

Total No. of Questions : 7]

SEAT No. :

PD3645

[Total No. of Pages : 2

[6486]-11

First Year M.Sc.

COMPUTER SCIENCE

**CS UT - 111 : Paradigm of Programming Languages
(2019 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 is compulsory.*
- 2) *Solve any five questions from Q.2 to Q.7.*
- 3) *Question 2 to 7 carry equal marks.*

Q1) Attempt any five of the following.

[5×2=10]

- a) What is source - to - source translation?
- b) Differentiate between method overloading and method overriding.
- c) Define semaphore.
- d) Explain Quasi - concurrency.
- e) Write a suitable code segment in C/C++ to create a dangling reference.
- f)
 - i) Write the output for the following statement.
"scala". drop (1). take(3)
 - ii) How to display above output in capital letters.

Q2) Attempt the following.

- a)
 - i) Explain the concept of an object closure with suitable example. [5]
 - ii) Write a run - time descriptor for limited dynamic string. [2]
- b) What is monitor? Explain how it is used to control access to a shared buffer. [5]

Q3) Attempt the following.

- a)
 - i) What are different types of unions? Comment: "unions in 'C' language are free unions". Justify true/false with suitable example.[5]
 - ii) What is parametric polymorphism? How it is achieved in C++? [2]
- b) Write a scala program to define a class person (id, name, age). Also define overloaded constructors. Accept 'n' person's details from user and display details. [5]

P.T.O.

Q4) Attempt the following.

- a) i) Discuss the value and reference model of a variable with suitable example. [5]
- ii) What is “this” pointer? Give its significance. [2]
- b) Consider the following pseudocode: [5]
var x : integer
procedure update
 x := x + 1
procedure docall (p : procedure)
 var x : integer
 x := 1
 p ()
 write - integer (x)
begin // main
 x := 0
 docall (update)
end
i) What does this program print if the language uses static scoping?
ii) What does it print with dynamic scoping? why?

Q5) Attempt the following.

- a) i) Write a scala program with recursion to compute $n1 * n2$ without using multiplication (*) operator. Accept n1 and n2 from user. [5]
- ii) What makes a language successful? [2]
- b) What is vtable? Explain with example how vtable is maintained in single inheritance. [5]

Q6) Attempt the following.

- a) i) Explain logically controlled loops. Also explain its types with suitable example. [5]
- ii) Comment : “In Java, a method’s execution can be delayed until the run’ method of another thread has completed its execution”. [2]
- b) Write a scala program to accept elements of an array. Display addition of all odd elements of an array. [5]

Q7) Write short notes on any two of the following. [2×6=12]

- a) Repeated inheritance.
- b) Overloaded subprograms and generic subprograms in C++
- c) Array categories based on binding to subscript range and storage.



Total No. of Questions : 7]

SEAT No. :

PD3646

[Total No. of Pages : 3

[6486]-12

First Year M.Sc. (Computer Science)
CSUT-112 : DESIGN AND ANALYSIS OF ALGORITHMS
(CBCS 2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Solve any five questions from Q.2 to Q.7.*
- 3) *Questions 2 to 7 carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*
- 5) *Use of single memory non programmable scientific calculator is allowed.*

Q1) Attempt any five of the following.

[5×2=10]

- a) List any four asymptotic notations.
- b) Give control abstraction for divide and control strategy.
- c) Define feasible solution and optimal solution.
- d) Define tree edges and non-tree edges.
- e) Give difference between fixed tuple and variable tuple formulation.
- f) What do you mean by branch and bound strategy?

Q2) Attempt the following.

- a) Rank the following functions in their ascending order of their growth rate $e^n, n^3, \log_e n^3, 2^n, \log_e 2^n, n!$ **[7]**
- b) Find maximum profit using Dynamic Programming Method for the following 0-1 knapsack instance. **[5]**

$n = 3,$

$(p_1, p_2, p_3) = (25, 18, 10),$

$(w_1, w_2, w_3) = (5, 6, 4)$

and $m = 10.$

P.T.O.

Q3) Attempt the following :

- a) Sort the following numbers using Merge Sort.

15, 7, 9, 20, 6, 34, 23, 2, 28, 12 [7]

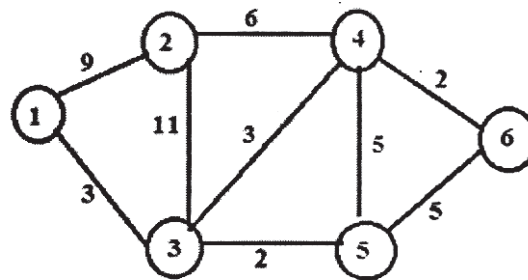
- b) A string X can be transformed to Y by applying a sequence of edit operations such as insert, delete and interchange with associated costs of 1, 1 and 2 respectively. Find the cost of string editing using Dynamic Programming Method. [5]

X = aababa

Y = baaba

Q4) Attempt the following :

- a) Find minimum Spanning Tree for the following graph using Kruskal's Algorithm. [7]



- b) Find the LCS for the following sequences using Dynamic Programming method. [5]

X = <A, C, D, A, B, C>

Y = <C, B, C, D, C>

Q5) Attempt the following :

- a) What is the best way to multiply a chain of matrices A₁, A₂, A₃, A₄ with dimensions 10×5, 5×4, 4×15, 15×5 respectively using Dynamic Programming Method? [7]

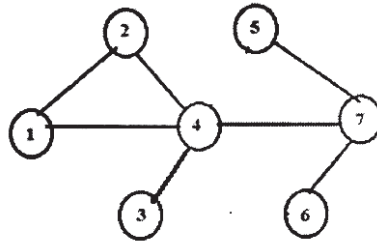
- b) Consider the following instance for job sequencing with deadline problem where n = 6.

(p₁, p₂, p₃, p₄, p₅, p₆) = (10, 8, 15, 5, 7, 12)

(d₁, d₂, d₃, d₄, d₅, d₆) = (4, 1, 3, 2, 3, 2). Obtain optimal solution using greedy method. [5]

Q6) Attempt the following :

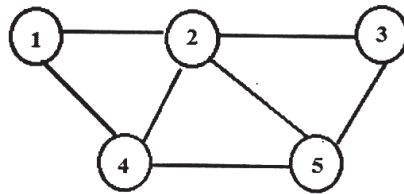
- a) Define Articulation point. Identify all articulation points from the following graph. [7]



- b) Explain concept of Recursive Algorithm with appropriate examples. [5]

Q7) Attempt any two of the following : [2×6=12]

- a) What is m-colouring problem? Find all possible solutions when the following graph is coloured with exactly 3 colours.



- b) Solve the following instance of TSP using LCBB method.

$$A = \begin{bmatrix} \infty & 10 & 8 & 14 \\ 22 & \infty & 7 & 6 \\ 9 & 10 & \infty & 4 \\ 5 & 6 & 2 & \infty \end{bmatrix}$$

- c) Define Satisfiability Problem. Check whether following formula is satisfiable or not?

$$X = (p \vee q) \wedge (\sim p \vee r) \wedge (\sim p \vee q)$$



Total No. of Questions : 7]

SEAT No. :

PD3647

[Total No. of Pages : 3

[6486]-13

M.Sc. - I (Computer Science)

CSUT - 113: DATABASE TECHNOLOGIES

(CBCS 2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Solve any five questions from question 2 to 7.*
- 3) *Question 2 to 7 carry equal marks.*
- 4) *Use of Mobile Phones and Electronic Devices are strictly prohibited.*

Q1) Attempt any FIVE of the following:

[5×2=10]

- a) What is polyglot persistence? List any two APIs which automates polyglot persistence.
- b) Give any two limitations of memory image.
- c) State the CAP theorem.
- d) What is the use of “\$addToSet”? Give its syntax.
- e) “Multi-operation transactions doesn’t work well on key value store database”. Justify the statement.
- f) Write any one risk and benefit of schema migration.

Q2) Attempt the following:

- a)
 - i) Relational database doesn’t work well on a cluster? Justify. **[4]**
 - ii) When are materialized views used ? Explain the basic strategies to manage these views. **[3]**
- b) What is a Document database? Explain any two features of Document database. **[5]**

P.T.O.

Q3) Attempt the following:

- a) i) Illustrate master slave replication with diagram. [4]
- ii) Explain the read consistency with example. [3]
- b) Consider the collection “Book” with the following documents.

```
{ “_id”: ObjectId(5983548781331adf45ec5), “title”: “MongoDB Overview” }  
{ “_id”: ObjectId(5983548781331adf45ec6), “title”: “NoSQL Overview” }  
{ “_id”: ObjectId(5983548781331adf45ec7), “title”: “No SQL Distilled” }
```

 - i) Write the query to set the new title ‘New MongoDB Introduction’ of the documents whose title is ‘MongoDB Overview’. [2]
 - ii) Write the query to remove all the documents whose title is ‘NoSQL Overview’. [1]
 - iii) Write the query to display the documents sorted by title in descending order. [2]

Q4) Attempt the following:

- a) i) “Key-value and document databases were strongly aggregate-oriented”. Justify. [4]
- ii) NoSQL databases follow the CAP theorem for Consistency, as compared to the ACID properties for RDBMS. Justify. [3]
- b) What is an incremental migration? Explain with an example. [5]

Q5) Attempt the following:

- a) i) What is the use of indexing engine in polyglot persistence. Explain with an example. [4]
- ii) Why is there a need of polyglot persistence? Explain with an example. [3]
- b) i) Write any two merits and demerits of object database. [2]
- ii) Give any three reasons for using XML database. [3]

Q6) Attempt the following:

[6486]-13

- a) i) Explain sharding as a data distribution model with example. [4]
- ii) Discuss three features of Apache Solr. [3]
- b) i) Why is there a need for improving programmer productivity? [2]
- ii) Write any three factors for database's better performance. [3]

Q7) Attempt any two of the following:

- a) Explain Map reduce with partitioning and combining map outputs. Give an example. [6]
- b) Write a query which illustrates schema changes in NoSQL data store. [6]
- c) i) Discuss scaling in Column family database. [3]
- ii) State the significance of using NoSQL? [3]



Total No. of Questions : 5]

SEAT No. :

PD3648

[Total No. of Pages : 6

[6486]-14

**First Year M.Sc. (Computer Science)
CSDT - 114A : CLOUD COMPUTING
(CBCS 2019 Pattern) (Semester - I)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q. No. 1 is compulsory.
- 2) Solve any three questions from Q. 2 to Q. 5.
- 3) Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following: **[5]**

- a) List the benefits of cloud computing?
- b) What do you mean by data center?
- c) What is grid computing?
- d) What is map-reduce?
- e) Define cloud computing as per NIST.
- f) What do you mean by Hypervisor?

Q2) Attempt the following: **[10]**

- a) i) What do you mean by Load Balancing in Cloud Computing? **[2]**
ii) Write a short note on PAAS? **[4]**
- b) Explain Virtual Machin Security? **[4]**

Q3) Attempt the following: **[10]**

- a) i) What is multitenancy? **[2]**
ii) Discuss in detail Virtualization of CPU. **[4]**
- b) What does the acronym SaaS mean? How does it relate to cloud computing? **[4]**

P.T.O.

Q4) Attempt the following: [10]

- a) i) Explain Hybrid Cloud in brief? [2]
- ii) Draw and explain architecture of GFS. [4]
- b) Give any 4 differences between cloud and grid computing? [4]

Q5) Attempt any two of the following. [10]

- a) Write a short note on cloud security challenges? [5]
- b) Give any 5 comparison between private, public, hybrid cloud. [5]
- c) Explain in short Security Governance. [5]



Total No. of Questions : 5]

PD3648

[6486]-14

First Year M.Sc. (Computer Science)
CSDT - 114B : ARTIFICIAL INTELLIGENCE
(2019 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q. No. 1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5 carry equal marks.

Q1) Solve any five of the following:

[5×1=5]

- a) What is classification?
- b) What is state space?
- c) Convert into FOPL - Its raining.
- d) Write python syntax to calculate square of a given no.
- e) What is backward chaining?
- f) What is use of yield?

Q2) Attempt the following.

[4+4+2=10]

- a) Explain A* Algorithm. **[4]**
- b) Write a short note on Future of AI. **[4]**
- c) Define list in python. **[2]**

Q3) Attempt the following: [10]

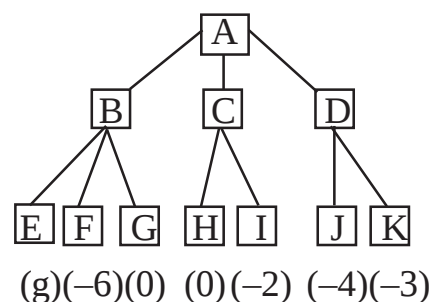
- a) Solve the cryptarithmic problem. SEND+MORE = MONEY. [4]
- b) Convert the following statements into FOPL & then into clausal form and prove using resolution “John like Peanuts”. [4]
 - i) John likes all kind of foods.
 - ii) Apples are food
 - iii) Chicken is a food.
 - iv) Anything anyone eats and is not killed by, is food.
 - v) Bill eats peanuts.
 - vi) John eats everything Bill eats.
- c) What is KNN? [2]

Q4) Attempt the following questions. [4+4+2=10]

- a) Write a short note on Random forest. [4]
- b) Python program for implementing water Jug problem. [4]
- c) What is knowledge representation. [2]

Q5) Attempt any two of the following. [5+5=10]

- a) Consider the following game tree in which scores are all from the first player point of view. Suppose first player is maximizing, what move should be chosen by player.



- b) Difference between BFS and DFS algorithm.
- c) Explain python operator with example code.



Total No. of Questions : 5]

PD3648

[6486]-14

**First Year M.Sc. (Computer Science)
CSDT - 114C : WEB SERVICES
(CBCS 2019 Pattern) (Semester - I)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q. No. 1 is compulsory.
- 2) Solve any three questions from Q. 2 to Q. 5.
- 3) Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following: [5]

- a) What is envelope in SOAP message?
- b) What are the different types of web services?
- c) What are the core building blocks of web services?
- d) What is resource in REST?
- e) List any two WSDL tools.
- f) What are the two basic types of service discovery in SOA.

Q2) Attempt the following. [10]

- a) i) What are the advantages of web services? [2]
ii) What are UDDI data structures? Show the relationship of UDDI data structures with the help of neat labelled diagram. [4]
- b) Differentiate between SOAP and REST. [4]

Q3) Attempt the following, [10]

- a) i) Explain different HTTP methods supported by RESTful web services. [2]
ii) Explain the Header block of SOAP message in detail. [4]
- b) Explain the three elements of UDDI. [4]

Q4) Attempt the following. [10]

- a) i) What is the transport method in SOAP? [2]
- ii) Differentiate between web services versus web-based applications.[4]
- b) Give the anatomy of WSDL document, describe definitions and import elements with an example. [4]

Q5) Attempt any TWO of following. [10]

- a) Write a short note on WSDL binding. [5]
- b) Write a short note on REST architectural elements. [5]
- c) Write short note on SOAP communication model. [5]



Total No. of Questions : 7]

SEAT No. :

PD3649

[Total No. of Pages : 2

[6486]-21

First Year M.Sc.

COMPUTER SCIENCE

**CSUT-121: Advanced Operating System
(2019 Pattern) (CBCS) (Semester-II)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Solve any 5 questions from Q.2 to Q.7.*
- 3) *Question 2 to 7 carry equal marks.*

Q1) Answer any five of the following.

[10]

- a) Explain swapping of a process.
- b) Differentiate between wait & waitpid.
- c) Justify the following: Random access I/O is not possible for pipe files.
- d) Justify the following: No process can preempt another process executing in the Kernel.
- e) Define valid and invalid pages.
- f) Explain fork() and vfork() system call.

Q2) Attempt all questions.

[12]

- a) Explain setjump() and longjump() with example. **[5]**
- b) Write a C program to demonstrate use of atexit() function. **[5]**
- c) What is inode? State operations related to inode. **[2]**

Q3) Attempt all questions.

[12]

- a) Write a note on types of files. **[5]**
- b) Explain memory layout of a C program. **[5]**
- c) Explain sticky bit. **[2]**

P.T.O.

- Q4)** Attempt all questions. [12]
- a) Explain UNIX architecture in detail. [5]
 - b) Write a note on dynamic memory allocation. [5]
 - c) What are unreliable signals? [2]
- Q5)** Attempt all questions. [12]
- a) Explain second scenario of buffer allocation. [5]
 - b) Write a note on advanced signal management. [5]
 - c) Differentiate between named and unnamed pipes. [2]
- Q6)** Attempt all questions. [12]
- a) Explain the 'param' parameter values of `mallopt()` used for advanced memory allocation. [5]
 - b) Write a C program to print type and size of a file. [5]
 - c) Write any two benefits of allocating memory via anonymous memory mapping. [2]
- Q7)** Attempt two of the following. [12]
- a) What is process? Draw and explain state transition diagram of a process. [6]
 - b) What is demand paging? Explain the data structures used for demand paging. [6]
 - c) Write a note on signal set. [6]



Total No. of Questions : 7]

SEAT No. :

PD3650

[Total No. of Pages : 2

[6486]-22

M.Sc.-I

COMPUTER SCIENCE

**CSUT - 122 : Mobile Technologies
(CBCS 2019 Pattern) (Semester -II)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is Compulsory.*
- 2) *Solve any five questions from Q.2 to Q.7.*
- 3) *Questions 2 to 7 carry equal marks.*

Q1) Solve any five of the following.

[10]

- a) List the applications of Mobile Computing.
- b) List the Data Types in Swift.
- c) What is service in android? Which are the different types of services in android?
- d) What is mean by intent? List the types of intents?
- e) List any four android activity callback methods.
- f) What is Accelerometer?

Q2) Attempt all questions.

- a) What are Adapters in android? Explain different types of adapters. **[7]**
- b) How do you programmatically determine whether a radio button and check box is checked? **[5]**

Q3) Attempt all questions.

- a) Explain IOS architecture. **[7]**
- b) Write a swift program to change the first and last character of a given string. **[5]**

P.T.O.

Q4) Attempt all questions.

- a) What is Android Operating System? Explain its architecture in detail. [7]
- b) What is JSON Parsing? Explain any four parsing methods of JSON object. [5]

Q5) Attempt all questions.

- a) Explain Asyn Task in detail with example. [7]
- b) Create an Android Application to accept two numbers and create a buttons Factorial and Display the result on the next activity on Button click. [5]

Q6) Attempt all questions.

- a) Why to use PhoneGap? Explain the Limitations of PhoneGap. [7]
- b) What is broadcast receiver? Explain it in detail. [5]

Q7) Attempt two of the following. [12]

- a) What is mean by Mobile Computing? What are the limitations of Mobile Computing?
- b) Write a note on location based services.
- c) Write the advantages and disadvantages of swift.



Total No. of Questions : 7]

SEAT No. :

PD3651

[Total No. of Pages : 2

[6486]-23

First Year M.Sc.

COMPUTER SCIENCE

CSUT 123 : Software Project Management

(2019 Pattern) (CBCS) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Attempt any 5 questions from question 2 to 7.*

Q1) Attempt any five of the following.

[10]

- a) Define project stakeholders.
- b) Define Configuration management.
- c) List the contents of the project charter.
- d) Define schedule variance.
- e) List the outputs of Performance Reporting process in communication management.
- f) State the purpose of statement of work (SOW).

Q2) Attempt all

- a) Write a short note on Goal Question Metric (GQM). **[7]**
- b) Difference between Software reliability and Hardware reliability. **[5]**

Q3) Attempt all

- a) Explain project management framework with diagram. **[7]**
- b) Explain the overall change control process with a neat diagram. **[5]**

P.T.O.

Q4) Attempt all

- a) What is the PDM? Explain the four types of relationship between activities used in PDM. [7]
- b) Draw the work breakdown structure (WBS) for the hotel management system. [5]

Q5) Attempt all

- a) Explain the matrix organization structure with its merits and demerits.[7]
- b) Explain what happens during the cost budgeting process? [5]

Q6) Attempt all

- a) Explain all the phases in CMM model. [7]
- b) Explain Resource loading and resource labeling. [5]

Q7) Write a short note on any two of the following. [12]

- a) Explain tools and techniques used for quality control.
- b) Explain risk identification and contents of register.
- c) Explain power of Human Resource (HR).



Total No. of Questions : 5]

SEAT No. :

PD3652

[Total No. of Pages : 3

[6486]-24

M.Sc. - I

COMPUTER SCIENCE

**CSDT-124 B : Human Computer Interaction
(2019 Pattern) (Semester - II)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any 3 questions from Q2 to Q5.
- 3) Question 2 to Question 5 carry equal marks.

Q1) Answer any five of the following: [5]

- a) Define Reasoning.
- b) Define Problem Solving.
- c) Write range of frequency which user can hear.
- d) What is Ergonomics?
- e) What does task analysis mean?
- f) Define standard and guidelines.

Q2) Attempt the following: [10]

- a) i) What is drag and drop? [2]
ii) Explain layers of Mobile Ecosystem. [4]
- b) Write Pros and Cons of SMS Application. [4]

Q3) Attempt the following: [10]

- a) i) Define usability and effectiveness. [2]
ii) Explain issues to consider when using an interactive Single-Page Process. [4]
- b) Write a short note on clickstream with process flow diagram. [4]

Q4) Attempt the following: [10]

- a) i) What is heuristic evaluation? [2]
ii) Explain interaction Design Process. [4]
- b) Write short note on open system Task Analysis (OSTA) [4]

Q5) Attempt any Two of the following: [10]

- a) Explain with example deductive, inductive and abductive reasoning. [5]
- b) Explain Mobile Application Media Matrix. [5]
- c) Explain the execution - Evaluation cycle. [5]



P.T.O.

Total No. of Questions : 5]

PD3652

[6486]-24

M.Sc. - I

COMPUTER SCIENCE

**CSDT-124 C : Soft Computing
(2019 Pattern) (Semester - II)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any **THREE** questions from Q. 2. to Q. 5.
- 3) Q.2. to Q.5.carry equal marks.

Q1) Solve any five of the following: **[5]**

- a) State any advantages of Genetic Algorithm.
- b) Define Core of a membership function.
- c) What is fuzzy equivalence relation?
- d) List down different classes of neural network architecture.
- e) Define multilayer Network.
- f) Find $A^c \cap B$ for the following two fuzzy sets A & B

$$A = \left\{ \frac{0.1}{0} + \frac{0.5}{1} + \frac{1}{2} + \frac{0.6}{3} + \frac{0.2}{4} \right\}$$

$$B = \left\{ \frac{0.2}{0} + \frac{0.5}{1} + \frac{0.8}{2} + \frac{0.3}{3} + \frac{0.1}{4} \right\}$$

Q2) Attempt the following: **[10]**

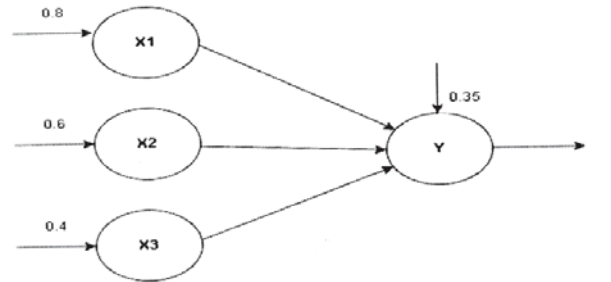
- a)
 - i) What do you mean by error correction and gradient rule. **[2]**
 - ii) Explain the following terminologies of genetic algorithm **[4]**
 - 1) Individual
 - 2) Genes
 - 3) Alleles
 - 4) Population
- b) What is Defuzzification? Explain methods of Defuzzification. **[4]**

Q3) Attempt the following: [10]

- a) i) Explain Intuition and Inference membership value assignment methods [2]
- ii) Using Genetic Algorithm maximize $f(x) = x^2 + 1$ with the initial values of (12,25,5,19) [4]
- b) Define artificial neural network? Explain its different components. [4]

Q4) Attempt the following: [10]

- a) i) Obtain the output of neuron Y for the network shown in the following figure using activation function as: [2]



- ii) Consider fuzzy sets [4]

$$A = \left\{ \frac{0.1}{a} + \frac{0.5}{b} + \frac{0.2}{c} \right\} \quad B = \left\{ \frac{0}{d} + \frac{0.5}{e} + \frac{0.3}{f} \right\} \quad C = \left\{ \frac{0.1}{g} + \frac{0.6}{h} + \frac{1}{i} \right\}$$

Find the following

- i) $R = A \times B$
- ii) $S = B \times C$
- iii) $T = R \circ S$ using max-min composition.
- b) What is fuzzy tolerance relation. [4]

Q5) Attempt the following (Any 2): [10]

- a) Consider the fuzzy matrix relation R [5]

$$R = \begin{bmatrix} 1 & 0.8 & 0 & 0.2 & 0.5 \\ 0.8 & 1 & 0.5 & 0 & 0.2 \\ 0 & 0.5 & 1 & 0.6 & 0 \\ 0.2 & 0 & 0.6 & 1 & 0.5 \\ 0.5 & 0.2 & 0 & 0.5 & 1 \end{bmatrix}$$

Determine the λ -cut relations for the following λ values on R.

$$\lambda_1, \lambda_{0.5}, \lambda_{0.8}, \lambda_{0.3}$$

- b) Explain important properties of TLNs. [5]
- c) Explain Reinforcement network. [5]



Total No. of Questions : 7]

SEAT No. :

PD3653

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[6486]-31

S.Y. M.Sc. (Computer Science)

**CSUT - 231 : SOFTWARE ARCHITECTURE AND DESIGN PATTERN
(2019 Pattern) (CBCS) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Q.1 is compulsory.
- 2) Solve any five questions from Q.2 to Q.7.
- 3) Questions 2 to 7 carry equal marks.

Q1) Solve any five of the following. [10]

- a) What is UML?
- b) What is software Architecture.
- c) What is distributed process?
- d) What is design pattern?
- e) What do you mean by creational patterns?
- f) What is GRASP?

Q2) Attempt all [12]

- a) i) What is unified process? [2]
ii) Explain the phases of UP. [5]
- b) What are different issues related to the implementation of the dependency mechanism of observer pattern? [5]

Q3) Attempt all [12]

- a) i) What do you mean by protected variations? [2]
ii) What are different mechanisms motivated by protected variations. [5]
- b) Explain spring lifecycle with diagram. [5]

P.T.O.

Q4) Attempt all [12]

- a) i) Explain benefits of design patterns in the chosen framework in business tier. [2]
- ii) State the importance of software architecture. [5]
- b) Differentiate between spring boot and spring core. [5]

Q5) Attempt all [12]

- a) i) What are pipes and filters? [2]
- ii) Explain advantages and disadvantages of pipes and filters. [5]
- b) What are different issues considered while implementing the command pattern? [5]

Q6) Attempt all [12]

- a) i) Which three things make a pattern? [2]
- ii) Explain the factors that show use of patterns in software Architecture. [5]
- b) Discuss various functionalities supported by Hibernate framework. [5]

Q7) Write short note on any two of following. [12]

- a) Structure of factory method. [6]
- b) Cohesion [6]
- c) Structure of Adapter [6]



Total No. of Questions : 7]

SEAT No. :

PD3654

[Total No. of Pages : 2

[6486]-32

**S.Y. M.Sc. (Computer Science)
CSUT-232 : Machine Learning
(Revised 2019 Pattern) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 is compulsory.*
- 2) *Solve any five questions from Q.2 to Q.7.*
- 3) *Questions 2 to 7 carry equal marks.*

Q1) Solve any five of the following :

[5×2=10]

- a) What is machine learning?
- b) Define bias and variance.
- c) What is multicollinearity?
- d) What is clustering?
- e) What is meant by exploitation?
- f) List any four activation functions used in ANNs.

Q2) Answer the following :

- a) Explain the concept of linear regression model. Give the advantages and disadvantages of linear regression. **[7]**
- b) Compare descriptive and inferential statistics. **[5]**

Q3) Answer the following :

- a) Explain the concept behind SVM. What is the role of hyperplane in SVM? **[7]**
- b) What metrics are used for evaluation of machine learning algorithm? Explain in detail. **[5]**

P.T.O.

Q4) Answer the following :

- a) Explain the k means algorithm. What is elbow method? Explain it with example. [7]
- b) What is dummy variable trap? What are the solutions to dummy variable trap? [5]

Q5) Answer the following :

- a) Find the frequent itemsets and the association rules with minsup = 2 and confidence level = 60%. [7]

TID	Items
1	1, 2, 5
2	2, 4
3	2, 3
4	1, 2, 4
5	1, 3
6	2, 3
7	1, 3
8	1, 2, 3, 5
9	1, 2, 3

- b) Explain the basic concept of KNN algorithm. How the choice of K affects the classification in KNN algorithm? [5]

Q6) Answer the following :

- a) Explain the structure of a Multilayer feed forward network. [7]
- b) Define frequent itemset. Give the applications of association rules. [5]

Q7) Write short notes on any two of the following : [12]

- a) Dimensionality reduction and various methods of dimensionality reduction.
- b) Reinforcement learning and its components.
- c) Convolution Neural Network (CNN)?



Total No. of Questions : 7]

SEAT No. :

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[6486]-33

Second Year M.Sc. (Computer Science)

CSUT 233 : WEB FRAMEWORKS

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any five questions from Q.2 to Q.7 of the following.
- 3) Q.2 to Q.7 carry equal marks.
- 4) Neat diagram must be drawn wherever necessary.
- 5) Figures to the right indicates full marks.

Q1) Solve any five of the following.

[10]

- a) Explain features of javascript.
- b) What is Node. js?
- c) What is Buffer?
- d) What is NPM?
- e) List the different web servers available.
- f) Define stream in FS module.

Q2) Attempt all of the following.

[12]

- a) What is module? Explain different types of modules.
- b) Explain date and time functions in javascript.

[7]

[5]

Q3) Attempt all of the following.

[12]

- a) Write a JavaScript code to accept username and password validate it with username should not be null and password should be at least 6 digit long.
- b) Explain the features of Node. js.

[7]

[5]

P.T.O.

Q4) Attempt all of the following. [12]

- a) Write a program to create a simple web server using Node. js. [7]
- b) Explain different popup boxes in Javascript. [5]

Q5) Attempt all of the following. [12]

- a) Explain, REST in detail with an example. [7]
- b) Write a short note on Asynchronous Js. [5]

Q6) Attempt all of the following. [12]

- a) Explain the CRUD operation in MYSQL in Node. js. [7]
- b) Explain Mongo DB and it's features. [5]

Q7) Write short notes on any two of the following. [12]

- a) Call back and promises.
- b) Views. py
- c) Features of Django.



Total No. of Questions : 5]

SEAT No. :

PD3656

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[6486]-34

S.Y. M.Sc. (Computer Science)

CSDT 234A : BIG DATAANALYTICS

(2019 Credit Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Questions 2 to Q.5 carry equal marks.

Q1) Solve any five of the following. [5]

- a) What is vertical scaling?
- b) What is unstructured data?
- c) What is Hadoop?
- d) Define database workload.
- e) What is sharding?
- f) What is YARN?

Q2) Attempt the following. [10]

- a) i) What is Big Data Warehouse? [2]
ii) Describe applications of Big Data. [4]
- b) Explain Hadoop components. [4]

Q3) Attempt the following. [10]

- a) i) What is In-memory database grid? [2]
ii) Explain scale-out architecture. [4]
- b) Write a short note on HDFS. [4]

P.T.O.

Q4) Attempt the following. [10]

- a) i) State any four data integration patterns. [2]
- ii) Describe Big Data Taxonomy. [4]
- b) Explain components of data Ecosystem. [4]

Q5) Attempt any two of the following. [10]

- a) Write short note on Big data & master data management. [5]
- b) Explain Big Data analytics SEMMA methodology. [5]
- c) Explain various features of HDFS. [5]



Total No. of Questions : 5]

SEAT No. :

PD3657

[Total No. of Pages : 2

[6486]-35

**S.Y. M.Sc. (Computer Science)
CSDT-234B : WEB ANALYTICS
(2019 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Solve any three questions from Q.2 to Q.5.*
- 3) *Questions from 2 to 5 carry equal marks.*

Q1) Solve any five of the following : **[5]**

- a) State the types of web analytics tools
- b) List the data sources in web analytics.
- c) Define the term-dashboards.
- d) Audience reports in Google Analytics help in understanding user perceptions comment.
- e) State the two benefits of site visits.
- f) Define conversion report in Google Analytics.

Q2) Attempt all : **[10]**

- a)
 - i) What is the significance of conversion funnels in web analytics?[2]
 - ii) Explain the process of conducting a heuristic evaluation. **[4]**
- b) Define off-site and on-site web analytics techniques. **[4]**

Q3) Attempt all : **[10]**

- a)
 - i) Heuristic evaluations are fast to perform. Justify. **[2]**
 - ii) Define the following terms : **[4]**
 - 1) Website surveys
 - 2) Post-visit surveys
- b) Write a note on sentiment analysis. Explain its types. **[4]**

P.T.O.

Q4) Attempt all : [10]

- a) i) What is the role of behaviour analysis in Google Analytics? [2]
ii) What is segmentation and different types of acquisition segmentation. [4]
- b) Explain any two CI data sources. [4]

Q5) Attempt any two : [10]

- a) Write a note on Google Website optimizer. [5]
- b) Explain different key insights analysis metrics in web analytics. [5]
- c) Explain how website traffic analysis is performed in web analytics. [5]

