

Total No. of Questions : 7]

SEAT No. :

P560

[Total No. of Pages : 2

[5840]-101

M.Sc. (Computer Science)

CSUT -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) *Questions from Q.2 to Q. 7. carry equal marks.*
- 4) *Figures to the right indicate full marks.*

Q1) Solve any five of the following:

[10]

- a) What is the difference between var and val in Scala?
- b) What is l-value and r-value?
- c) What is an array slice? name any two languages supporting it.
- d) Show IEEE floating point standard for single and double precision.
- e) What are the Keyword and positional parameters?
- f) Give any two tasks performed by a preprocessor.

Q2) Attempt the following.

[12]

- a) i) What are the three characteristics of tasks that distinguish it from a subprogram? **[3]**
- ii) Explain the differences between compilation and Interpretation. Which languages use a compiler and which interpreter? **[4]**
- b) What are the different parameter passing methods? Explain any 2 in detail. **[5]**

Q3) Attempt the following.

[12]

- a) i) What are the design issues of subprogram? **[3]**
- ii) Explain the concept of tail recursion with suitable example. **[4]**
- b) What is a dangling pointer? Explain two solutions to the dangling pointer problem? **[5]**

P.T.O.

- Q4)** Attempt the following. [12]
- a) i) Explain implementation of Single Inheritance with suitable example. [3]
 - ii) Write a Scala Program to accept a number from the user and find factorial of that number. [4]
 - b) What are the design issues of an array? Explain various categories of array based on binding to subscript ranges and binding to storage. [5]

- Q5)** Attempt the following. [12]
- a) i) Define the following terms: [3]
 - 1) Precedence
 - 2) Associativity
 - 3) Orthogonality
 - ii) What is descriptor? Draw descriptor for static length, limited dynamic length strings. [4]
 - b) Explain Heap-based allocation. [5]

- Q6)** Attempt the following. [12]
- a) i) Why are there so many Programming Languages? [3]
 - ii) What is Binding Time? Explain the different binding times at which binding decisions can be made. [4]
 - b) Explain five different methods to create List in Scala. [5]

- Q7)** Write short notes on any Two of the following. [12]
- a) Write a note on SIMD and MIMD computer architectures. [6]
 - b) Write a note on Semaphore. How semaphores are used to accomplish Co-operation and Competition Synchronization [6]
 - c) Write a note on Programming Languages Classification and its subtype. [6]



Total No. of Questions : 7]

SEAT No. :

[Total No. of Pages : 3

P561

[5840]-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) *All questions are compulsory*
- 2) *Neat diagrams must be drawn wherever necessary.*

Q1) Solve any FIVE of the following.

[5×2=10]

- a) Define O and give one example.
- b) Define
 - i) Cross edge
 - ii) Tree edge
- c) What are Limitations of Merge-sort?
- d) What is shortest path? When we use Bellman-Ford algorithm.
- e) Define sum of subset problem.
- f) Define FIFOBB and LIFOBB.

Q2) Solve the following.

- a) Explain heap sort with proper example. **[5]**
- b) X be a sequences = $\langle a, a, b, a, b \rangle$ y = $\langle b, a, b, b \rangle$ let the cost associated with edit operation, insert and delete be 1 and change is 2. Find the total minimum cost of transformation of X to Y using dynamic programming. **[7]**

P.T.O.

Q3) Explain strassen's multiplication algorithm. Solve the.

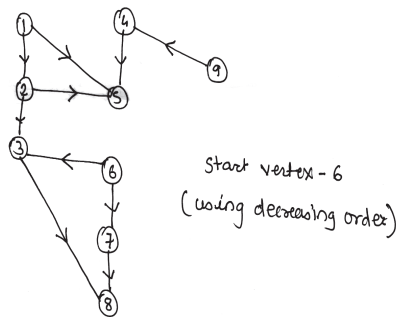
- a) Following by using strassen's multiplication to find matrix Product.

$$A = \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 3 & -4 \\ -4 & 2 \end{bmatrix} = B \quad [7]$$

- b) What is Longest common subsequence. Find LCS of X & Y where
 $X = \langle 1, 0, 0, 1, 0, 1, 1, 1, 0 \rangle$
 $Y = \langle 1, 1, 0, 1, 0 \rangle$ [5]

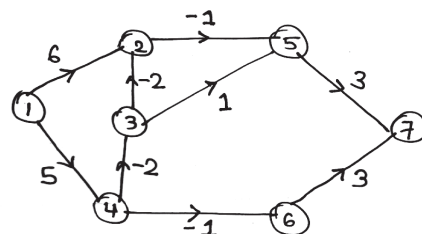
Q4) Solve the following.

- a) Explain algorithm to construct HuFFman code. obtain a set of optimal HuFFman codes for the messages ($m_1, m_2, m_3, m_4, m_5, m_6, m_7$) with relative frequencies (4, 5, 7, 8, 10, 12, 20) [7]
- b) Find the topological sort of the given directed graph? [5]



Q5) Attempt the following.

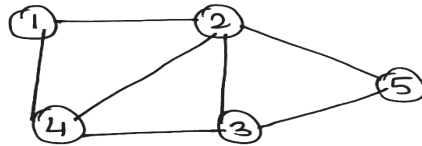
- a) Give any 2 algorithm which are used to find out shortest path. Use Bellman-Ford algorithm to find shortest path from 1. [7]



- b) Find optimal solution to the Knapsack instances $n=7$ $m=15$ [5]
 $(P_1, P_2, \dots, P_7) = (10, 5, 15, 7, 6, 18, 3)$
 $(w_1, w_2, \dots, w_7) = (2, 3, 5, 7, 1, 4, 1)$
 (Use Greedy method)

Q6) Solve the following.

- a) What is m-coloring problem. For the following graph show that only 06 solution is exist. If graph is colored using exactly 3 colors. [7]



- b) Explain insertion sort. Apply insertion sort on following numbers. [5]
85, 24, 63, 45, 17, 31, 96, 50,

Q7) Solve any Two from the following.

- a) State Cook's theorem. Give it's significance. [2×6=12]
b) Solve the given instance of TSP by using reduced cost matrix method

$$\begin{bmatrix} \infty & 20 & 30 & 10 \\ 15 & \infty & 16 & 4 \\ 3 & 5 & \infty & 2 \\ 19 & 6 & 18 & \infty \end{bmatrix}.$$

- c) Define 4 queen's problem. Draw state space tree to Find solution for 4 queen's problem using backtracking.



Total No. of Questions : 7]

SEAT No. :

P562

[Total No. of Pages : 2

[5840]-103

M.Sc. (Computer Science)

CSUT -113 : DATABASE TECHNOLOGIES

(2019 Pattern) (Semester-I) (Revised)

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 from Q.2 to Q. 7. carry equal marks.*

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

- a) List some popular document databases.
- b) Graph databases are called as odd man out fish in NOSQL pond comment.
- c) What are ACID transactions?
- d) What is polyglot programming?
- e) State any two reasons to use NOSQL technologies.
- f) What are key value databases?

Q2) Attempt all. [12]

- a) i) Explain the term NOSQL. [2]
- ii) Differentiate between relational databases and NOSQL databases.[5]
- b) Explain any suitable use cases for graph databases. [5]

Q3) Attempt all. [12]

- a) i) What are Quorums? [2]
- ii) Explain read and write quorum. [5]
- b) Model the following Department system as a document database. consider a set of students, course and marks. A student can register for more than one course.
Assume appropriate attributes and collections as per query requirements and Answer the following queries. [5]
 - i) Count the number of students having more than 80 marks.
 - ii) List the name and age of the oldest 5 students.

P.T.O.

- Q4)** Attempt all. [12]
- a) i) What is consistency? [2]
 - ii) What are two ways to maintain session consistency? [5]
 - b) A Rawat furniture showroom has different types of furniture like sofa sets, tea tables, computer tables cupboards, beds & dining tables. There are different types of sections for each furniture types. Each section handaled by sales staff. one sales staff can handle more than one sections. Mr. Kale enquired about brown soft set and computer table. Mr. Gore has purchased red colour bed after enquiry. [5]
 - i) Identify different labels, nods, relationships and respective properties.
 - ii) Draw a graph model using same.

- Q5)** Attempt all. [12]
- a) i) What are version stamps? [2]
 - ii) How version stamps are applied on multiple nodes. [5]
 - b) Explain mapreduce technique with example. [5]

- Q6)** Attempt all. [12]
- a) i) Define Replication [2]
 - ii) Explain in brief master slave replication. [5]
 - b) What are different points to be considered while choosing a database.[5]

- Q7)** Write short notes on any Two of the following. [12]
- a) What is super column family? Explain. [2]
 - b) Write a short note on materialized views. [5]
 - c) Explain various barriers of NOSQL. [5]



Total No. of Questions : 5]

SEAT No. :

P563

[5840]-104

[Total No. of Pages : 6

M.Sc. (Computer Science)
CSDT-114A : CLOUD COMPUTING
(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) Which type of cloud service is provided by Google App Engine?
- b) What is the objective of security governance?
- c) What is the use of virtualization in cloud computing?
- d) Comment on the statement- "Load balancing is an optimization technique".
- e) List out different amazon cloud services.
- f) Define multitenancy.

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

- a)
 - i) Explain in short disaster recovery in cloud. **[2]**
 - ii) Compare services provided in cloud-SaaS, PaaS, IaaS. **[4]**
- b) Write a note on Amazon S₃ cloud service. **[4]**

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

- a)
 - i) Why there is need to monitor system continuously? **[2]**
 - ii) Which are various cloud enabling technologies? Explain it. **[4]**
- b) Explain various components of microsoft windows Azure cloud platform, with neat labelled diagram. **[4]**

P.T.O.

Q4) Attempt the following: [10]

- a) i) Define bare metal and hosted architecture of hypervisor. [2]
- ii) What is the concept of virtual clustering? Explain it with Figure. [4]
- b) Which are the different security issues given by Gartner? Explain it. [4]

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

- a) Write a short note on [5]
 - i) Open nebula
 - ii) Sector/sphere
- b) Describe benefits of cloud computing in detail. [5]
- c) Write a short note on [5]
 - i) Security architecture design
 - ii) Identify and Access management.



Total No. of Questions : 5]

P563

[5840]-104

M.Sc. (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) *Questions 2 to 5 carry equal marks.*

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

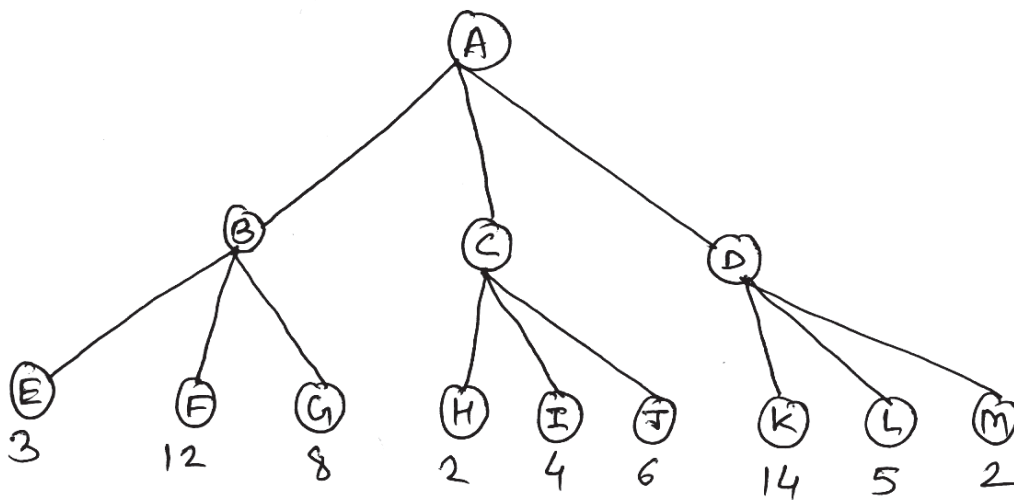
- a) List any two applications of AI.
- b) What is heuristic search?
- c) Distinguish between knowledge & data.
- d) Explain any two characteristics of a problem. With example.
- e) Define “local maximum” that is reached when you apply hill climbing search.
- f) Translate the following FOL (first-order-logic) statement into English.
 $\forall x : \text{student}(x) \Rightarrow \text{smart}(x)$

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

- a) What is Reinforcement learning? **[2]**
- b) Explain backward chaining. Solve below example using backward chaining. **[4]**
 - i) Gita loves all types of clothes
 - ii) Suits are clothes
 - iii) Jackets are clothes
 - iv) Anything any wear and isn't bad is clothes.
 - v) Sita wears skirt & is good.
 - vi) Renu wears anything Sita wears.
- c) Discuss the relation between tuples & lists tuples and dictionaries in detail. **[4]**

- Q3)** Attempt the following. [10]
- Define best first search. [2]
 - Define constraint satisfaction problem. Solve SEND+MORE=MONEY using constraint satisfaction problem. [4]
 - What is Regression? Explain different types of regression. [4]

- Q4)** Attempt the following: [10]
- List the criteria to measure the performance of different search strategies. [2]
 - Find the best move for MAX player using minmax procedure & perform left-to-right alph-beta pruning on the tree indicate where cut offs occur. [4]



- Write state space representation of water jug problem. We have 2 jugs of water of size 4L & 2L resp. We want 2ltr. water in 4ltr. jug. [5]

- Q5)** Attempt any two of the following: [10]
- Explain AO* algorithm with example. [5]
 - Represent following facts in First order logic [5]
 - Lucy* is a professor.
 - All professors are people.
 - Fuchs is the dean.
 - Deans are professors.
 - All professors consider the dean a friend or don't know him.
 - Write a python program to check whether a given program is prime or not. [5]



Total No. of Questions : 5]

P563

[5840]-104

**M.Sc. (Computer Science)
CSDT-114C : WEB SERVICES
(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 envelop 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 services discovery in SOA.

Q2) Attempt the following: [10]

- a) i) What are the advantages of web services? [2]
- ii) What are VDDI data sructures? 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 meassage 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) What are ,<definitions> and <port type> elements in WSDL? Write on example for each. [4]

Q5) Attempt any two of following: [10]

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



Total No. of Questions : 7]

SEAT No. :

P564

[Total No. of Pages : 3

[5840]-201

M.Sc. (Computer Science)

CSUT -121 : ADVANCED OPERATING SYSTEM

(2029 Pattern) (Semester-II)

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 from 2 to 7 carry equal marks.*

Q1) Solve any five of the following:

[10]

- a) Explain sigpromask () function
- b) Comment “In linux the files are usually accessed via filenames”.
- c) What is symbolic link?
- d) Explain sticky bit.
- e) What is orphan & zombie process
- f) “ Random access I/O is not possible for pipe files”. Justify.

Q2) Attempt the following.

[12]

- a) i) State & explain setjmp () & longjmp () functions. **[4]**
ii) What is a) Block special file b) Character special file c) Socket file. **[3]**
- b) Explain scenario of delayed write buffer allocation with suitable diagram. **[5]**

Q3) Attempt the following.

[12]

- a) i) Explain wait (), wait pid (), wait 3 (), wait 4 () system call with syntax. **[4]**
ii) Describe major responsibilities handled by kernel. **[3]**

P.T.O.

- b) Explain the behaviour of following C program [5]

```
#include < signal.h >
main ()
{
    register int i ;
    setpgrp ( ) ;
    for (i=0; i<10; i++)
    {
        if (fork ( ) ==0)
        {
            if (i & 1)
            setgrp ( ) ;
            printf (“pid= %d pgrp=%d”, getpid ( ), getpgrp ( ) );
            pause ( );
        }
    }
    kill (0, SIGINT);
}
```

- Q4)** Attempt the following. [12]

- a) i) Explain the behaviour of following C program. [4]

```
main ()
{
    int fd;
    char buff [1024];
    fd=create (“Try”, 0666);
    lseek (fd, 2000,2);
    write (fd, “Good morning”, 5)
    close (fd) ;
    fd=open (“ Try” , O_ RDONLY);
    read (fd, buff, 1024);
    read (fd, buff, 1024);
    read (fd, buff, 1024);
}
```

- ii) Explain the data structure used for demand paging. [3]

- b) Write a program to demonstrate race condition in catching signal. [5]

- Q5) Attempt the following. [12]**
- a) i) Explain [4]
 - 1) Read ()
 - 2) write ()
 - 3) read v ()
 - 4) write v () with syntax
 - ii) Explain the purpose of nice (), getpriority () & setpriority () system call. [3]
 - b) How to manipulate memory? Explain memset (), memchr (), memcmp (), & memmove () functions. [5]

- Q6) Attempt the following. [12]**
- a) i) Explain advantages & disadvantages of mmap (). [4]
 - ii) Give the difference between dup & dup 2 system call with syntax. [3]
 - b) Write a note on “ Advanced signal management”. [5]

- Q7) Attempt any two of the following. [12]**
- a) Explain following system calls with syntax.
 - 1) alarm ()
 - 2) pause ()
 - 3) raise ()
 - b) What is process? Draw & explain in detail process transition diagram of process.
 - c) Write a C program that prints size of a file for each command line argument. [5]



Total No. of Questions : 7]

SEAT No. :

P565

[Total No. of Pages : 2

[5840]-202

M.Sc. (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 from Q.2 to Q. 7. carry equal marks.*

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

- a) What is storyboard?
- b) What is JSON parsing?
- c) What is Dalvik virtual machine?
- d) What is user mobility & device portability.
- e) What is broadcast Receiver?
- f) Name the types of view groups.

Q2) Attempt all.

- a) Describe intent. Explain types of Intents. **[7]**
- b) Explain Alarm and Toast with example. **[5]**

Q3) Attempt all.

- a) Explain PhoneGap plug-ins. write steps to publish a plugin to npm. **[7]**
- b) What is thread? Explain run on ui Thread with example. **[5]**

Q4) Attempt all.

- a) Discuss various applications of mobile communication. **[7]**
- b) Explain content providers with example. **[5]**

Q5) Attempt all.

- a) Explain SMS and MMS with example. **[7]**
- b) Explain iOS application cycle with example. **[5]**

P.T.O.

Q6) Attempt all.

- a) What is Android? Explain its Architecture in detail. [7]
- b) Explain various types of event handlers used in Android framework. [5]

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

- a) Geolocation API.
- b) Data types used in swift.
- c) Phone Gap



Total No. of Questions : 7]

SEAT No. :

P566

[Total No. of Pages : 2

[5840]-203

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

CSUT 123 : SOFTWARE PROJECT MANAGEMENT

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q. 1 is compulsory.*
- 2) *Solve any Five questions form Q.2 to Q.7.*
- 3) *Q.2 to Q.7 carry equal marks.*

Q1) Solve any Five of the following :

[10]

- a) Write a short note on PSP.
- b) What is a Project Plan?
- c) Write characteristics of Measurement Team Members.
- d) Define project. Give any two example of Project.
- e) List the outputs of administrative closure in project communication Management.
- f) List the processes involves in communication management.

Q2) a) Write common elements of a project plan and also describe the overview of the project. **[7]**

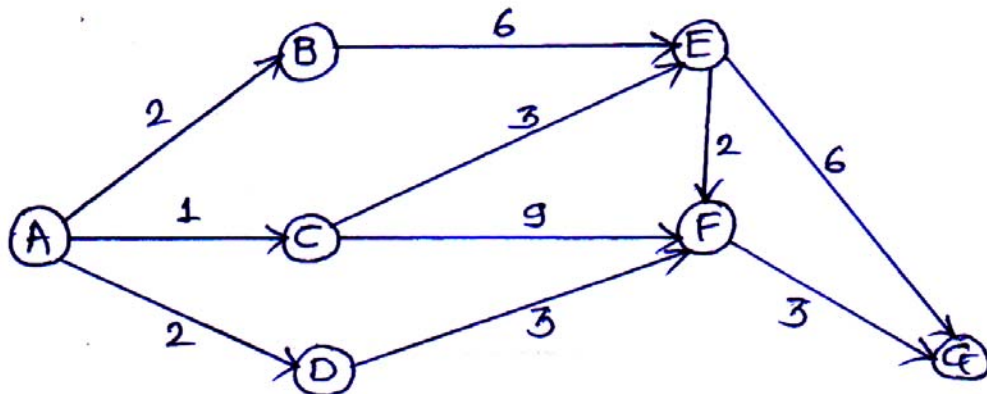
b) Explain CMM model phases with help of diagram. **[5]**

Q3) a) Write a note on Team Structure and Explain in brief tools and methods used in software project Management. **[7]**

b) What is Human resource Management. And describe team development process in Human resource Management. **[5]**

P.T.O.

- Q4)** a) List the Quality Models and write a note on McCall software quality model. [7]
- b) Define CPM. Find Critical path for the following Network diagram : [5]



- Q5)** a) Explain the types of Data and What is Good Data. [7]
- b) Write the categories of Risk. and Explain the Risk Management Processes in detail. [5]

- Q6)** a) Define MTTF and MTBF. Write meaning of Productivity and How do we measure productivity. [7]
- b) What is EVA? Given the following information for a project, answer the following question. [5]
 BCWS = 27,000 Rs, BCWP = 18,000 Rs, ACWP = 36,000 Rs.
 Find CPI and SPI

- Q7)** Write short notes on any two of the following : [12]
- a) Goals of Metrics Plan.
- b) Template of Scope statement.
- c) Types of contract.



Total No. of Questions : 5]

SEAT No. :

P567

[Total No. of Pages : 4

[5840] - 204

M.Sc. (Computer Science)

CSDT124B : 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 Q5 carry equal marks.*

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

- a) What is meant by sensory memory?
- b) What are the steps for interaction design process?
- c) What is Design space analysis?
- d) What is GOMS?
- e) List out the layers of mobile ecosystem?
- f) Define overlays and inlays.

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

- a)
 - i) What is drag and 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 airline 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) Explain with example deductive, inductive and abductive reasoning. [5]
- b) Write a short note on Fitts's Law. [5]
- c) Explain the execution - Evaluation cycle. [5]



Total No. of Questions : 5]

P567

[5840] - 204
M.Sc. (Computer Science)
CSDT 124C : 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 form 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 features of membership function.
- b) What are the properties of TLN?
- c) Compare Human Brain Versus computer.
- d) What are the applications of Neural Network.
- e) Define multilayer Network.
- f) Explain the main operators in GA.

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

- a)
 - i) What is cartesian product? Explain with example. **[2]**
 - ii) Explain Biological Neuron and Artificial Neuron with diagram. **[4]**
- b) How genetic algorithms are different from traditional methods. **[4]**

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

- a)
 - i) What are the applications of GA. **[2]**
 - ii) Differentiate feedforword and feedback network. **[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]

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

- i) Find max-min composition.
- ii) Find max product composition.

Q4) Attempt the following : [10]

- a) i) Explain the crossover in GA. [2]
- ii) What is supervised and unsupervised learning Explain. [4]
- b) Consider the fuzzy relation matrix R. [4]

$$R = \begin{bmatrix} 1 & 0.8 & 0 & 0.1 & 0.2 \\ 0.8 & 1 & 0.4 & 0 & 0.9 \\ 0 & 0.4 & 1 & 0 & 0 \\ 0.1 & 0 & 0 & 1 & 0.5 \\ 0.2 & 0.9 & 0 & 0.5 & 1 \end{bmatrix}$$

Perform λ -cut operations for the values $\lambda = 1, 0.2, 0.4, 0.7$.

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

- a) What is fuzzy set? Explain operations on fuzzy set with diagram. [5]
- b) Explain perceptron network with diagram. [5]
- c) What is pattern space & weight space? Explain. [5]



Total No. of Questions : 7]

SEAT No. :

P568

[Total No. of Pages : 2

[5840]-301

M.Sc. (Computer Science)

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

(Revised 2019 Pattern) (Semester - III) (CBCS) (Credit : 4)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

Q1) Solve any Five of the following :

[10]

- a) Define Software Architecture.
- b) List any 2 structural things and draw it's notation.
- c) Define pattern.
- d) Draw structure of decorator pattern.
- e) What is GRASP?
- f) What is Inversion of Control?

Q2) Attempt All :

- a) Describe a template of Design patterns. **[7]**
- b) List advantages and disadvantages of singleton design pattern. **[5]**

Q3) Attempt All :

- a) What is abstract factory design pattern? And write consequences of it in detail. **[7]**
- b) Write a short note on pipes and filters architecture style. **[5]**

P.T.O.

Q4) Attempt All :

- a) Discuss GRASP in detail. [7]
- a) Explain spring framework Architecture with suitable diagram. [5]

Q5) Attempt All :

- a) i) Describe intent and applicability of adapter design pattern. [4]
- ii) List participants and structure of observer design pattern. [3]
- b) Write a short note on protected variations (PV). [5]

Q6) Attempt All :

- a) i) Describe layered systems Architected style with diagram. [5]
- ii) List three categories of GOF design pattern. [2]
- b) Why software architecture is important? [5]

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

- a) Rational Unified Process.
- b) Microservices with spring.
- c) Law of Demeter (Don't talk to strangers)



Total No. of Questions : 7]

SEAT No. :

P569

[Total No. of Pages : 2

[5840]-302

Second Year M.Sc. (Computer Science)

CSUT 232 : MACHINE LEARNING

(2019 Pattern) (Revised) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

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

Q1) Solve any Five of the following :

[10]

- a) What are types of ANN?
- b) What is reinforcement learning?
- c) Explain the term support vectors.
- d) Write an applications of Association Rule.
- e) What is dendrogram?
- f) What is F1-score?

Q2) Attempt All :

- a) Describe machine learning system cycle and design cycle in detail. **[7]**
- b) Write a short note on Support Vector Machine algorithm. **[5]**

Q3) Attempt All :

- a) What is machine learning? Explain various types of machine learning models. **[7]**
- b) Differentiate Supervised/Unsupervised Learning and Reinforcement Learning. **[5]**

P.T.O.

Q4) Attempt All :

- a) Discuss components and types of ANN in detail. [7]
- b) Find the frequent itemsets with minsup = 2. [5]

TID	Items bought
T1	A,B,C
T2	B,C,D
T3	A,B,C,D
T4	A,E

Q5) Attempt All :

- a) Write a short note on Decision tree algorithm. Give advantages and disadvantages. [7]
- b) Explain the types of learners in classification. [5]

Q6) Attempt All :

- a) What are the steps in handling missing data. [7]
- b) Explain the concept of linear regression model. [5]

Q7) Write a short note on any Two of the following : [12]

- a) Feature scaling.
- b) Overfitting and Underfitting.
- c) Naïve Bayes classifier.



Total No. of Questions : 7]

SEAT No. :

P7248

[Total No. of Pages : 2

[5840] - 303
M.Sc. (Semester - III)
COMPUTER SCIENCE
CSUT - 233 : Web Frameworks
(2019 Pattern)

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 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 DOM?
- b) What is event loop in Node.js?
- c) Explain Module. Exports.
- d) What is NPM?
- e) How to handle HTTP Requests in Node.js?
- f) Which method is used to remove a file from the file system? Explain with suitable syntax.

Q2) Attempt all of the following :

[12]

- a) Which Web Framework is followed by Django? Explain with suitable diagram. **[7]**
- b) What is REST? Explain functions used in REST. **[5]**

Q3) Attempt all of the following :

[12]

- a) Explain Node.js Process Model. **[7]**
- b) Create a Node.js file that demonstrate create database and table in MySQL. **[5]**

P.T.O.

Q4) Attempt all of the following : **[12]**

- a) What is Callback and Promises in JavaScript? Explain with suitable example. **[7]**
- b) Using node.js create a web page to read two file names from user and append contents of first file into second file. **[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 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 50. **[5]**

Q6) Attempt all of the following : **[12]**

- a) What is form? How forms are created in Django? **[7]**
- b) Create a node.js file that Insert Multiple records in "Student" table and display the result object on console. **[5]**

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

- a) Async / Await in JavaScript.
- b) Event Emitter Class.
- c) Mongoose ODM.



Total No. of Questions : 5]

SEAT No. :

P570

[Total No. of Pages : 2

[5840]-304

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

CSDT - 234A : BIG DATA ANALYTICS

(2019 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

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

- a) What are the benefits of using Big Data?
- b) Write any two characteristics of Database workload.
- c) Define Master Data Management.
- d) What is hadoop?
- e) Explain real time analytics.
- f) What is Pig?

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

- a)
 - i) Explain 3v's of Big Data? **[2]**
 - ii) Define characteristics of Big Data. **[4]**
- b) Write in details step to extract value from Big Data. **[4]**

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

- a)
 - i) What is MapReduce? **[2]**
 - ii) Define HBase and Mahout. **[4]**
- b) Explain Hadoop Architecture in detail. **[4]**

P.T.O.

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

- a) i) Explain Hadoop Distributed file system. **[2]**
- ii) Write in details application of Big Data. **[4]**
- b) Explain Big Data Analytics Methodology. **[4]**

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

- a) What are the challenge in Big Data?
- b) Write any five components of data ecosystem?
- c) Explain in details - Data Integration Pattern.



Total No. of Questions : 5]

SEAT No. :

P571

[Total No. of Pages : 2

[5840]-305

M.Sc. (Computer Science)

CSDT - 234B : WEB ANALYTICS

(2019 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

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

- a) Define Web Analytics.
- b) What is clickstream data?
- c) Define A/B Testing.
- d) What is conversion rate?
- e) What is competitive Intelligence analysis?
- f) What is Google Analytics.

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

- a)
 - i) Explain Demographics. **[2]**
 - ii) Explain Search Engine console report. **[4]**
- b) Write a note on following terms **[4]**
 - i) Hybrid data
 - ii) Search Engine Data.

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

- a)
 - i) What is 4-Q Survey? **[2]**
 - ii) What is survey? Explain Post visit surveys. **[4]**
- b) Write a note on dashboard & its implementation also explain various types of dashboards. **[4]**

P.T.O.

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

- a) i) Explain web 2.0 challenge. **[2]**
- ii) What do you mean by event tracking? What are the different elements in event tracking. **[4]**
- b) What is segmentation? Explain types of segmentation. **[4]**

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

- a) Explain Goals & funnels in detail. **[5]**
- b) What is website traffic Analysis. **[5]**
- c) Write a note on conducting a Heuristic Evaluation. **[5]**

