Reg. No. : 23CSEC15

1230 Q.P. Code : [21 CSEEC 06]

(For the candidates admitted from 2021 onwards)

M.Sc. DEGREE EXAMINATION, APRIL/MAY 2023.

Second Semester

Computer Science

LINUX PROGRAMMING

Time : Three hours Maximum : 50 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The ———— interacts with the hardware and the ———— interacts with the user.

   (a) Shell, Kernel

   (b) Kernel, Shell

   (c) Environment variables, user defined variables

   (d) None of the above

2. In Linux, _____ is used to communicate with the kernel.

(a) System calls

(b) Library functions

(c) Both (a) and (b)

(d) None of the above

3. The _____ option of is command lists all files and subdirectories in a directory tree.

(a) –r (b) –d

(c) –R (d) –a

4. The _____ command in Linux is used to compare the content of two sorted files.

(a) Diff (b) cmp

(c) comm (d) none of the above

5. The number 1 is typically reserved for the special _____ process, which manages other processes.

(a) Foreground (b) Backround

(c) User process (d) init

6. _____ system call duplicates the current process, creating a new entry in the process table with many of the same attributes as the current process.

(a) exec family (b) fork

(c) system (d) None of the above

7. The _____ provides a means of passing data between two programs, without the overhead of invoking a shell to interpret the requested command.

(a) pipe ( ) (b) popen( )

(c) pclose( ) (d) All of the above

8. The simplest semaphore is a variable that can take only the values 0 and 1, is called a _____.

(a) Binary semaphore

(b) General semaphore

(c) Dual semaphore

(d) None of the above

9. The _____ argument determines the nature of the communication, including the address format.

(a) Communication (b) Protocol

(c) Domain (d) Type

10. _____ is connection oriented, rely on TCP to provide reliable two-way connected communication.

(a) Stream socket

(b) Datagram socket

(c) Both (a) and (b)

(d) None of the above

SECTION B — (5 × 3 = 15 marks)

Answer ALL questions.

Each answer should not exceed 400 words or 2 pages.

11. (a) Write short note on chmod command with suitable example.

Or

(b) What are three modes of VI editor?

12. (a) Distinguish the head and tail filters in Linux.

Or

(b) Describe test statement to evaluate expressions in Linux with suitable example.

13. (a) How do you create a new process using system library function?

Or

(b) How do you turn the particular signal to its default behavior?

14. (a) What is named pipe? Write the code to create the named pipe.

Or

(b) How do we control the shared memory?

15. (a) Elaborate about socket addressing structure.

Or

(b) Compare datagram socket with stream socket.

SECTION C — (5 × 5 = 25 marks)

Answer ALL questions.

Each answer should not exceed 800 words or 4 pages.

16. (a) Describe the features of Linux OS.

Or

(b) Illustrate the output of is command with –l option with a neat example.

17. (a) Explain case statement with a neat syntax in Linux OS. Give a suitable program.

Or

(b) Describe the use of stat, lstat and fstat system calls.

18. (a) Explain how to make several threads to have synchronized execution.

Or

(b) How do we replace a current process with a new process in Linux OS?

19. (a) Develop an application to send and receive data to and from the invoked program and invoking program using popen( ) and pclose( ).

Or

(b) What is message queue IPC? Explain its functions with a neat syntax.

20. (a) Create TCP echo client and server application.

Or

(b) Illustrate the flow of datagram socket connection via UDP.

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1231 **Q.P. Code : [21 CSEEC 05]**

(For the candidates admitted from 2021 onwards)

M.Sc. DEGREE EXAMINATION, APRIL/MAY 2023.

Second Semester

Computer Science

COMPILER DESIGN

Time : Three hours Maximum : 50 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which one of the following takes a program written in one programming language as input and produces a program in another language as output.

   (a) Compiler

   (b) Assembler

   (c) Interpreter

   (d) Translator

2. Parsing is also known as ————————.

(a) Lexical Analysis

(b) Syntax Analysis

(c) Semantic Analysis

(d) Code Generation

3. What does a bottom-up parser generate?

(a) Left-most derivation in reverse

(b) Left-most derivation

(c) Right-most derivation in reverse

(d) Right-most derivation

4. A lexical analyzer is also called as ————————.

(a) Token (b) Scanner

(c) Error handler (d) Code generator

5. Which of the following is a Grammar symbol?

(a) X (b) S

(c) Id (d) *

6. The ———————— parser starts with the root and work down to the leaves.

(a) Bottom-up (b) Zig – Zag

(c) Top-Down (d) Spiral

7. The simplest way to implement a symbol table is as a ———————— array of records.

(a) One-dimensional

(b) Two-dimensional

(c) Multi-dimensional

(d) Linear

8. In ———————— each leaf represents an operand and each interior node an operator.

(a) Parse trees

(b) Syntax trees

(c) Three address code

(d) Quadruple

9. Another form of local optimization is called as ————————.

(a) Peehole (b) Pehole

(c) Peephole (d) Peephol

10. The output of the code generator is ————————.

(a) Class (b) Object program

(c) Objects (d) Values

SECTION B — (5 × 3 = 15 marks)

Answer ALL the questions.

11. (a) Differentiate Compiler and Interpreter.

Or

(b) Describe the parameter passing mechanisms with an example.

12. (a) Define regular expressions and explain its properties.

Or

(b) Write the steps to convert Non-Deterministic Finite Automata (NFA) to Deterministic Finite Automata (DFA). Supply an example.

13. (a) Discuss the error-recovery strategies in parser.

Or

(b) Construct SLR Parsing table for the following context-free grammar.

S–>AA

A–>aA | b

14. (a) Discuss the variants of Syntax Trees.

Or

(b) Illustrate the structural equivalence of type expressions.

15. (a) Explain 'Data Flow Analysis' with its basic terminologies.

Or

(b) Explain Simple Code Generator Algorithm with neat steps.

SECTION C — (5 × 5 = 25 marks)

Answer ALL the questions.

16. (a) Discuss all the phases of a compiler with a neat diagram.

Or

(b) Classify the compiler construction tools in detail.

17. (a) Describe the role of the Lexical Analyzer in detail.

Or

(b) Demonstrate the design of the Lexical Analyzer.

18. (a) Define and explain the Context-Free Grammars.

Or

(b) Compare and contrast LR and LL Parsers.

19. (a) Define Syntax-Directed Definitions (SDD) and explain the evaluation orders for SDD's.

Or

(b) Explain in detail about storage organization with suitable examples.

20. (a) (i) Analyze the rules used for the construction of DAGs. (3)

(ii) Construct DAG for the following expression. (2)

$(a+b)\times(a+b+c)$.

Or

(b) Discuss the various issues in the design of a Code Generator.

Reg. No. : 22CSEE15

1133 **Q.P. Code : [21 CSEEC 08]**

(For the candidates admitted from 2021 onwards)

M.Sc. DEGREE EXAMINATION, APRIL/MAY 2023.

Second Semester

Computer Science

INTERNET OF THINGS

Time : Three hours Maximum : 50 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer

1. ———— Identify the lightweight protocol.

   (a) HTTP (b) MQTT

   (c) CoAP (d) IP

2. Expand REST

   (a) Representational State Transfer

   (b) Repetitive State Transfer

   (c) Representational Shift Transfer

   (d) Repetitive Shift Transfer

3. _____ establishes common grounding and common language for IoT architecture and IoT systems.

(a) IoT References model

(b) ISO model

(c) TCP/IP model

(d) Network model

4. _____ Layer is responsible for delivering application specific services to the user.

(a) Network (b) Perception

(c) Application (d) Presentation

5. IEEE 802.15.4e is a data link standard commonly used in _____ layer.

(a) LLC (b) MAC

(c) Application (d) Presentation

6. TCG stands for _____

(a) Trusted Computing Group

(b) Trusted Communication Group

(c) Third Criteria Group

(d) Trusted Capacity Group

7. WoT Platform Middleware is also called as _____

(a) M2M Framework

(b) Application Frameworks

(c) M2M Server

(d) Middleware Frameworks

8. _____ sits between an operating system behind the cloud and the cloud users /application.

(a) Cloud Middleware (b) Kernel

(c) Firmware (d) None of the options

9. _____ covers the domains of machine-to-machine (M2M) and industrial communication technologies with automation applications.

(a) Internet of Things

(b) Cloud of Things

(c) Industrial IoT

(d) Web of Things

10. Expand CPS.

(a) Cyber Physical Systems

(b) Cyber Physical Software

(c) Cyber Practice Software

(d) Cyber Physical Product

SECTION B — (5 × 3 = 15 marks)

Answer ALL questions.

11. (a) List and state the purpose various components involved in IoT System.

Or

(b) Compare IoT with M2M.

12. (a) Explain IETF core functional components with an diagram.

Or

(b) List and state the purpose of various standards involved in OGC SWE.

13. (a) List and mention the purpose of seven layer model in IoT ecosystem.

Or

(b) Explain about IoT management protocols.

14. (a) Differentiate between IoT and WoT.

Or

(b) Write a note on two pillars of web.

15. (a) With table representation, compare Consumer IoT with the Industrial IoT.

Or

(b) Outline the various key challenges in IIoT.

SECTION C — (5 × 5 = 25 marks)

Answer ALL questions

16. (a) With a neat sketch, explain the SDN architecture.

Or

(b) Write a detailed note on four pillars of IoT.

17. (a) With a neat sketch, explain the IoT Functional model.

Or

(b) Write a detailed note on five layer architecture in IoT reference architecture.

18. (a) Discuss about session layer protocols.

Or

(b) Examine various security standards in IoT.

19. (a) With a neat sketch, explain cloud of things architecture.

Or

(b) Outline the need for Architecture Standardization in WoT. Enumerate the classification of WoT Architecture Standardization.

20. (a) Explain in detail about IIoT architecture with a diagram.

Or

(b) With a neat sketch, explain IIoT protocol stack.

Reg. No. : .....

1233 **Q.P. Code : [22 CSEEC 02]**

(For the candidates admitted from 2022 onwards)

M.Sc. DEGREE EXAMINATION, APRIL/MAY 2023.

Second Semester

Computer Science

DATABASE ADMINISTRATION AND MANAGEMENT

Time : Three hours Maximum : 50 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer:

1. Which of the following is the full form of DDL?
   (a) Data definition language
   (b) Data derivation language
   (c) Dynamic data language
   (d) Detailed data language

2. What is a row of a relation known as?
   (a) Entity (b) Degree
   (c) Tuple (d) None

3. Rectangle in E-R diagram represents?

(a) Tables (b) Attributes

(c) Tuples (d) Entity sets

4. Which of the following keys is generally used to represents the relationships between the tables?

(a) Primary key (b) Foreign key

(c) Secondary key (d) Candidate key

5. Relation R has eight attributes ABCDEFGH. Fields of R contain only atomic values. F= {CH->G, A->BC, B->CFH, E->A, F->EG} is a set of functional dependencies (FDs) so that F+ is exactly the set of FDs that hold for R. How many candidate keys does the relation R have?

(a) 3 (b) 4

(c) 5 (d) 6

6. In RDBMS, different classes of relations are created using ———— technique to prevent modification anomalies.

(a) Functional Dependencies

(b) Data integrity

(c) Referential integrity

(d) Normal Forms

7. Which of the following is the highest isolation level in transaction management?

(a) Serializable (b) Repeated Read

(c) Committed Read (d) Uncommitted Read

8. Which of the following is NOT a property of database transactions?

(a) Atomicity (b) Consistency

(c) Insulation (d) Durability

9. A distributed database has which of the following advantages over a centralized database?

(a) Software cost (b) Software complexity

(c) Slow Response (d) Modular growth

10. Which of the following is not one of the stages in the evolution of distributed DBMS?

(a) Unit of work

(b) Remote unit of work

(c) Distributed unit of work

(d) Distributed request

SECTION B — (5 × 3 = 15 marks)

Answer ALL questions.

11. (a) What are the three levels of abstraction?

Or

(b) What do you mean by instances and schemas?

12. (a) What is an entity relationship model?

Or

(b) Define the terms (i) DDL (ii) DML

13. (a) What is meant by normalization of data?

Or

(b) What is meant by functional dependencies?

14. (a) What are the ACID properties?

Or

(b) What are the states of transaction?

15. (a) Define Distributed Database Management System.

Or

(b) List the characteristics Distributed Database Management System.

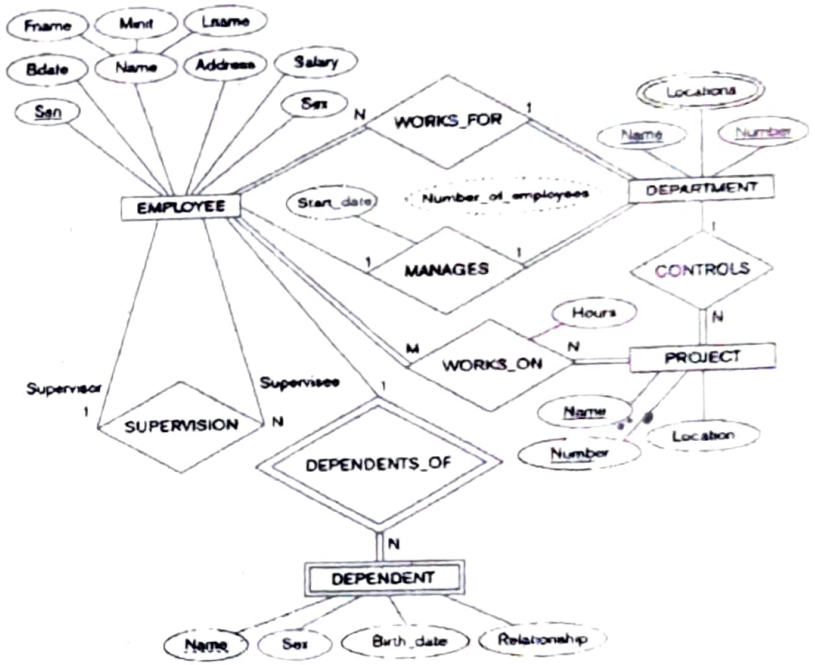
SECTION C — (5 × 5 = 25 marks)

Answer ALL questions.

16. (a) Explain the architecture of database management systems.

Or

(b) Convert the below given ER diagram to relational schema.



17. (a) What is data integrity? Explain the types of integrity constraints.

Or

(b) What are aggregate functions? List the aggregate functions supported by SQL.

18. (a) Given a relation R (A, B, C, D) and Functional Dependency set $FD = \{AB \rightarrow CD, B \rightarrow C\}$ determine whether the given R is in 2NF? If not convert it into 2 NF.

Or

(b) Given a relation R (P, Q, R, S, T, U, V, W, X, Y) and Functional Dependency set, $FD = \{PQ \rightarrow R, P \rightarrow ST, Q \rightarrow U, U \rightarrow VW,$ and $S \rightarrow XY\}$ determine whether the given R is in 3NF? If not convert it into 3 NF.

19. (a) Check whether the given schedule S is conflict serializable or not.

$S : R_1(A), R_2(A), R_1(B), R_2(B), R_3(B), W_1(A), W_2(B)$

Or

(b) What is dead lock? Explain the four conditions for dead lock with an example.

20. (a) Explain the Architecture of Distributed DBMS.

Or

(b) What are the various kinds of transparencies in distributed database design?

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1232 Q.P. Code : [22 CSEEC 01]

(For the candidates admitted from 2022 onwards)

M.Sc. DEGREE EXAMINATION, APRIL/MAY 2023.

Second Semester

Computer Science

DATA MINING TECHNIQUES AND TOOLS

Time : Three hours Maximum : 50 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer:

1. In the ———— stage, the data needed for the data mining process may be obtained from many different and heterogeneous data sources

   (a) Preprocessing

   (b) Selection

   (c) Transformation

   (d) Visualization

2. _____ is a statistical property that measures how well a given attribute separates the training examples according to their target classification.

(a) Entropy (b) Gini Index

(c) Information Gain (d) Splitting Criteria

3. _____ uses a sampling-based method to deal with large data sets.

(a) DBSCAN (b) K-Means

(c) PAM (d) CLARA

4. Subsections of the Chromosomes are called _____

(a) Crossover (b) Genes

(c) Population (d) Mutation

5. _____ measures the strength of the rule.

(a) Confidence (b) Threshold

(c) Support (d) Association

6. _____ algorithm is called level-wise algorithm.

(a) Dynamic Itemset Counting

(b) Incremental

(c) FP-Growth

(d) Apriori

7. Finding the natural grouping of users, pages, etc. is an example of _____

(a) Clustering (b) Classification

(c) Associations (d) Sequential Analysis

8. SPADE is _____

(a) Sequential Pattern Data using Equivalence classes

(b) Sequential Process Data using Execution classes

(c) Sequential Pattern Discovery using Equivalence classes

(d) Sequential Pattern Discovery using Execution classes

9. _____ file contains the list of the instances, and the attribute values for each instance separated by commas.

(a) .xls (b) .csv

(c) .arff (d) .doc

10. _____ is used to skip the current iteration of a loop without terminating the loop.

(a) Next (b) Continue

(c) Break (d) Goto

SECTION B — (5 × 3 = 15 marks)

Answer ALL questions.

11. (a) Identify the relationship between Data, Information, and Knowledge.

Or

(b) State the three phases of the Tree Construction Principle.

12. (a) Discover the issues in the Data Clustering technique.

Or

(b) Express the uses of Similarity and Dissimilarity Metrics.

13. (a) Differentiate the terms: Frequent Set, Maximal Frequent Set, and Border Set.

Or

(b) Assess the performance of the Partition Algorithm based on its working.

14. (a) Define the following terms: Low precision, and Low recall.

Or

(b) What is Unstructured Text? Show its features.

15. (a) Write the different types of Decision-Making statements in R.

Or

(b) Write a note about the Explorer in Weka.

SECTION C — (5 × 5 = 25 marks)

Answer ALL questions.

16. (a) Explain the significant Data Mining Techniques.

Or

(b) Evaluate the performance of the CART algorithm with an example.

17. (a) Appraise the working of the DBSCAN clustering algorithm.

Or

(b) What are Artificial Neural Networks? Discuss the use of Activation Functions.

18. (a) How does the Incremental algorithm works? Illustrate.

Or

(b) How does the Dynamic Itemset Counting algorithm differ from the Apriori algorithm? Express your views.

19. (a) What is Sequence Mining? Why it is required? Analyze.

Or

(b) Describe the significant Web Mining Tasks.

20. (a) What are the different types of Data Structures in R? Infer their need and usage.

Or

(b) How to perform Classification tasks in Weka? Design the process, execute, and visualize the results.

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1223 Q.P. Code : [22 CSEDS 08/ 22 CSEEE 02]

(For the candidates admitted from 2022 onwards)

M.Sc. DEGREE EXAMINATION, APRIL/MAY 2023.

Second Semester

Computer Science/Data Science

Core/Elective – MACHINE LEARNING TECHNIQUES

Time : Three hours Maximum : 50 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer.

1. Machine learning is a type of _____ technique which provides computers with the ability to learn without being explicitly programmed.

   (a) machine learning

   (b) deep learning

   (c) natural language processing

   (d) artificial intelligence

2. The most notable machine learning applications is _____ which is a method for cataloging and detecting an object or feature in a digital image.

(a) image recognition (b) image size

(c) image pixel (d) image enhancement

3. Linear Regression is a machine learning algorithm based on _____.

(a) supervised learning

(b) unsupervised learning

(c) semi- supervised learning

(d) reinforced learning

4. Regression decision tree is used as a _____.

(a) clustering model

(b) descriptive model

(c) classification model

(d) predictive model

5. _____ is the practice of checking the integrity, accuracy and structure of data before it is used for a business operation.

(a) Structured validation

(b) Consistency validation

(c) Data type validation

(d) Data validation

6. The number and depth of trees used in a _____, increases model complexity.

(a) random forest model

(b) SVM

(c) logistic regression

(d) decision tree

7. _____ performs the division of objects into clusters that share similarities and are dissimilar to the objects belonging to another cluster.

(a) K-mode (b) K-median

(c) Clustering (d) K-means

8. _____ is an unsupervised learning method for clustering data points.

(a) Hierarchical clustering

(b) DBSCAN

(c) PCA

(d) ICA

9. _____ is a method that allows us to get information about the population based on the statistics from a subset of the population.

(a) Probability (b) Non-probability

(c) Systematic (d) Sampling

10. Gibbs sampling is commonly used as a means of statistical inference, especially _____.

(a) Bayesian inference

(b) Naive inference

(c) Expectation-maximization algorithm

(d) Randomized algorithm

SECTION B — (5 × 3 = 15 marks)

Answer ALL questions.

11. (a) What are the goals and applications of machine learning?

Or

(b) Describe the five steps in machine learning.

12. (a) How do you analyze linear models for regression in machine learning?

Or

(b) Briefly discuss about Bayesian Approach in machine learning.

13. (a) What is ROC curve in machine learning?

Or

(b) What are ML cross validation methods?

14. (a) What is clustering in unsupervised learning?

Or

(b) What are the types of unsupervised clustering?

15. (a) What is sampling in machine learning?

Or

(b) What is the use of machine learning in Monte Carlo simulation?

SECTION C — (5 × 5 = 25 marks)

Answer ALL questions.

16. (a) How do you analyze learning systems in machine learning?

Or

(b) What are the four 4 types of machine learning algorithms?

17. (a) How do you implement decision tree learning in supervised learning?

Or

(b) Discuss about the support vector machine in implementation of supervised learning method.

18. (a) How do you evaluate machine learning performance?

Or

(b) Discuss in brief about model complexity in machine learning.

19. (a) Evaluate the clustering in unsupervised learning algorithm.

Or

(b) What is the best clustering algorithm?

20. (a) What are the basic sampling methods in machine learning?

Or

(b) How do you use the reinforcement learning in machine learning?
