

Total No. of Questions : 7]

SEAT No. :

PE5583

[Total No. of Pages : 2

[6520]-101

M.Sc. - I

COMPUTER SCIENCE

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

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Attempt 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) Give any two tasks performed by a preprocessor?
- b) What is binding time?
- c) What is l - value and r - value?
- d) What is container?
- e) What is pure virtual function?
- f) What is the use of tuples in scala?

Q2) Answer the following:

- a) i) What is constructor? Explain different types of constructor in scala. **[5]**
ii) What is a referencing environment? **[2]**
- b) Define thread and Co-routine. State the steps to turn Co-routine into thread. **[5]**

Q3) Answer the following:

- a) i) Explain various parameter passing modes with suitable examples. **[5]**
ii) What is enumeration type? **[2]**
- b) Explain the nesting of classes with suitable example. **[5]**

P.T.O.

Q4) Answer the following:

- a) i) What is short - circuit Boolean evaluation? Why it is useful? [5]
- ii) Under which two circumstances, bootstrapping is necessary? [2]
- b) Write a C/C++ function that declares an array statically, on the stack and in the heap. Which one is likely to be more efficient? [5]

Q5) Answer the following:

- a) i) Write a scala program to display largest and smallest element of the set. [5]
- ii) “Dataflow languages provide inherently parallel model”, Justify true or false. [2]
- b) What is a “simple” subprogram? Give the actions taken when control returns from the simple subprogram. [5]

Q6) Answer the following:

- a) i) What is semaphore? Explain the wait and release operations for semaphore. [5]
- ii) What is memorization? [2]
- b) What is dangling pointer? What are the solutions to the dangling pointer problem? [5]

Q7) Attempt any two from the following.

- a) What is object closure? Explain with suitable example in C++. [6]
- b) Give implementation of virtual methods for the following: [6]

```
Class bar
{
    int a ;
    double b;
    char c;
    public:
        virtual void x (- -) { - - -}
        virtual void y (- -) { - - -}
        virtual void z (- -) { - - -}
        virtual void m ( );
}F
```

- c) Write the Data types in scala programming. Explain with suitable example.[6]



Total No. of Questions : 7]

SEAT No. :

PE-5584

[Total No. of Pages : 3

[6520]-102

M.Sc.

COMPUTER SCIENCE

CSUT-112 : Design and Analysis of Algorithms

(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

Q1) Solve any five of the following :

[5 × 2 = 10]

- a) What is comparison sort? Give two examples of comparison sort.
- b) What is Huffman coding? Give types of Huffman coding methods.
- c) What is articulation point? Give an example of articulation point.
- d) Define
 - i) Back edge
 - ii) Tree edge
- e) Define LCBB search.
- f) Give non-deterministic algorithm for sorting n elements.

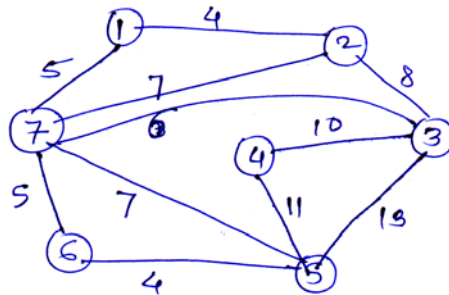
Q2) Attempt all questions :

- a) Explain radix sort and give time complexity of it. Solve the following example.
Cow, ANT, AND, MOD, MAX, MIN **[5]**
- b) What is stable sort? Is quick sort is stable sort? Solve the following by quick sort 2,8,7,1,3,5,6,4. **[5]**
- c) Define dynamic programing. Give two examples where dynamic programming is use. **[2]**

P.T.O.

Q3) Attempt all questions :

- a) Write linear search algorithm and analyze its time complexity. [5]
- b) What is minimum cost spanning tree. Solve the following using prims algorithm. [5]



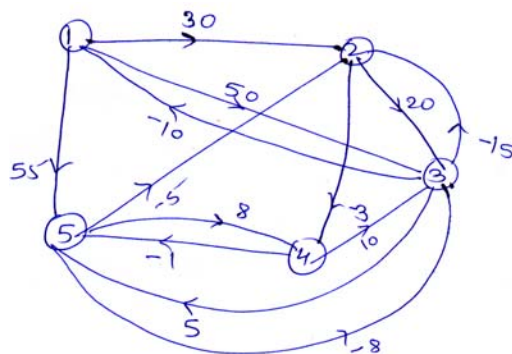
- c) State 2 classes of problem classification. [2]

Q4) Attempt all questions :

- a) Give control abstraction of Greedy algorithm. Solve the Greedy knapsack problem.
 $P(25,24,15)$ $w=(18,15,10)$ $m = 20$ $n = 3$ [5]
- b) What is Longest common subsequences problem? Give longest common subsequences from following. [5]
 $X = AGCGA$
 $Y = CAGATAGAG$
- c) Give 4 characteristics of algorithm. [2]

Q5) Attempt all questions :

- a) Write short note on optimal merge pattern. Find optimal binary merge pattern for the following. [5]
28, 32, 12, 5, 48, 13, 35, 11
- b) Apply Bellman ford algorithm on following graph and give shortest path from 1 to all vertices. [5]

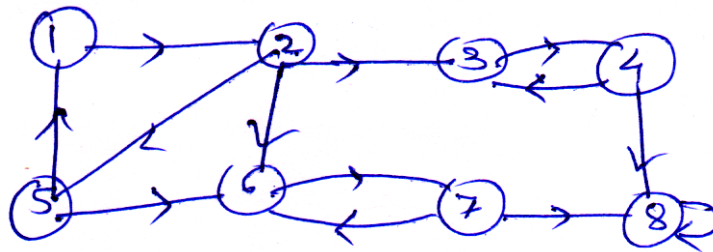


- c) Define BFS. Give example. [2]

Q6) Attempt all questions :

- a) Solve the follow problem by strongly connected algo.

[5]

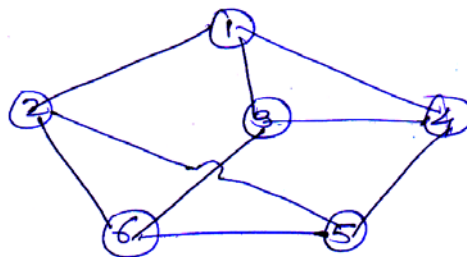


- b) What is 0/1 knapsack problem? Solve the following example using branch and bound algorithm. LCBB $n = 4$, $p(10, 10, 12, 13)$ $w(2, 4, 6, 9)$ $m = 15$ [5]
 c) Give time complexity of binary search algorithm. [2]

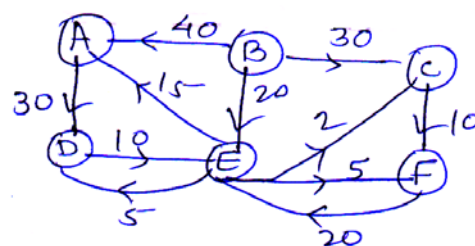
Q7) Solve any two of the following :

[2 × 6 = 12]

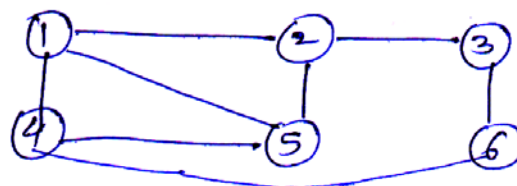
- a) What is Hamiltonian cycle? Find all Hamiltonian cycles for the following graph.



- b) Explain Dijkstra's algorithm. Solve following problem using Dijkstra's algorithm.



- c) Explain DFS & BFS. Solve the following by DFS & BFS.



Total No. of Questions : 7]

SEAT No. :

PE5585

[Total No. of Pages : 2

[6520]-103

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

CSUT-113 : DATABASE TECHNOLOGIES

(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) *Q.2 to Q.7 carry equal marks.*

Q1) Solve any five of the following.

[10]

- a) What do you mean by schemaless database?
- b) What is a system transaction?
- c) What is session consistency?
- d) What is the purpose of snapshot?
- e) Define memtable.
- f) A company wants to create a profile matching website where people can search other people based on location, education etc. Which database is useful and why?

Q2) Attempt all.

- a) Relational databases are not designed to run on cluster. Comment. [5]
- b) Write a note on CAP Theorem. [5]
- c) What do you mean by auto sharding? [2]

Q3) Attempt all.

- a) Write a note on Materialized view. [5]
- b) NoSQL database are eventually consistent, comment. [5]
- c) What is replication factor. [2]

P.T.O.

Q4) Attempt all.

- a) Explain the various distribution models for NoSQL database. [5]
- b) Model an Employee information system as a graph model, Based on the following information An employee works in a given department and has various skill sets. An employee works on various projects which are controlled by various departments. Projects are managed by employees. Identify labels, relationship & nodes. Assume appropriate values for the nodes. [5]
- c) What is incremental migration? [2]

Q5) Attempt all.

- a) What are the challenges of using NoSQL database? [5]
- b) An aggregate is opaque to key value database, where as it is transparent to document database, comment. [5]
- c) What are domain buckets. [2]

Q6) Attempt all.

- a) Write a note on Document database. [5]
- b) Write a note on Integration database. [5]
- c) Define Read Quorum. [2]

Q7) Attempt any two.

- a) Explain cases where column databases are most suitable. [6]
- b) Explain the cases where it is better to stick with relational database. [6]
- c) Consider a college's student collection spread over 3 nodes in a cluster, where each document contains student information like, student-no, student-name, address, course and marks. [6]

Draw a Map-Reduce pattern for the following queries.

- i) Find the number of students staying at 'Baner'.
- ii) Find average marks of students from "Database" course.



Total No. of Questions : 5]

SEAT No. :

PE5586

[Total No. of Pages : 2

[6520]-104

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

CSDT-114A : CLOUD COMPUTING

(2019 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q.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 challenges of cloud computing.
- b) What do you mean by multitenant technology?
- c) What is load balancing in cloud?
- d) List the security advantages of cloud based solution.
- e) What is Big-Table?
- f) List the emerging cloud software environment.

Q2) Attempt the following. [10]

- a) Explain security Architecture Design. [2]
- b) Explain IaaS service model in detail. [4]
- c) Discuss the virtual machine provisioning life cycle with suitable diagram. [4]

Q3) Attempt the following. [10]

- a) Explain Data level security. [2]
- b) Explain in brief the deployment models in cloud computing. [4]
- c) Explain Amazon simple storage service (S3) with suitable diagram. [4]

P.T.O.

Q4) Attempt the following. **[10]**

- a) Write a short note on Nimbus. **[2]**
- b) Explain the desired features of cloud computing. **[4]**
- c) Explain the software as a service security. **[4]**

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

- a) Explain the architecture of google file system with suitable diagram. **[5]**
- b) What is virtual machine migration? Explain any two migration techniques. **[5]**
- c) Explain cloud enabling data center technology. **[5]**



Total No. of Questions : 5]

SEAT No. :

PE5587

[Total No. of Pages : 2

[6520]-105

M.Sc. - I (Computer Science)

CSDT-114B : ARTIFICIAL INTELLIGENCE

(2019 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q.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) What are the requirements of good control strategy?
- b) What is reinforcement learning?
- c) What are the application of python?
- d) What is generate and Test algorithm?
- e) List the types of machine learning.
- f) List any two packages of python.

Q2) Answer the following.

[4+4+2=10]

- a) What is unsupervised learning? Discuss any one algorithm with example.[4]
- b) Solve constraint satisfaction problem. [4]

BASE + BALL = GAMES

- c) What is unification? [2]

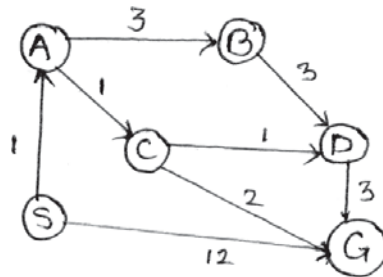
P.T.O.

Q3) Answer the following.

[4+4+2=10]

- a) Find the shortest path using A * algorithm.

[4]



Start from town A and reach to town G using following heuristic function.

Node	h (n)
S	4
A	2
B	6
C	2
D	3
G	0

- b) Define AI? Explain AI application.

[4]

- c) Write a python program to find gcd of two given numbers.

[2]

Q4) Answer the following.

[4+4+2=10]

- a) Consider the following statements

[4]

- All philosophers are Indians.
- All Indians are happy.
- Either Aryabhata or C.V. Raman is a philosopher.
- C.V. Raman is not a philosopher.

Represent the statement in WFF and prove using resolution “Aryabhata is happy”.

- b) Write syntax for following python list operation.

[4]

- Length
- Concatenation
- Indexing
- Slicing

- c) What is decision tree?

[2]

Q5) Attempt any two of the following.

[10]

- Explain hill climbing search technique.
- Difference between logistic and linear regression.
- Write short note on forward and backward chaining.



Total No. of Questions : 5]

SEAT No. :

PE5588

[Total No. of Pages : 2

[6520]-106

**F.Y. M.Sc. (Computer Science)
CSDT-114C: WEB SERVICES
(2019 Pattern) (Semester - I)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

Q1) Attempt any five of the following. **[5]**

- a) Define Web Services.
- b) Give examples of WSDL tools.
- c) RESTful Services are stateless Justify True/False.
- d) List characteristics of Web Services.
- e) What SOAP stands for?
- f) What is resource?

Q2) Attempt the following.

- a) Give the use of SOAP must Understand attribute. **[2]**
- b) Write a note on JAVA RMI distributed computing technology. **[4]**
- c) Explain different characteristics of RESTful system. **[4]**

Q3) Attempt the following.

- a) Define UDDI registry. List elements of UDDI registry. **[2]**
- b) Write a note on anatomy of SOAP message and describe each element. **[4]**
- c) Write a note on SOA architecture. **[4]**

P.T.O.

Q4) Attempt the following.

- a) Differentiate between SOAP and RESTful web service. [2]
- b) Explain Web service life cycle. [4]
- c) Enlist advantages and disadvantages of SOAP. [4]

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

- a) Write a note on core building blocks of Web services.
- b) Describe UDDI data structure and their relationship with figure.
- c) Write a note on HTTP.



Total No. of Questions : 7]

SEATNo.:

PE-5486

[Total No. of Pages : 2

[6520]-201

First Year M.Sc.

Computer Science

CSUT-121 : Advanced Operating System

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 compulsory.
- 2) Solve any questions from Q.No.2 to Q.No.7
- 3) Q.No.2 to Q.No.7 carry equal marks.
- 4) Neat diagram must be drawn wherever necessary.

Q1) Answer the following (any Five)

[5×2=10]

- a) Write a various flags used in status field of an in-core inode.
- b) Give the difference and similarities between the signal and interrupt.
- c) Give physical layout of UNIX file system.
- d) Justify: Text region and data region can be merged into one region.
- e) Give any two reasons by which the Kernel swap a process out, if it need space in memory.
- f) State the advantages and disadvantages of anonymous memory mapping.

Q2) Attempt the following:

- a) What is meant by a process? Elaborate the various state of transition with the help of suitable diagram. [5]
- b) What is an Inode? Explain the structure of regular file. [5]
- c) What is Absolute path and Relative path? [2]

Q3) Attempt the following:

- a) Explain kill() and raise() function with their prototypes. [5]
- b) Write a short note on advance memory allocations. [5]
- c) Differentiate named and unnamed pipe. [2]

P.T.O.

Q4) Attempt the following:

- Explain first scenario for buffer allocation. [5]
- Explain wait(), waitpid(), wait3(), wait4() system call with syntax and example. [5]
- What are different types of files? [2]

Q5) Attempt the following:

- Write a note on changing the size of the process. [5]
- What are symbolic links? Explain symlink() and readlink(). [5]
- Explain nice system call. [2]

Q6) Attempt the following:

- What are significance of dup() and dup2() system call? [5]
- Explain behaviour of program to copy file. [5]
- Who takes care of the zombie process in unix? [2]

Q7) Attempt any two: **[2×6=12]**

- a) Explain following system calls. [6]
- | | |
|------------------|-------------------|
| i) vfork() | ii) exec() |
| iii) exit() | iv) setpriority() |
| v) getpriority() | vi) stat() |
- b) Write a short note on [6]
- | |
|------------------|
| i) sigsuspend() |
| ii) sigpromask() |
| iii) abort() |
- c) Write memory layout of a c program. [6]



Total No. of Questions : 7]

SEAT No. :

PE-5487

[Total No. of Pages : 2

[6520]-202

First Year M.Sc.

COMPUTER SCIENCE

CSUT-122 : Mobile Technologies

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Attempt any 5 questions from question 2 to 7.
- 3) Question 2 to 7 carry equal marks.

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

- a) What is the purpose of the Image switcher?
- b) Give syntax of Toast().
- c) What is Content Provider?
- d) Explain Thread in Android.
- e) List any two methods of SQLite database.
- f) What is Swift?

Q2) Attempt all questions. [12]

- a) What is Activity? Explain activity life cycle used in Android. [5]
- b) What is Intent? Explain different types of Intent. [5]
- c) Explain any two applications of mobile communication. [2]

Q3) Attempt all questions. [12]

- a) Create an Android application (MainActivity.java) that will display toast message of current time after each minute. [5]
- b) Explain use of XML file in Android application. [5]
- c) What is Android Virtual Device (AVD)? [2]

Q4) Attempt all questions. [12]

- a) Write a code (MainActivity.java) to insert Student Details (rollno, name, marks) in SQLite database using Android App. [5]
- b) Explain advantages and disadvantages of phoneGap. [5]
- c) What is Adapter in Android? [2]

P.T.O.

- Q5)** Attempt all questions. [12]
- a) How can you create spinner control in Android GUI? Explain with syntax. [5]
 - b) Write a short note of swift loop with example. [5]
 - c) Explain working of PhoneGap. [2]
- Q6)** Attempt all questions. [12]
- a) What is difference between AsyncTasks and Thread? [5]
 - b) Write a short note on SQLite Database. [5]
 - c) How to create a progress bar in Android? [2]
- Q7)** Attempt any two of the following. [12]
- a) Write a short note on Broadcast Receiver. [6]
 - b) Explain in detail JSON. [6]
 - c) Discuss IOS layered Architecture with diagram. [6]



Total No. of Questions : 7]

SEAT No. :

PE-5488

[Total No. of Pages : 2

[6520]-203

First Year M.Sc.

**CSUT-123 : Software Project Management
(2019 Pattern) (Semester - II)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any five questions from Q.No.2 to Q.No.7.*
- 3) *Questions 2 to 7 carry equal marks.*
- 4) *Neat diagram must be drawn wherever necessary.*

Q1) Answer the following: (any five)

[5×2=10]

- a) Define activity.
- b) Define earned value.
- c) State the processes of project communication management.
- d) State the purpose of statement of work.
- e) What is quality assurance?
- f) Discuss the reasons of failure of IT projects.

Q2) Attempt the following:

- a) Explain project management plan. **[5]**
- b) Explain work breakdown structure with example. **[5]**
- c) What are the qualities of project manager? **[2]**

Q3) Attempt the following:

- a) Write a short note on PSP. **[5]**
- b) Write a short note on Metric plan. **[5]**
- c) Given the following information for a one year. **[2]**

Project, answer the following question.

- i) BCWS = Rs. 2,30,000
- ii) BCWP = Rs. 2,00,000
- iii) ACWP = Rs. 2,50,000
- iv) BAC = Rs. 12,00,000

Calculate:

- 1) Cost Variance (CV)
- 2) Schedule Variance (SV)

P.T.O.

Q4) Answer the following:

- a) Differentiate between software reliability and hardware reliability. [5]
- b) Write a short note on overall change control. [5]
- c) What is mean by resource loading and leveling? [2]

Q5) Answer the following:

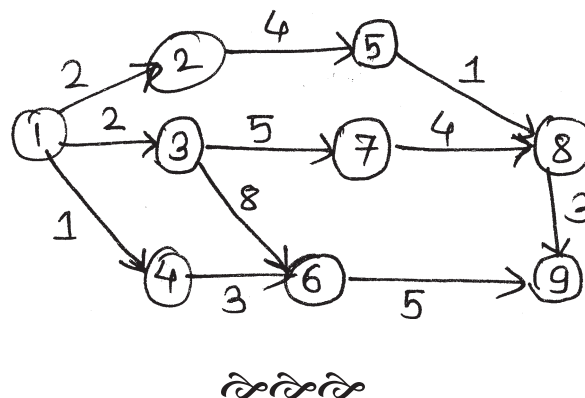
- a) Explain size oriented metrics with example. [5]
- b) Define risk tolerance. Explain various processes involved in Risk Management. [5]
- c) Define indicator of software. [2]

Q6) Attempt the following:

- a) How do we measure productivity? How does team structure affects productivity? [5]
- b) Write a short note on project staff acquisition. [5]
- c) Define software quality. [2]

Q7) Attempt any two of the following: [12]

- a) Explain key process areas in detail. [6]
- b) Write a note on configuration management. [6]
- c) Define critical path. Find critical path for the following network diagram. [6]



Total No. of Questions : 5]

SEAT No. :

PE-5489

[Total No. of Pages : 2

[6520]-204

First Year M.Sc.

COMPUTER SCIENCE

CSDT-124B : Human Computer Interaction

(2019 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

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

- a) What is HCI?
- b) Define Moore's law.
- c) What are the elements of design model?
- d) What is GOMS?
- e) List out the layers of mobile ecosystem.
- f) Define overlays and inlays.

Q2) Attempt the following: [10]

- a) i) Who are the actors in drag & drop? [2]
ii) What is the purpose of drag and drop module? [4]
- b) Who are stake holders? Out line the types of stakeholders for an Railway booking system. [4]

Q3) Attempt the following: [10]

- a) i) Define usability and effectiveness. [2]
ii) Write a note on principles of learnability. [4]
- b) Write a short note on clickstream. [4]

P.T.O.

Q4) Attempt the following: [10]

- a) i) What is heuristic evaluation? [2]
 - ii) Negative affect can make it harder to do even easy tasks; positive affect can make it easier to do difficult tasks. What are the implications of this for interaction design. [4]
- b) Write short note on Open System Task Analysis (OSTA). [4]

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

- a) What are overlays? Types of overlays. [5]
- b) Write a short note on Fitts's Law. [5]
- c) What is Hill-Climbing? Explain with example. [5]



Total No. of Questions : 5]

SEAT No. :

PE-5490

[Total No. of Pages : 2

[6520]-205

First Year M.Sc.

COMPUTER SCIENCE

CSDT-124C : Soft Computing

(2019 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No.1 is compulsory
- 2) Solve any Three questions from Q.No.2 to Q.No.5.
- 3) Q.No.2 to Q.No.5 carries equal marks.

Q1) Solve any five of the following:

[5]

- a) What is ANN?
- b) What is a biological neuron?
- c) Compare Human Brain versus computer.
- d) "The AND function is linearly separable." Comment.
- e) What is selection in Genetic Algorithms?
- f) What is a Perceptron?

Q2) Attempt the following:

[10]

- a) i) What is a membership function in Fuzzy Logic? [2]
- ii) Explain any two Neuron Signal functions that you know. [4]
- b) Explain any two operators in Genetic Algorithms. [4]

Q3) Attempt the following:

[10]

- a) i) What are the applications of G.A. [2]
- ii) Explain the Backpropagation algorithm. [4]

P.T.O.

- b) The membership functions for the linguistic variables 'tall' and 'short' are [4]

$$\text{'tall'} = \left\{ \frac{0.2}{5} + \frac{0.3}{7} + \frac{0.7}{9} + \frac{0.9}{11} + \frac{1.0}{12} \right\}$$

Develop the membership function for the following linguistic phrases.

- i) Very tall
- ii) fairly tall

Q4) Attempt the following: [10]

- a) i) What is meant by Genotype and Phenotype? [2]
- ii) Explain supervised and unsupervised learning. [4]
- b) Let $x = \{x_1, x_2\}$, $y = \{y_1, y_2\}$ and $z = \{z_1, z_2, z_3\}$ consider the following fuzzy relations: [4]

$$R = \begin{matrix} & y_1 & y_2 \\ \begin{matrix} x_1 \\ x_2 \end{matrix} & \begin{bmatrix} 0.7 & 0.5 \\ 0.8 & 0.4 \end{bmatrix} \end{matrix} \text{ and } S = \begin{matrix} & z_1 & z_2 & z_3 \\ \begin{matrix} y_1 \\ y_2 \end{matrix} & \begin{bmatrix} 0.9 & 0.6 & 0.2 \\ 0.1 & 0.7 & 0.5 \end{bmatrix} \end{matrix}$$

- Find max-min composition.
- Find max product composition.

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

- a) Write a note on applications of Neural Network. [5]
- b) Compare biological neuron with an artificial neuron. [5]
- c) Define a fuzzy set. Explain the operations of fuzzy set? [5]



Total No. of Questions : 5]

SEAT No. :

PE5589

[Total No. of Pages : 2

[6520]-301

M.Sc. (Computer Science)

**CSUT - 231 : SOFTWARE ARCHITECTURE AND DESIGN
PATTERNS**

(Revised 2019 Pattern) (CBCS) (Semester - III) (4 Credits)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data, if necessary.*

Q1) Attempt any TEN of the following :

[10×1=10]

- a) What is implicit invocation?
- b) What is mean by Applicability of decorator pattern?
- c) Enlist structural Patterns.
- d) Draw structure of Command design pattern.
- e) Define
 - i) Interface
 - ii) Collaboration
- f) What is GRASP?
- g) Define Design Pattern.
- h) What is Inversion of Control?
- i) Give the factors for describing design pattern.
- j) What is Pattern?
- k) Define singleton Pattern.
- l) Define High cohesion.

Q2) Answer of the following :

[5×2=10]

- a) What is Decomposition structure and Uses Structure?
- b) “Software architecture manifests the earliest set of design decisions”
Justify.
- c) What are design patterns and why are they useful?
- d) Enlist some useful Allocation structure. Explain any two.
- e) What are different forms of coupling?

P.T.O.

Q3) Attempt any FOUR of the following : **[4×5=20]**

- a) Explain Low Coupling GRASP.
- b) Write a short note on Repositories.
- c) Write a short note on Abstract factory Design patterns. (Intent, Structure, Participants, Consequences).
- d) Write a short note on pipes and filters architecture style.
- e) Write a short note on component and Connector Structure (C & C).

Q4) Attempt any FOUR of the following : **[4×5=20]**

- a) Discuss GRASP in detail.
- b) How pattern Interact is Selected Frame Work.
- c) Explain spring framework Architecture with suitable diagram.
- d) What do you mean Decorator design Pattern? When it is used?
- e) Viewers evaluate contestants in a singing competition on voice quality attributes by rating them. Evaluation data updates as more and more viewers evaluate online. The result is displayed in variety of display formats including bar chart, pie chart and tabular form. Select the most appropriate design pattern to use to address the problem and how it is applied give an appropriate class diagram containing relevant classes to illustrate use of the pattern.

Q5) Attempt any ONE of the following : **[1×10=10]**

- a)
 - i) Explain Process Unified Process/Rational Unified Process. **[5]**
 - ii) Enlist Advantages of Spring. **[3]**
 - iii) Describe layered systems Architected style with diagram? **[2]**
- b)
 - i) Explain participants and structure of State design pattern. **[5]**
 - ii) Structure of Decorator Pattern. **[3]**
 - iii) Creational Things. **[2]**

x x x

Total No. of Questions : 7]

SEAT No. :

PE-5590

[Total No. of Pages : 2

[6520]-302

M.Sc.

COMPUTER SCIENCE

CSUT-232 : Machine Learning

(2019 Pattern) (CBCS) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question 1 is compulsory
- 2) Attempt any 5 questions from 2 to 7.
- 3) Figures to right side indicate full marks.

Q1) Attempt any five of the following :

[5 × 2 = 10]

- a) What is underfitting?
- b) Explain the term Feature selection?
- c) Explain any two components Association Rule?
- d) Explain the term complete linkage.
- e) Define Dendrogram.
- f) Define the term Accuracy.
- g) What is hard clustering?

Q2) Attempt all of the following:

- a) Explain CNN in detail. [7]
- b) Explain Q learning algorithm. [5]

Q3) Attempt all of the following:

- a) Explain the K-Means clustering. [7]
- b) Explain Logistic Regression in detail. [5]

Q4) Attempt all of the following:

- a) Explain bias and variance. [7]
- b) Differentiate Supervised and Unsupervised Learning. [5]

P.T.O.

Q5) Attempt all of the following:

- a) Differentiate Null hypothesis and alternative hypothesis. [7]
- b) Explain components of CNN. [5]

Q6) Attempt all of the following:

- a) Find frequent itemset using Apriori Algorithm with min_sup=3. [7]

Transaction ID	Itemset
T1	E,F,G
T2	F,A,N
T3	E,C,G
T4	G,C,N,E
T5	C,E,F,G

- b) Naive Bayes Theorem. [5]

Q7) Attempt any two of the following :

[2 × 6 = 12]

- a) Decision Tree.
- b) Differentiate Machine Learning and Traditional Programming.
- c) Handling missing Data.



Total No. of Questions : 7]

SEAT No. :

PE5591

[Total No. of Pages : 2

[6520]-303

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

CSUT-233 : WEB FRAMEWORKS

(2019 Pattern) (Semester-III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.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 side indicates full marks.*

Q1) Solve any five of the following.

[5×2=10]

- a) What is Django?
- b) What is the use of 'migrate' command in Django?
- c) What is NPM?
- d) What is Node.js?
- e) What is event loop in Node.js?
- f) How to handle HTTP Requests in Node.js?

Q2) Attempt all of the following:

[12]

- a) Explain DOM in detail.
- b) Describe principles of REST API.

[7]

[5]

Q3) Attempt all of the following:

[12]

- a) What is Call back and Premises in JavaScript? Explain with suitable example.
- b) Write a program for reading and writing into the files.

[7]

[5]

P.T.O.

Q4) Attempt all of the following: [12]

- a) What is HTTP Streaming? Explain different types of streams in Node.JS? [7]
- b) Create an HTML form that contain the student registration details and write a JavaScript to validate student first and last name as it should not contain other than alphabets and age should be between 18 to 40.[5]

Q5) Attempt all of the following: [12]

- a) Which core files of Django Framework are used to develop any web application? Explain in detail. [7]
- b) Create a Node.js file that demonstrate create database and table in MySQL. [5]

Q6) Attempt all of the following: [12]

- a) Explain in detail MVT architecture. [7]
- b) Create a Node.js file that will convert the output “Hello World!” into upper-case letters. [5]

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

- a) Explain data types of JavaScript.
- b) Mongoose ODM
- c) Core Module



Total No. of Questions : 5]

SEAT No. :

PE5592

[Total No. of Pages : 2

[6520]-304

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

CSDT - 234A : BIG DATAANALYTICS

(2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data if necessary.*

Q1) Solve any Eight of the following :

[8×1=8]

- a) What is the purpose of JPS command in Hadoop?
- b) Explain the concepts of Data Acquisition.
- c) State what happens when the data node fails.
- d) List the different configurations in Hadoop.
- e) Define Master Data Management.
- f) What are the benefits of using Big Data?
- g) What is Pig?
- h) What is hive?
- i) Explain real time analytics.
- j) Define term - replication.

Q2) Attempt any Four of the following :

[4×2=8]

- a) Write the various features of HDFS.
- b) What is Map - reduce?
- c) How does real - time analytic works?
- d) What are the benefits of hadoop?
- e) Explain implications of Big Data scale on data processing.

P.T.O.

Q3) Attempt any Two of the following :

[2×4=8]

- a) Explain types of replication strategies.
- b) What are the challenges of Big Data?
- c) Write in details step to extract value from Big Data.

Q4) Attempt any Two of the following :

[2×4=8]

- a) Explain CRISP methodology.
- b) What are the benefits of Hadoop?
- c) Define characteristics of Big Data.

Q5) Attempt any One of the following :

[1×3=3]

- a) Explain 3V's of Big Data.
- b) Explain In-memory Data grids in Big Data.

x x x

Total No. of Questions : 5]

SEAT No. :

PE5593

[Total No. of Pages : 2

[6520]-305

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

CSDT-234B : WEB ANALYTICS

(2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) Assume suitable data if necessary.*

Q1) Attempt any Eight of the following:

[8×1=8]

- a) What is Search engine?
- b) What are the types of Metrics for every Dashboard?
- c) How to find where visitors are clicking most?
- d) What is Google Analytics' Conversion Report mean?
- e) Write the names of data collection levels of Google Analytics.
- f) What is 4-Q survey?
- g) Define the term Funnel.
- h) What is page tagging?
- i) Write the importance of web analytics.
- j) Define the term 'page view' in Google Analytics.

Q2) Attempt any Four of the following:

[4×2=8]

- a) Explain the different types of web analytics with examples.
- b) Explain E-commerce with examples.
- c) What are KPI's and how do you find them?
- d) What are the different elements in event tracking?
- e) What are the issues related with data privacy?
- f) Differentiate between bounce rate and exit rate.

P.T.O.

Q3) Attempt any Two of the following:

[2×4=8]

- a) Discuss the factors that affects web crawling.
- b) Discuss requirement of web trafficking model.
- c) Justify “Online survey is powerful way to get feedback in all E-commerce application”.

Q4) Attempt any Two of the following:

[2×4=8]

- a) What is click stream analysis? Discuss it’s commercial applications.
- b) Explain Mobile analytics concept with an example.
- c) Explain the purpose of online survey with its benefits and give the details of different online survey tools.

Q5) Attempt any One of the following:

[1×3=3]

- a) What is Data Segmentation? How the Segmentation is carried out using total traffic?
- b) Explain the Web Analytics Frameworks in detail.
- c) What are different CI Data sources? Explain any 2 in detail.

