency.

5. Differentiate between RISC and CISC architectures.

6. Explain Gustafson's law.

7. With the help of a neat diagram, explain memory hierarchy.

8. What is multithreading ? What are the advantages of multithreading ?

PART – B

Answer **any four** questions. **Each** carries **10** marks.   (4×10=40)

9. With the help of a neat diagram, explain VLIW architecture.

10. Explain data flow mechanism.

11. Briefly explain Backplane bus systems.

12. Explain super scalar and vector processor.

13. Explain the different latency hiding techniques.

14. Explain distributed memory MIMD architecture.

12005

I Semester M.Sc. Degree Examination, May/June 2023
(CBCS Scheme) (F+R)
COMPUTER SCIENCE
MSC 107T : Soft Core – Quantitative, Teaching and Research Aptitude

Time : 3 Hours

Max. Marks : 70

Instruction : *Answer **all** the Sections.*

SECTION – A

I. Answer **any five** questions. **Each** question carries **6** marks. (5×6=30)

1) Find the greatest 4-digit number such that when divided by 16, 24 and 36 leaves remainders 4 in each case.

2) Two cards are drawn at random from a pack of 52 cards. What is the probability that either both are black or both are queen ?

3) In how many different ways can the letters of the word 'MACHINE' be arranged so that the vowels are never together ?

4) A and B can do a piece of work in 9 days, B and C can do it in 12 days, A and C can do it in 18 days. In how many days will A, B and C finish it, working together and separately ?

5) What was the day of week on 15th August 1947 ?

6) Distinguish between deductive and inductive reasoning with an example.

7) Explain the factors affecting the learning.

8) Describe the methods of research.

SECTION – B

II. Answer **any four** questions. **Each** question carries **10** marks. (4×10=40)

9) a) A bag contains 6 white and 4 black balls. Two balls are drawn at random. Find the probability that they are of the same color. 5

   b) Find the wrong number in the series : 5
   2, 9, 28, 65, 126, 216, 344.
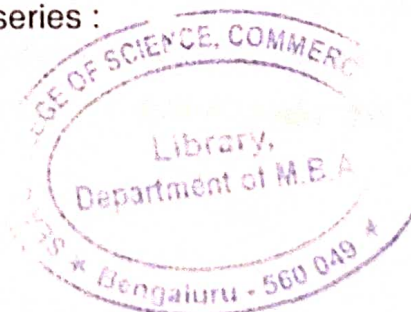
P.T.O.

10) a) Explain the test divisibility.

   b) The traffic lights at three different signal points change after every 45 seconds, 75 seconds and 90 seconds respectively. If all the traffic signals change simultaneously at 7 : 20 : 15 hours, then at what time (hours) they will change again simultaneously ?   5

11) a) Two pipes A and B can fill a tank in 20 and 30 minutes respectively. If both the pipes are used together, then how long will it take to fill the tank ?   5

   b) The salaries of A, B, C are in the ratio 2 : 3 : 5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be the new ratio of their salaries ?   5

12) Explain the basic requirements of teaching.   10

13) Explain the steps and ethics of research.   10

14) Write a note on the following :   5

   a) Communication.   5

   b) Formal and distance education.

I Semester M.Sc. Examination, July 2022
(CBCS)
COMPUTER SCIENCE
MSC 107T : Quantitative, Teaching and Research Aptitude (Soft Core)

Time : 3 Hours

Max. Marks : 70

Instruction : Answer 5 questions from Section – A and answer 4 questions from Section – B.

SECTION – A

Answer **any five** questions. **Each** question carries **6** marks.   (5×6=30)

1. How many words can be formed from the word 'DIRECTOR' so that the vowels are always together ?

2. A box contains 4 red and 6 white balls. Two draws of one ball each are made without replacement. What is the probability that one is white and other is red ?

3. Rajiv's age after 15 years will be 5 times his age 5 years back. What is the present age of Rajiv ?

4. A train is moving at a speed of 132 km/hr. If the length of the train is 110 meters, how long will it take to cross a railway platform of 165 meters long ?

5. If the sales tax is reduced from 3½% to $3^1/_3$%, then what difference does it make to a person who purchases an article with marked price of ₹ 8,400 ?

6. Discuss different types of communication.

7. If $a^2 + b^2 = 117$ and $ab = 54$ then find the value of $[(a+b)/(a – b)]$ and find out $(a + b)^3$ and $(a – b)^3$.

8. Differentiate between formal education and distance education in India.

12005

SECTION – B

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

(4×10=40)

9. a) Find the LCM of 72,108 and 2100 using both factorization method and division method. 4

   b) Write the divisibility rules by 8, 9 and 11 and test the same with the number 98789652 using the divisibility rules stated. 6

10. a) A and B can do a piece of work in 18 days, B and C can do it in 24 days, A and C can do it in 36 days. In how many days will A, B and C finish it, working together and separately ? 5

   b) A car travels a distance of 170 km in 2 hours partly at a speed of 100 km/hr and partly at 50 km/hr. Find the time it travels at a speed of 100 km/hr. 5

11. a) A person incurs 5% loss by selling a watch for Rs. 114. At what price should the watch be sold to earn 5% profit ? 6

   b) A bag contains 50p, 25p, 10p coins in the ratio 5:9:4 amounting to 206. Find the number of coins of each type. 4

12. a) Discuss the factors affecting teaching. 4

   b) What are the basic requirements of good teaching ? Discuss the qualities of a good teacher and a good student. 6

13. a) Explain the steps involved in research. 6

   b) Explain Governance Policy and Administration of higher education system in India. 4

14. a) What was the day of the week on 15th August 1947 ? 5

   b) The HCF of two numbers is 11 and their LCM is 693. If one of the numbers is 77, find the other number. 5

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12004

First Semester M.Sc. Degree Examination, July 2022
(CBCS Scheme)
COMPUTER SCIENCE
Paper : MSC 104T – Advanced Architecture

Time : 3 Hours

Max. Marks : 70

Instruction : Answer **any five** questions from Part – **A**, **four** questions from Part – **B**.

PART – A

Answer **any five** questions, **each** carries **6** marks. (5×6=30)

1. Explain distributed memory multicomputers.

2. Explain different architectural development tracks.

3. Explain program flow mechanism.

4. Explain granurality and latency.

5. Differentiate between RISC and CISC architectures.

6. Explain Gustafson's law.

7. With the help of a neat diagram, explain memory hierarchy.

8. What is multithreading ? What are the advantages of multithreading ?

PART – B

Answer **any four** questions. **Each** carries **10** marks. (4×10=40)

9. With the help of a neat diagram, explain VLIW architecture.

10. Explain data flow mechanism.

11. Briefly explain Backplane bus systems.

12. Explain super scalar and vector processor.

13. Explain the different latency hiding techniques.

14. Explain distributed memory MIMD architecture.

I Semester M.Sc. Examination, July 2022
(CBCS Scheme)
COMPUTER SCIENCE
MSC103T : Theory of Computation

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **any five** questions from Section – **A,** each carries **six** marks.
2) Answer **any four** questions from Section – **B,** each carries **10** marks.

SECTION – A

Answer **any five** questions. (5×6=30)

1. What is finite automata ? Explain any four applications of finite automata. 6

2. Design a DFA that accepts the strings of 0's and 1's that have a sequence 01, somewhere in the string. Illustrate the behaviour of the DFA on any two strings. 6

3. Explain chomsky hierarchy of grammars with examples. 6

4. What is an ambiguous grammar ? Check whether the following grammar is ambiguous ? 6

   S → AB/C

   A → aAb/ab

   B → cBd/cd

   C → aCd/aDd

   D → bDc/bc

5. Prove that CFL's are closed under union, concatenation and star. 6

6. Simplify the following CFG . 6

   S → a/aA/B/C

   A → aB/^

   B → aA

   C → cCD

   D → ddd

12003

7. Define Recursive and Recursively enumerable languages.   6

8. Define TM, ID of a TM and language acceptance of a TM.   6

SECTION – B

Answer **any four** questions.   (4×10=40)

9. Define DFA and NFA. Convert the following NFA to an equivalent DFA.   10

δ_N	a	b
→ A	{A, B}	{A}
B	ϕ	{C}
C	ϕ	{D}
* D	ϕ	ϕ

10. State and prove pumping lemma for regular languages and prove that the following language is not regular.   10

$L = \{\omega\omega^R / \omega \in (a+b)^*\}$

11. Minimize the following DFA.   10

δ	a	b
→ A	B	A
B	A	C
C	D	B
* D	D	A
E	D	F
F	G	E
G	F	G
H	G	D

12. Obtain a PDA to accept the language $L = \{a^n b^{2n}/n \geq 1\}$ using final state acceptance. Check whether the strings aabbbb and aabbb is accepted by the PDA.   10

13. Define GNF and convert the following grammar into GNF.   10

S → AB1/0
A → 00A/1A1
B → 1A1

14. Explain Church-Turing Thesis and Godel Numbering.   10

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I Semester M.Sc. Examination, July 2022
(CBCS Scheme)
COMPUTER SCIENCE
MSC 101T : File Structures

Time : 3 Hours

Max. Marks : 70

Instructions : *Answer any five questions from Section – A and answer any four questions from Section – B.*

SECTION – A

Answer **any five** of the following questions. **Each** carries 6 marks.   (5×6=30)

1. Differentiate between logical file and physical file.

2. Describe the following :
   i) seek ( ) function.
   ii) Relative Record Number.

3. Define data compression. Explain any two data compression techniques.

4. Explain k-way merging with suitable example.

5. Explain in detail an object oriented representation of B–tree.

6. Explain briefly the simple prefix B+ tree.

7. Explain the internal structure of index set blocks.

8. How do linear probing, quadratic probing and chaining useful in collision resolution ?

SECTION – B

Answer **any four** of the following questions. **Each** carries 10 marks.   (4×10=40)

9. a) What is buffer ? Discuss the management of System Input-Output buffers.   7
   b) Explain the functions OPEN, READ and WRITE with parameters.   3

10. What is co-sequential processing ? What are the assumptions and components of the model ?

11. What is meant by multi-level indexing ? Explain briefly the concept of B–trees in multilevel.

12. Explain the organization of an index in an index sequential file, indicating how insertion and deletions are handled.

13. Construct B–tree of order 3 for the following input elements. The leaf node capacity is 2 elements.

    15, 10, 71, 5, 0, 3, 8, 16, 14, 72, 40

14. Define extendible hashing. With example, explain the working of extendible hashing where bucket size = 3 and hashing function h(k) = k. Key elements to be inserted are 16, 22, 24, 10, 31, 9, 20, 26.
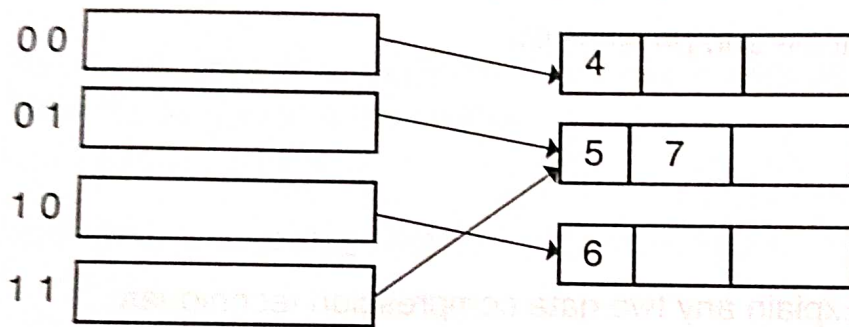
III Semester All P.G. Degree Examination, April/May 2022
(CBCS Scheme)
COMPUTER SCIENCE
Open Elective – Cyber Space

Time : 3 Hours

Max. Marks : 70

Instruction: Answer **all** questions in Part – **A**, any **4** in Part – **B** and any **3** in Part – **C**.

PART – A

Answer **all** questions, **each** question carries **2** marks. (10×2=20)

1. Write any two differences between Internet and Intranet.

2. Define URL.

3. Write any two uses of Twitter.

4. What is a protocol ? Expand HTTP.

5. Define EDI.

6. What are E-Markets ?

7. List any four popular E-Commerce websites.

8. Define E-Governance.

9. What is a Malware ?

10. Define Digital Signature.

PART – B

Answer **any four** questions, **each** question carries **5** marks. (4×5=20)

11. Briefly explain the structure of the HTML document.

12. Write a short notes on formatting tags in HTML.

P.T.O.

35019

13. What is an IP address ? Explain the difference between static and dynamic IP address.

14. Explain the difference between B2B and B2C business models.

15. Explain any four benefits of E-Governance.

16. Explain the different approaches to protect from cyber-attacks.

PART – C

Answer **any three** questions, **each** question carries **10** marks.   (3×10=30)

17. a) Define WWW. Explain the role of a web server.   5
    b) What is TCP/IP ? Explain why TCP/IP is called language of Internet.   5

18. a) What is a search engine ? Explain the working of a search engine.   5
    b) Write a short note on social media platform Linked In.   5

19. a) Explain the advantages of using E-commerce.   5
    b) Explain the architecture frame work of E-commerce.   5

20. a) What are the salient features of Information Technology Act, 2000 ?   5
    b) Explain the stages of E-Governance in detail.   5

21. a) What are the procedure and powers of Cyber Appellate Tribunal ?   5
    b) Briefly explain the advantages and disadvantages of using social media.   5

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III Semester M.Sc. Examination, April/May 2022
(CBCS Scheme)
COMPUTER SCIENCE
MSC303T : Cryptography and Network Security

Time : 3 Hours

Max. Marks : 70

PART – A

Answer **any five** questions. **Each** question carries **6** marks. (5×6=30)

1. What is IDS ? Explain the profile based IDS.

2. Explain Secure Hashing Algorithm.

3. How S/MIME provides security for E-mail applications ?

4. Explain Pretty Good Privacy in detail.

5. Write a note on Encapsulating Security Payload.

6. Write a note on Secure Electronic Transaction.

7. Write a note on Web Security.

PART – B

Answer **any four** questions. **Each** question carries **10** marks. (4×10=40)

8. Explain the operations, requirements, components of Network Security Model.

9. Explain the various active attacks. What security mechanisms are suggested to counter attack active attacks ?

10. Give the structure of HMAC. Explain the application of HMAC.

11. Explain the main features of Kerberos Version 5.

12. What are the services provided by IPSec ? Where can be IPSec located on a network ?

13. Explain the four protocols defined by Secure Socket Layer.

14. Briefly explain about Digital Signature and write any three applications.

III Semester M.Sc. Examination, April/May 2022
(CBCS Scheme)
COMPUTER SCIENCE
Paper – MSC301T : Advanced Web Programming

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **any 5** questions from Section – **A**.
2) Answer **any 4** questions from Section – **B**.

SECTION – A

Answer **any five** questions. **Each** question carries **6** marks. (5×6=30)

1. What are the three categories of Perl variables ? Give examples for each.

2. Explain some of the common CGI.pm functions.

3. Write the major steps to access database MYSQL using Perl with example.

4. Explain the applications Java Server Pages.

5. Explain $_POST and $_GET in PHP with example.

6. With example explain selection and loop statements in Ruby.

7. Explain Code blocks and iterations in ruby.

8. Explain how Rails Implements Ajax.

SECTION – B

Answer **any four** questions. **Each** question carries **10** marks. (4×10=40)

9. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table. 10

10. Explain how html pages are created dynamically in CGI with example. 10

11. a) Explain file handling functions in PHP with example. 5
    b) Explain any five string handling functions in PHP. 5

12. a) Explain built-in methods and lists in ruby. 5
    b) Explain the scalar types in Ruby. 5

13. Explain the directory structure of Rails applications with a neat diagram. 10

14. Create a XHTML form with Name, Address Line 1, Address Line 2 and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name. 10

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III Semester M.Sc. Degree Examination, May/June 2023
(CBCS Scheme) (F + R)
COMPUTER SCIENCE
MSC302T : Advanced Algorithms

Time : 3 Hours

Max. Marks : 70

Instruction : *Answer* **all** the Parts.

PART – A

I. Answer **any five** questions. **Each** carries **6** marks. (5×6=30)

1) Define and explain various asymptotic notations used to represent the rate of growth of algorithms running time.

2) Give an account of algorithmic problem solving.

3) Describe Dijkstra's algorithms with an example. Mention its complexity.

4) Give an account of asymptotic notations with examples.

5) Explain NP class problem with suitable example.

6) Write a note on TSP approximation algorithm.

7) Write a note on probabilistic algorithm.

8) Explain how backtracking algorithm is used to solve the sum of the subset problem and trace it for instant S = {2, 5, 6, 7, 8} and d = 15.

PART – B

II. Answer **any four** questions. **Each** carries **10** marks. (4×10=40)

9) Apply Ford-Fulkerson algorithm for the following flow network 'G' given in the figure below discuss the steps. 10
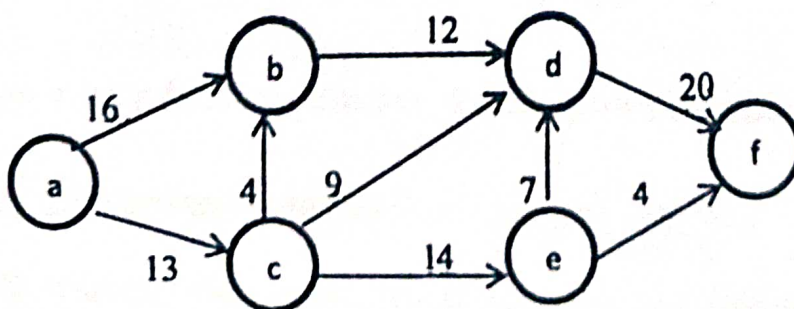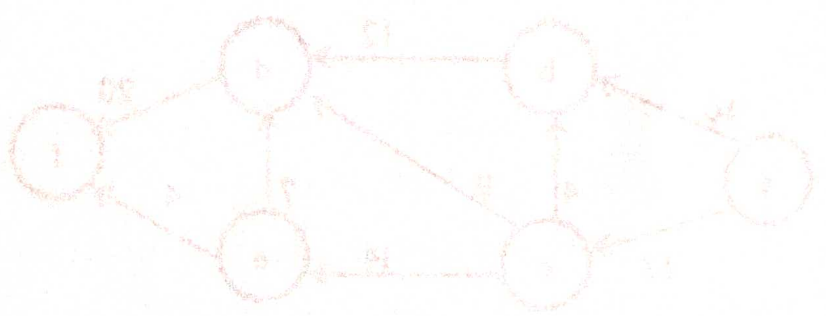
10) Explain approximation vertex cover algorithm with neat diagram. Explain operation through pseudo code. **10**

11) a) Can we gain more speed by trading space ? Explain with an example algorithm. **5**

   b) Produce Rabin-Carp string matching algorithm. **5**

12) a) Explain parallel merge sort algorithm and its efficiency. **5**

   b) How are the approximation algorithms evaluated for their efficiency ? **5**

13) Explain Monte Carlo and Las Vegas algorithms with examples. **10**

14) Write a short note on the following :
   a) Branch and bound. **5**
   b) Knapsack algorithm. **5**

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III Semester M.Sc. Examination, May/June 2023
(CBCS Scheme) (F + R)
COMPUTER SCIENCE
MSC 303T : Cryptography and Network Security

Time : 3 Hours

Max. Marks : 70

Instruction : *Answer all the Parts.*

PART – A

I. Answer **any five** questions. **Each** question carries **6** marks.   (5×6=30)

1) Explain the critical characteristics of information.

2) How to secure remote connections through VPN ?

3) Explain DES algorithm in detail.

4) Explain Conventional Encryption principles and algorithms.

5) Give a description of the operations in PGP.

6) Explain the SSL handshake protocol action in detail.

7) Discuss principles and applications of public key cryptosystems.

8) Explain information security blueprint.

PART – B

II. Answer **any four** questions. **Each** question carries **10** marks.   (4×10=40)

9) a) Explain the information security policies, standards and practices.   5

   b) Explain the organization hierarchy for approaches to information security
      implementation.   5

10) Explain the technical details of firewall and describe any 3 types of firewall with neat diagram and mention the advantages of firewall.   10

11) a) Explain the Diffie – Hellman key exchange algorithm with an example.   5

    b) Discuss the applications of public key cryptosystems.   5

12) a) Discuss the procedure for authentication with Kerberos realm.   5

    b) How S/MIME provides security for E-mail applications ?   5

13) Explain in detail SET protocol.   10

14) Write a note on :

    a) HMAC   5

    b) SNMP.   5

12001

First Semester M.Sc. Degree Examination,
August/September 2021

(CBCS Scheme)

Computer Science

Paper MSC 101T – FILE STRUCTURE
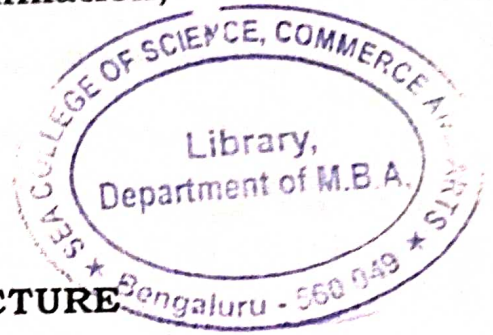
Time : 3 Hours]   *[Max. Marks : 70*

Instructions to Candidates : Answer all the Sections.

SECTION – A

Answer any **FIVE** questions :   **(5 × 6 = 30)**

1. Explain the file related functions OPEN, READ, WRITE and SEEK with parameters.

2. What are the different ways of adding structure to a file to maintain the identity of records? Explain with example.

3. Describe how co-sequential processing is implemented in a general ledger program.

4. Explain B-Tree methods for delete and search with necessary C++ code.

5. Explain paged binary tree, AVL tree with neat diagram.

6. With suitable example, explain how spaces can be reclaimed in files after record deletion.

7. Define hashing. Write a simple hashing algorithm and explain with an example.

8. Explain the internal structure of index set blocks in simple prefix B+ Tree.

SECTION – B

(4 × 10 = 40)

9. Define max heap. Explain heap sort algorithm for given set of elements and show the tree diagram at each insertion of the element.

   25, 35, 15, 7, 9, 10, 12, 50.

10. Discuss how changes involving multiple blocks in the simple prefix B+ Tree when new record is added.

11. Define Inheritance. Explain how inheritance is used for record buffer classes.

12. Given a 2-3 B-Tree of order 3 with a leaf node capacity to hold 2 records, build B-Tree for the following inputs. Trace the B-Tree insertion for the numbers given below :

    33, 9, 10, 50, 13, 15, 12, 40, 9, 8.

13. What are the different collision resolution techniques? Explain.

14. Given the bucket size of 3 and the following diagram of hashing with a hashing function $h(k) = K$, insert the following records :

    12, 5, 7, 9, 8, 14, 6, 10 using extendible hashing.

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2/2

12002

First Semester M.Sc. Degree Examination, August/September 2021

(CBCS Scheme)

Computer Science
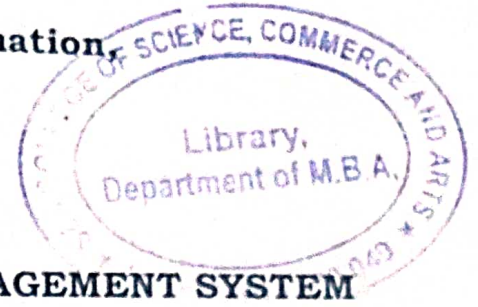
Paper MSC 102T – ADVANCED DATABASE MANAGEMENT SYSTEM

Time : 3 Hours]

[Max. Marks : 70

Instructions to Candidates : Answer all Sections.

SECTION – A

Answer any **FIVE** of the following. Each question carries **6** Marks :   (5 × 6 = 30)

1. Explain the characteristics in Data Base Management System.

2. Explain different ACID properties in Data Base System.

3. What are the different security issues in Data Base Security?

4. Explain the inter and intra operations parallelism.

5. Explain the Three Schema Architecture.

6. Explain the multimedia databases with example.

7. What are different concurrency control techniques?

8. Explain the Distributed Query Processing.

SECTION – B

Answer any **FOUR** of the following. Each question carries **10** Marks :

(4 × 10 = 40)

9. Explain 1 NF, 2 NF, 3 NF and BCN normalizations with an example.

10. Explain the Deadlock security issues and control measures.

11. Write the client server Architecturer with neat diagram.

12. Write short notes on distributed database concepts.

13. Explain briefly about the Spatial Databases and Web Databases.

14. What are Different Database Recovery Techniques? Explain with an example.

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1/1
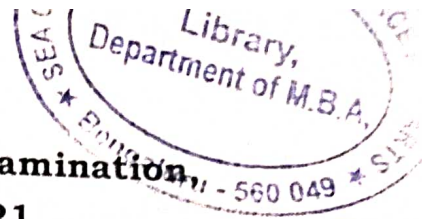
12003

First Semester M.Sc. Degree Examination, August/September 2021

(CBCS Scheme)

Computer Science

Paper MSC 103T – THEORY OF COMPUTATION

Time : 3 Hours]

[Max. Marks : 70

Instructions to Candidates : Answer all the Sections.
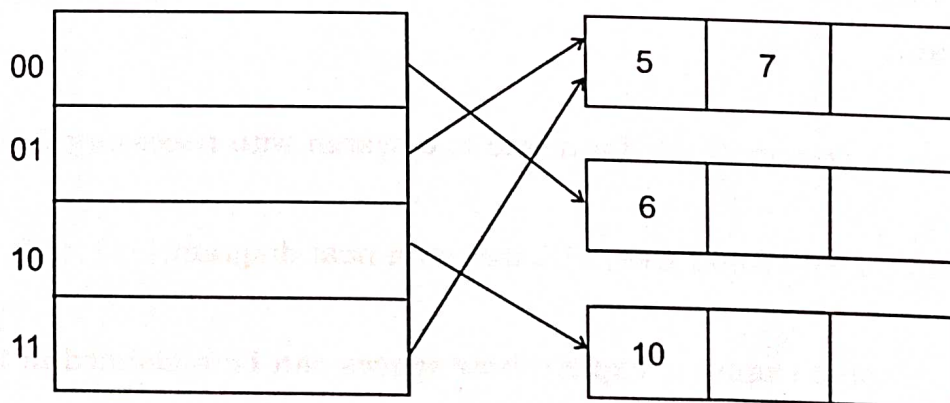
SECTION – A

Answer any **FIVE** questions, each carries **6** marks : **(5 × 6 = 30)**

1. (a) Define DFA and the language accepted by DFA?

    (b) Draw a DFA to accept strings of 0's and 1's ending with 101.

2. Convert the following NFA to Equivalent DFA
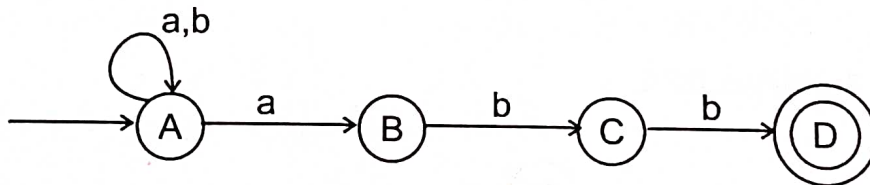
3. Construct an NFA with ∈ moves for the regular expression $(0+1)^* 1 (0+1)$.

4. Explain the different types of grammar.

5. What do you mean by ambiguous grammar? Show that the following grammar is ambiguous.

    S → aB/bA

    A → aS/bAA/a

    B → bS/a BB/b

6. Define Pushdown Automata. Explain the instantaneous description of PDA and its language acceptance.

7. Obtain the equivalent PDA for the grammar.

   $S \rightarrow$ aABC

   $A \rightarrow$ aB/a

   $B \rightarrow$ bA/b

   $C \rightarrow$ a

8. Write a short note on Godel's Numbering system.

SECTION – B

Answer any **FOUR** questions, each carries **10** marks :   **(4 × 10 = 40)**

9. Define FA. Explain and compare the different types of Finite Automata each with an example.

10. Minimize the following DFA.
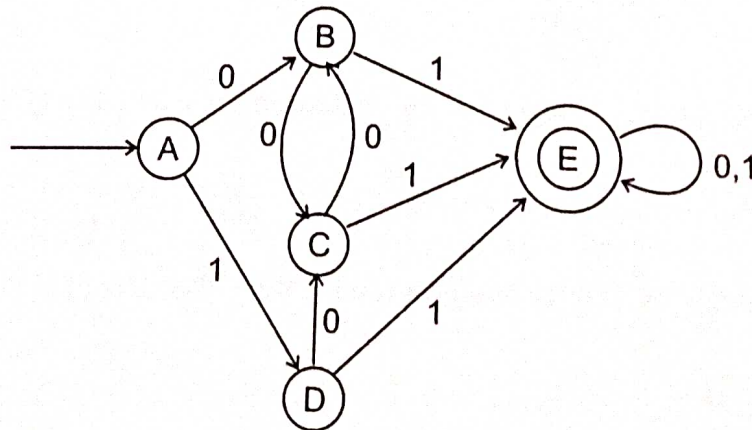
11. Obtain a PDA to accept the language $L(M) = \{w \subset w^R / w \in (a+b)^*\}$ where w^R is the reverse of w. Prove that it is deterministic too.

12. (a) Prove that the regular languages are closed under union, intersection and difference.

(b) Reduce the following grammar into CNF

$S \rightarrow 0A/1B$

$A \rightarrow 0AA/1S/1$

$B \rightarrow 1BB/0S/0$
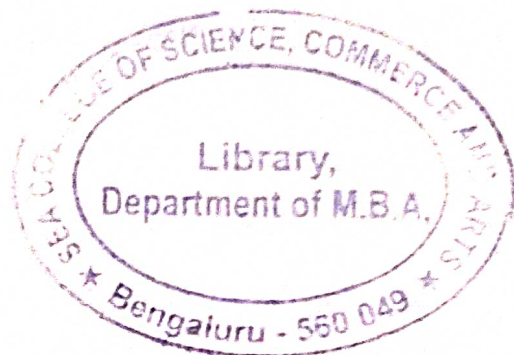
13. Obtain a turning machine to accept the language $L = \{0^n 1^n / n >= 1\}$

14. State and explain Cook's theorem.

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12004

First Semester M.Sc.(CS) Degree Examination, January/February 2020

(CBCS Scheme)

Computer Science

Paper MSC 104 T – ADVANCED ARCHITECTURE

Time : 3 Hours]   [Max. Marks : 70

Instructions to Candidates :

    1)   Answer any **FIVE** questions from Section A.

    2)   Answer any **FOUR** questions from Section B.

SECTION – A

Answer any **FIVE** questions. Each question carries **6** marks :   **(5 × 6 = 30)**

1.   Explain classification of instruction set architecture. Give their relative merits and demerits.   **(6)**

2.   (a)   Define pipeline hazards.   **(3 + 3)**

    (b)   List all categories of pipeline hazards and discuss any two in detail.

3.   Discuss shared memory multiprocessor with a neat diagram.   **(6)**

4.   (a)   Discuss program flow mechanism.   **(3 + 3)**

    (b)   Explain grain size and latency.

5.   Explain SIMD computers in detail.

6.   Discuss virtual memory and its categories.

7.   State principle of locality and list types of locality.

8.   Write the benefits of multicore architecture.

SECTION – B

Answer any **FOUR** questions. Each question carries **10** marks :   **(4 × 10 = 4**

9.   (a)   What is parallelism? What are the various conditions of parallelism? **(6 +**

    (b)   Explain different levels of parallelism in detail.

10. (a) Explain distributed memory with multi computers. (4 + 6)

    (b) Discuss architectural development tracks in detail.

11. (a) Explain Super scalar processing. (5 + 5)

    (b) Discuss VLIW architecture.

12. Discuss various approaches for ILP using suitable examples.

13. Discuss primary dynamic approaches to detect instruction level parallelism.

14. (a) Differentiate between centralized shared memory processor and distributed memory multiprocessor. (5 + 5)

    (b) What is multi threading and discuss thread level parallelism in detail.

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12005

First Semester M.Sc. Degree Examination, August/September 2021

(CBCS Scheme)

Computer Science

Paper MSC 107T (Soft Core) – QUANTITATIVE, TEACHING AND RESEARCH APTITUDE
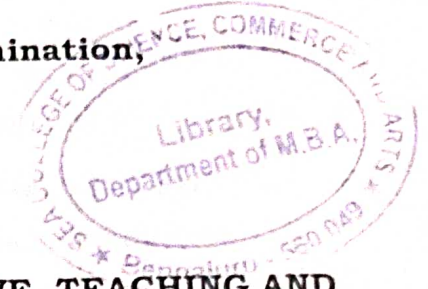
Time : 3 Hours]   [Max. Marks : 70

Instructions to Candidates : Answer all the Sections.

SECTION – A

Answer any **FIVE** questions. Each question carries **6** marks :   (5 × 6 = 30)

1. Describe the method of research.

2. Explain the factors affecting the Learning.

3. Rohit was 4 times old as his son 8 years ago. After 8 years, Rohit will be twice as old as his son. What is their present age?

4. What was the day of week on 15th August 1947?

5. At what time between 4 and 5 O' clock will the hands of a clock be at right angle?

6. Find the compound interest on Rs. 20,000 at 20% per annum for 9 months, compound quarterly.

7. Explain the Workshop, Conference and Symposium.

8. Distinguish between Deductive and Inductive reasoning with example.

SECTION – B

Answer any **FOUR** questions. Each question carries **10** marks :   (4 × 10 = 40)

9. (a) Two dice are thrown together. What is the probability that the sum of the numbers on the two faces is divisible by 4 or 6?

   (b) Find the wrong number in the Series : 3, 8, 15, 24, 34, 48 and 43.

10. Explain Thesis writing and its characteristics.

11. Explain the basic requirement of teaching.

12. Explain the Steps, Method and ethics of research.

13. (a) Explain the characteristics and types of communication.

    (b) Explain policy and administration of Higher education system.

14. (a) Explain the Test Divisibility.

    (b) A bag contains 6 white and 4 black balls. Two balls are drawn at random. Find the probability that they are of same color.

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First Semester M.Sc.(CS) Degree Examination, January/February 2020

(CBCS Scheme)

Computer Science

Paper MSC 101 T – FILE STRUCTURES

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to Candidates :

    1)   *Answer any **FIVE** questions from Part A.*

    2)   *Answer any **FOUR** questions from Part B.*

PART – A

Answer any **FIVE** of the following questions. Each carries **6** marks :   **(5 × 6 = 30)**

1. Write a C++ program to copy the contents of one text file and display the contents in reverse order.

2. Define track, sector and cylinder. If the Seagate cheetah-9 disk drive having 512 bytes per sector, 170 sectors per track, 16 tracks per cylinder and 526 cylinders. Find Track capacity, Cylinder capacity and Drive capacity.

3. Discuss any four UNIX file system commands for operations on files.

4. Write a C++ program or algorithm to search a record using RRN.

5. Define B-tree. Represent B-tree using object-oriented mechanism by considering search operation.

6. Differentiate between internal sorting and external sorting techniques.

7. List the needs of data compression. Explain Run-length encoding algorithm with an example.

8. What is file OPEN, READ and CLOSE operations? Discuss with an example.

PART – B

Answer any **FOUR** of the following questions. Each carries **10** marks :

                                    (4 × 10 = 40)

9. Write a C++ program to read and write student object with fixed length records and the fields delimited by "1". Implement pack (), unpack (), modify () and search () methods.

10. Demonstrate the extendable hashing by inserting the following records:

    3, 6, 5, 4, 1, 8, 14, 9, 0, 2, 7.

    Using bucket size as 2, elements 3, 6, 5, 4 are hashed in the following manner.
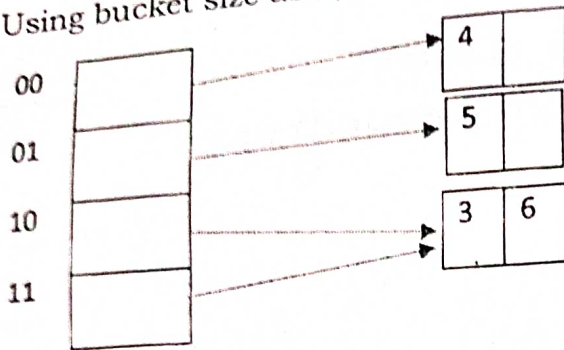
11. Given a B-tree of order 3 with leaf node capacity to hold 2 records, build B-tree for the following inputs.

    8, 18, 22, 5, 17, 14, 11, 28, 13

    Delete elements 22 and 17. Show the tree at each iteration.

12. (a) Discuss hard disk and compact disk as an efficient storage mechanism to handle files.

    (b) Discuss how Solid State Drive (SSD) is different from Hard Disk Drive.

    (5 + 5)

13. Explain the following :

    (a) Unix directory structure.

    (b) Key sorting algorithm.

14. Explain the working of k-way merge sort algorithm. Given the following input, sort the numbers using 2-way merge sort.

    2, 6, 9, 4, 3, 2, 8, 1, 7.

    _____

12002

First Semester M.Sc.(CS) Degree Examination, January/February 2020

(CBCS Scheme)

Computer Science

Paper MSC 102 T – ADVANCED DATABASE MANAGEMENT SYSTEM

Time : 3 Hours]

[Max. Marks : 70

Instructions to Candidates :

1) Answer any **FIVE** questions from Section A.
2) Answer any **FOUR** questions from Section B.

SECTION – A

Answer any **FIVE** questions. Each question carries **6** marks :　　　　(5 × 6 = 30)

1. Explain the characteristics of Database approach.

2. Define data warehousing and explain its architecture.

3. Design an E-R diagram for bank database.

4. Explain the optimistic concurrency control techniques in detail.

5. Describe the desirable properties of transaction.

6. Describe Shadow paging in detail.

7. Differentiate between ODB and RDB.

8. Explain the different types of parallel database architecture.

SECTION – B

Answer any **FOUR** questions. Each question carries **10** marks :　　(4 × 10 = 40)

9. (a) Explain 3 schema architecture of database.　　　　　　　　(6 + 4)

   (b) What is normalization? Explain BCNF with example.

10. Briefly describe the concurrency control based on timestamp ordering.

11. Explain inter query and intra query parallelism in detail.

12. Explain ARIES recovery algorithm.

13. Explain the concept of distributed databases. Discuss the merits and demerits of distributed databases.

    (5 + 5)

14. Write short notes on :

    (a) I/O parallelism

    (b) Multimedia database.

    _____

12004

First Semester M.Sc.(CS) Degree Examination, January/February 2020

(CBCS Scheme)

Computer Science

Paper MSC 104 T – ADVANCED ARCHITECTURE

Time : 3 Hours]

[Max. Marks : 70

Instructions to Candidates :

1) Answer any **FIVE** questions from Section A.
2) Answer any **FOUR** questions from Section B.

SECTION – A

Answer any **FIVE** questions. Each question carries **6** marks :   (5 × 6 = 30)

1. Explain classification of instruction set architecture. Give their relative merits and demerits.   **(6)**

2. (a) Define pipeline hazards.   **(3 + 3)**

    (b) List all categories of pipeline hazards and discuss any two in detail.

3. Discuss shared memory multiprocessor with a neat diagram.   **(6)**

4. (a) Discuss program flow mechanism.   **(3 + 3)**

    (b) Explain grain size and latency.

5. Explain SIMD computers in detail.

6. Discuss virtual memory and its categories.

7. State principle of locality and list types of locality.

8. Write the benefits of multicore architecture.

SECTION – B

Answer any **FOUR** questions. Each question carries **10** marks :   (4 × 10 = 40)

9. (a) What is parallelism? What are the various conditions of parallelism? **(6 + 4)**

    (b) Explain different levels of parallelism in detail.

10. (a) Explain distributed memory with multi computers.

    (b) Discuss architectural development tracks in detail.

                                        (4 + 6)

11. (a) Explain Super scalar processing.

    (b) Discuss VLIW architecture.

                                        (5 + 5)

12. Discuss various approaches for ILP using suitable examples.

13. Discuss primary dynamic approaches to detect instruction level parallelism.

14. (a) Differentiate between centralized shared memory processor and distributed memory multiprocessor.

                                        (5 + 5)

    (b) What is multi threading and discuss thread level parallelism in detail.

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12003

Time : 3 Hours]

[Max. Marks : 70

Instructions to Candidates : Answer any **FIVE** *questions from Part A and Answer any* **FOUR** *questions from Part B.*

### PART – A

Answer any **FIVE** questions. Each question carries **6** marks :   (5 × 6 = 30)

1. (a)   What is mathematical induction?   (3)

    (b)   Explain any three different applications of Finite Automata.   (3)

2.   Draw a DFA to accept set of all strings on the alphabet $\Sigma = \{0, 1\}$ that either begins or ends or both with the substring 01.

3.   Explain leftmost derivation and rightmost derivation with an example,

4.   Show that $L = \{a^{n!} / n \geq 0\}$ is not regular.

5.   What are the variants of Turing machine?

6.   Define recursive and recursively enumerable languages.

7.   Explain about the halting problem.

8.   What are the NP-complete problems?

PART – B

Answer any **FOUR** questions. Each question carries **10** marks :   (4 × 10 = 40)

9.   Convert the following NFA to its equivalent DFA.
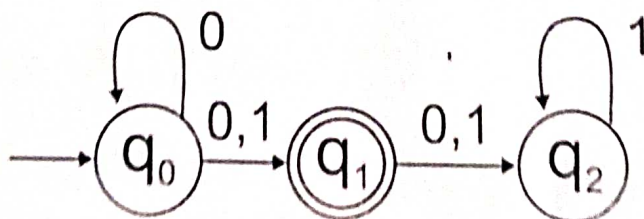
10. (a)   Explain Chomsky hierarchy with an example.   (6)

     (b)   Prove that CFLs are closed under union, concatenation and star.   (4)

11. Convert the following grammar into CNF:

$S \rightarrow 0A/1B$

$A \rightarrow 0AA/1S/1$

$B \rightarrow 1BB/0S/0$

12. Obtain a PDA to accept the language $L(M) = \{a^n b^n / n \geq 0\}$.

13. Design a Turing machine to accept the following language $L = \{0^n 1^n / n \geq 1\}$.

14. Write a short note on :

    (a)   Push down automata. **(5)**

    (b)   P and NP problem. **(5)**

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First Semester M.Sc.(CS) Degree Examination, January/February 2020

(CBCS Scheme)

Computer Science

Paper MSC 107 T – SOFT CORE – QUANTITATIVE, TEACHING AND RESEARCH APTITUDE

Time : 3 Hours]

[Max. Marks : 70

Instructions to Candidates :

1) Answer any **FIVE** questions from Section A.

2) Answer any **FOUR** questions from Section B.

SECTION – A

Answer any **FIVE** questions. Each question carries **6** marks : (5 × 6 = 30)

1. If $\dfrac{1}{3.718} = 0.2689$, then find the value of $\dfrac{1}{0.0003718}$.

2. Reduce $\dfrac{391}{667}$ to lowest terms.

3. If $\sqrt{3} = 1.732$, find the value of $\sqrt{192} - \dfrac{1}{2}\sqrt{48} - \sqrt{75}$ correct to 3 places of decimal.

4. The sum of two numbers is 16 and the sum of their square is 113. Find the numbers.

5. The ages of two persons differ by 16 years. If 6 years age, the elder one be 3 times as old as the younger one, find their present ages.

6. Find the largest among $4\sqrt{6}, \sqrt{2}$ and $\sqrt[3]{4}$.

7. Mention the main recommendations of Governance of higher education.

8. If 36 men can do a piece of work in 25 hours, in how many hours will 15 men do it?

SECTION – B

Answer any **FOUR** questions. Each question carries **10** marks :   **(4 × 10 = 40)**

9.   (a)   *A* can do a certain job in 12 days. *B* is 60% more efficient than *A*. How many days does *B* alone take to do the same job?   **(5 + 5)**

      (b)   Two pipes *A* and *B* can fill a tank in 36 hours and 46 hours respectively. If both the pipes are opened simultaneously, how much time will be taken to fill the tank?

10.   (a)   Peter can cover a certain distance in 1 hr and 24 minutes. By covering 2/3 of the distance at 4 kmph and the rest at 5 kmph. Find the total distance.   **(5 + 5)**

      (b)   A train 100 meters long takes 6 seconds to cross a man walking at 5 kmph in the direction opposite to that of the train. Find the speed of the train.

11.   (a)   How much water must be added to 60 ltrs of milk at $1\frac{1}{2}$ ltrs for Rs. 2 so as to have a mixture worth Rs. $10\frac{2}{3}$ a ltr?   **(5 + 5)**

      (b)   A certain sum of money amounts to Rs. 1008 in 2 years and to Rs. 1164 in $3\frac{1}{2}$ years. Find the sum and rate of interests.

12.   (a)   Explain the learners motivational characteristics.   **(5 + 5)**

      (b)   Explain the important factors affecting teaching.

13.   (a)   Explain the strategies for evaluating teaching effectiveness.   **(5 + 5)**

      (b)   Distinguish between qualitative and quantitative research.

14.   Explain the features and characteristics of a thesis.

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