Total No. of Questions : 7] **SEAT No. :**

PC-3969

[Total No. of Pages : 3

[6346] - 101
M.Sc.(Computer Science)
CSUT 111: Paradigm of Programming Language
(2019 Pattern) (Semester - I) (CBCS)

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) ***Questions 2 to 7 carry equal marks.***

Q1) **Attempt any FIVE of the following :** **[5 × 2 = 10]**

a) Give classification of programming languages.

b) What is "Calling Sequence"?

c) "Scala is object oriented and functional programming language", Comment.

d) What is the purpose of "this" pointer in C++?

e) Explain the concept of short-circuit evaluation.

f) What are the design issues with String data type?

Q2) **Attempt all of the following :**

a) i) Explain any four String functions in Scala with example. **[4]**

ii) What is Pure Interpreter? Explain. **[3]**

b) Explain the concept of dangling pointer and memory leakage with suitable example. **[5]**

P.T.O.

Q3) **Attempt all of the following :**

a) i) What are semantics models of Parameter Passing? Explain with suitable example. **[4]**

ii) Explain associative array with suitable example. **[3]**

b) What is a vtable? How is it used? Explain with suitable example. **[5]**

Q4) **Attempt all of the following :**

a) i) What is a task? Write characteristics of a task. Also explain lightweight and heavyweight tasks. **[4]**

ii) Write a Scala program to create two sets and find common elements between them. **[3]**

b) Explain the concept of Generic Subprograms in C++ with suitable example. **[5]**

Q5) **Attempt all of the following :**

a) i) Write a Scala program to create a list of even numbers up to 10 and calculate its product. **[4]**

ii) "Unions in 'C' are free unions". Comment. **[3]**

b) What is fully qualified reference and elliptical references? Explain with suitable example. **[5]**

Q6) **Attempt all of the following :**

a) i) What is Inner Class? How it is implemented in Java? **[4]**

ii) What is multiway assignment? Explain with suitable example. **[3]**

b) Write a short note on Monitors. **[5]**

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

a) Explain different categories of control-flow mechanism.

b) Write a Scala program to illustrate the concept types of constructors.

c) Consider following code:

```
x: integer : =1
y : integer := 2
procedure add
    x := x + y
procedure second(P : procedure)
    x : integer := 2
    P()
procedure first
    y : integer := 3
    second(add)
first()
write integer(x)
```

i) What does the program print if the language uses static scoping?

ii) What does the language print if it uses dynamic scoping with deep binding?

iii) What does the language print if it uses dynamic scoping with shallow binding?

Total No. of Questions : 7] **SEAT No. :**

PC3970 **[Total No. of Pages : 4**

[6346]-102
First Year M.Sc. (C.S)
CSUT-112 : DESIGN AND ANALYSIS OF ALGORITHMS
(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.No. 2 to Q.No. 7.***
3) ***Question 2 to 7 carry equal marks.***

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

a) Define Ω notation.

b) Merge sort is in-place sorting algorithm. Justify.

c) Define algorithm and write any two characteristics of algorithm.

d) What do you mean by longest common subsequence problem?

e) What is sum of subset problem?

f) What is non- deterministic algorithm?

Q2) Attempt all questions. **[12]**

a) Write algorithm for insertion sort and explain its time complexity in best case and worst case. **[5]**

b) Use Strassen's algorithm to compute the matrix product of following matrices giving each computational step. **[5]**

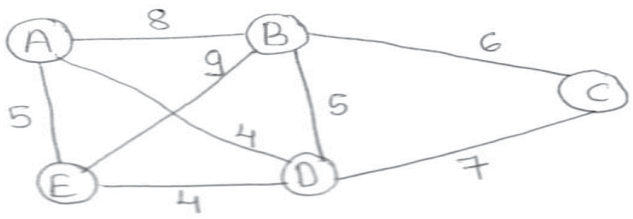
$$A = \begin{bmatrix} 4 & 3 \\ 5 & 6 \end{bmatrix} \qquad B = \begin{bmatrix} 3 & -2 \\ -4 & 2 \end{bmatrix}$$

c) Define m-colourability problem. **[2]**

P.T.O.

Q3) Attempt all questions. **[12]**

a) Using Prims algorithm find the minimum cost spanning tree. **[5]**



b) What is counting sort? sort the following numbers with counting sort algorithm 2, 1, 6, 2, 1, 2, 5 **[5]**

c) Differentiate between FIFOBB and LCBB **[2]**

Q4) Attempt all questions. **[12]**

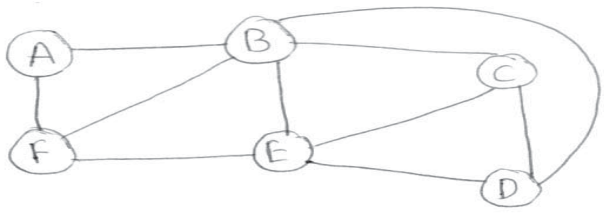
a) Solve the following 0/1 knapsack problem using function method **[5]**

n = 5 m = 12

p = (10, 15, 6, 8, 4)

w = (4, 6, 3, 4, 2)

b) Draw DFs and BFs for the following graph (start vertex A) **[5]**



c) What is stable sorting algorithm? List any two sorting algorithms that are stable. **[2]**

Q5) Attempt all questions. **[12]**

a) What is optimal merge pattern? Find an optimal binary merge pattern for following files whose lengths are 5, 11, 12, 13, 28, 32, 35, 48 **[5]**

b) Find an optimal solution to knapsack instance using greedy method **[5]**

n = 7 m = 15

p = (10, 5, 15, 7, 6, 18, 3)

w = (2, 3, 5, 7, 1, 4, 1)

c) State Cook's theorem. Give its significance. **[2]**

Q6) Attempt all questions. **[12]**

a) Obtain the reduced cost matrix for the travelling salesperson instance given by the cost matrix **[5]**

$$\begin{bmatrix} \infty & 10 & 12 & 9 \\ 7 & \infty & 6 & 4 \\ 9 & 4 & \infty & 4 \\ 11 & 10 & 5 & \infty \end{bmatrix}$$

Which node will be selected next in LCBB formulation of problem.

b) What is job sequencing with deadline problem? Consider the following instance for job sequencing with deadline problem where n = 7 **[5]**

p = (3, 5, 20, 18, 1, 6, 30)

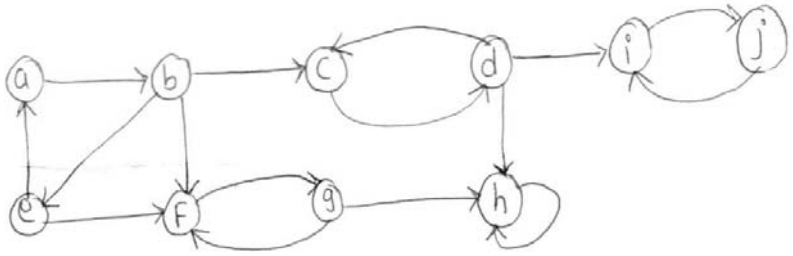
d = (1, 2, 4, 3, 2, 1, 2)

Give solution obtained using greedy method.

c) Write two bounding functions associated with every node in LCBB. **[2]**

Q7) Attempt any two of the following. **[12]**

a) What is strongly connected component? Find strongly connected component of the following graph. **[6]**



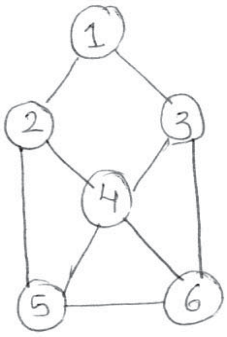
b) What is string editing problem? A string *x* can be transformed into string y by applying a sequence of edit operations such as insert, delete and interchange with associated costs of 1, 1, 2 respectively. **[6]**

$x = a, a, b, a, b$

$y = b, a, b, b$

Find the cost of transforming *x* to *y*.

c) What is Hamiltonian cycle? Find out all possible Hamiltonian cycle for following graph. [start vertex 1] **[6]**



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Total No. of Questions : 7]

SEAT No. :

PC3971

[Total No. of Pages : 3

[6346]-103

M.Sc. - I (Computer Science)

CSUT 113 : DATABASE TECHNOLOGIES

(2019 Pattern) (Semester-I)

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

Instructions to the candidates:

1) ***Question No.1 is compulsory.***
2) ***Solve any five questions from question 2 to question 7.***
3) ***Questions 2 to 7 carry equal marks.***

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

a) What is business transaction?

b) List some of the popular column family databases.

c) Define Event log.

d) What is polyglot persistence?

e) What is Domain Bucket?

f) State the CAP Theorem

Q2) Attempt all: **[12]**

a) The most important result of the rise of NoSQL is polyglot persistence. Comment. **[5]**

b) Write a note on two-stage map reduce. **[5]**

c) What is keyspace? **[2]**

P.T.O.

Q3) Attempt all: **[12]**

a) Explain process of combining sharding and replication in detail. **[5]**

b) Write a note on Read consistency **[5]**

c) Define version stamp. **[2]**

Q4) Attempt all: **[12]**

a) Consider the following case study. **[5]**

A library consist of books which are written by various authors. Author may have also translated some books. People can write review about the book and also borrow books. Books are supplied by various suppliers. The library contains books which are published by various publishers.

Draw a graph model for the above mentioned case study and identify labels and relationships and nodes. Assume appropriate values for the nodes.

b) Differentiate between handling of events in typical system and event sourcing system. **[5]**

c) What is Transition period? **[2]**

Q5) Attempt all: **[12]**

a) Which are the different aggregate oriented databases in NoSQL? Explain any one with example. **[5]**

b) Explain different features of graph Database. **[5]**

c) State use of slaveOK parameter in MongoDB. **[2]**

Q6) Attempt all: **[12]**

a) NoSQL databases are schemaless. How does this feature of NoSQL data stores impact the enterprise application? **[5]**

b) What are pros and cons of Graph database under NoSQL? **[5]**

c) Define write quorum. **[2]**

Q7) Attempt any two **[12]**

a) One of the main reason to use NoSQL technology is to improve programmer productivity. Comment **[6]**

b) Explain cases where key-value databases are not suitable. **[6]**

c) Consider Account information of Bank spread over 3 nodes in a cluster, where each document contains account information like Acc_no, Acc_holder_name, Acc_type, Acc_balance, branch. **[6]**

Draw a map-reduce pattern for the following queries.

i) Find average balance of accounts from “Pune” branch.

ii) Give total count of all saving-accounts.

Total No. of Questions : 5]

SEAT No. : ____

PC3972

[Total No. of Pages : 6

[6346]-104

First Year M.Sc. (Computer Science)

CSDT-114(A) : CLOUD COMPUTING

(2019 Pattern) (Semester - I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

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

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

a) State True/False with justification - "with cloud model you lose control over physical security".

b) What do you mean by scalability in cloud computing.

c) Define virtual cluster.

d) What is bare metal virtualization?

e) Which is fundamental storage service for Google's search engine?

f) What was the aim of Eucalyptus product?

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

a) What is load balancing? Discuss simple load balancing technique in short. **[2]**

b) Explain microsoft windows Azure platform for cloud computing and Explain its components in detail with figure. **[4]**

c) Elaborate the security challenges which can be faced by organisations while adopting cloud computing. **[4]**

P.T.O.

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

a) How is cloud computing different from traditional software development? **[2]**

b) Explain two-level memory mapping procedure with the help of neat labelled diagram. **[4]**

c) Enlist and explain any four Saas services provided by google cloud. **[4]**

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

a) Give the four building blocks used by bigtable. **[2]**

b) Describe in brief a cloud enabling technology - Broadband Networks and internet Architecture. **[4]**

c) Write a note on Identity & access Management. **[4]**

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

a) Write short note on **[5]**

i) Open Nebula

ii) Sector/Sphere

b) Elaborate the importance of security governance and risk management. **[5]**

c) Explain various characteristics of cloud computing. **[5]**

Total No. of Questions : 5]

PC3972

[6346]-104

First Year M.Sc. (Computer Science)

CSDT-114(B) : ARTIFICIAL INTELLIGENCE

(CBCS 2019 Pattern) (Semester - I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

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

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

a) Define Artificial Intelligence.

b) What is Hill Climbing?

c) Define BFS

d) What is Backward Chaining?

e) State any two applications of Machine Learning.

f) Translate the following FOL (first order-logic) statement into English.

$x\forall$: student (x) $\Rightarrow$ intelligent (x)

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

a) What is Supervised learning? **[2]**

b) Explain backward chaining. Prove that "Somu knows Hindi" example using backward chaining. **[4]**

i) Somu is a soldier

ii) Somu is an Indian

iii) All Indian soldiers know Hindi

c) Explain the syntax: tuples, lists, and dictionaries in detail. **[4]**

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

a) Define depth-first search. **[2]**

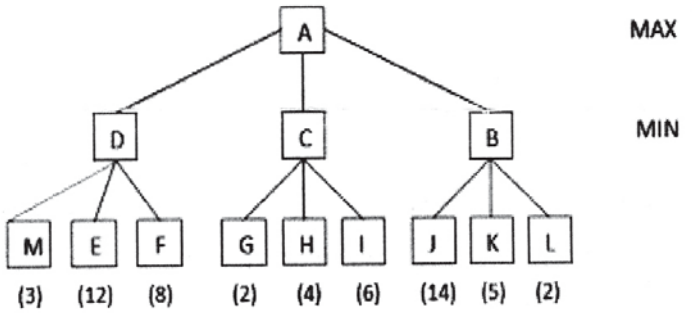
b) Define the constraint satisfaction problem. Solve CROSS + ROADS = DANGER using the constraint satisfaction problem. **[4]**

c) Explain Classification and Regression. **[4]**

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

a) Write a short note on AO* algorithm. **[2]**

b) Find the best move for the MAX player using the mini-max procedure & perform left-to-right alpha-beta pruning on the tree to indicate where cut-offs occur. **[4]**



c) Write state space representation of the water jug problem. We have 2 jugs of water of size 2L & 4L resp. We want 2ltr. water in 4ltr. jug. **[4]**

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

a) Explain the Means Ends analysis algorithm with an example. **[5]**

b) Represent the following facts in First-order logic **[5]**

i) Jack owns a dog

ii) Every dog owner is an animal lover

iii) Tom is a dog

iv) No animal lover kills a dog

v) Either Jack or Tom killed a tuna, the cat.

c) Write a Python program to check whether a given number is odd or even. **[5]**

Total No. of Questions : 5]

PC3972

[6346]-104

First Year M.Sc. (Computer Science)

CSDT-114(C) : WEB SERVICES

(2019 Pattern) (Semester - I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

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

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

a) List different operations of web service architecture.

b) Which language is used by UDDI?

c) List different HTTP methods supported by RESTFul web services.

d) Define SOAP web services.

e) List different roles in a service oriented architecture.

f) What UDDI stands for.

Q2) Attempt the following:

a) What are the elements of a SOAP message? **[2]**

b) Write a note on UDDI data structures. **[4]**

c) Write a note on CORBA distributed computing technology. **[4]**

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

a) Differentiate between web services and web based application. **[2]**

b) Enlist advantages and disadvantages of statelessness. **[4]**

c) Write a note on WSDL interface with neat diagram. **[4]**

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

a) What are the components of web service? **[2]**

b) Differentiate between SOAP and RESTFul services. **[4]**

c) How does one-way operation differ from a request - response operation in WSDL? **[4]**

Q5) Solve any two of the following : **[2×5=10]**

a) What is SOAP communication? Explain its types. **[5]**

b) Explain publisher interface and inquiry interface for the information handled by UDDI. **[5]**

c) Write a note on REST web services. **[5]**

Total No. of Questions : 7]

SEAT No. :

PC3973

[6346]-201

[Total No. of Pages :2

First Year M.Sc. (Computer Science)

CSUT-121 : ADVANCED OPERATING SYSTEMS

(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: **[5×2=10]**

a) Justify : Anonymous memory mapping is associated with a file.

b) Explain sigqueue ( ) function.

c) Give the difference between wait and waitpid.

d) Explain lseek function with syntax.

e) What are daemons?

f) Explain sticky bit.

Q2) Attempt all questions: **[12]**

a) Write a C program to illustrate use of pipe and dup system call. **[5]**

b) Explain setjmp and longjmp with an example. **[5]**

c) Justify : Process 0 and Process 1 exists through the lifetime of a system. **[2]**

Q3) Attempt all questions: **[12]**

a) What is a link? Explain types of links. **[5]**

b) Explain states of a process with suitable diagram. **[5]**

c) Write difference between fork ( ) and vfork ( ). **[2]**

Q4) Attempt all questions: **[12]**

a) Explain second scenario for buffer allocation. **[5]**

b) Explain kill ( ) and raise ( ) function. **[5]**

c) Explain the tasks of Kernel. **[2]**

P.T.O.

Q5) Attempt all questions: **[12]**

a) Write a C program to demonstrate atexit ( ) function. **[5]**

b) Explain in detail demand paging a memory management technique. **[5]**

c) What is an inode? List any two operations performed on inode. **[2]**

Q6) Attempt all questions: **[12]**

a) What is a signal? Explain signal set in detail. **[5]**

b) Explain the behaviour of the following program. **[5]**

```
#include <signal.h>
main ( )
{
    int retval, status;
    signal (SIGCLD, SIG-IGN);
    if (fork ( ) = = 0)
    {
     exit (0);
    }
    retval = wait (& status);
 }
```

c) Explain brk ( ) and sbrk ( ) system call. **[2]**

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

a) Explain six values for param defined in <malloc.h> supported by Linux. **[5]**

b) Explain following system calls. **[5]**

i) Creat ( )

ii) read ( )

iii) exec ( )

c) Write short notes on: **[2]**

i) Unreliable signals

ii) reentrant functions

iii) signal mask

Total No. of Questions : 7]

SEAT No. : ____

PC3974

[Total No. of Pages : 2

[6346]-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) ***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) Define term.

i) Mobility

ii) Portability

b) What is Intent.

c) What is Android Activity?

d) Give use of thread in Android?

e) What is use of cursor in SQ Lite Database?

f) What is advantage of swift?

Q2) Attempt all questions. **[12]**

a) Explain Android Architecture with diagram. **[5]**

b) What is Layout? Explain different types of Layout used in Android. **[5]**

c) Explain any two Android Features. **[2]**

Q3) Attempt all questions. **[12]**

a) Write a Android program (Main Activity Java) for select any three subjects out of five subjects using checkbox. **[5]**

b) Explain any two tags used in XML file of Android Application. **[5]**

c) What is Dalvik virtual machine. **[2]**

P.T.O.

Q4) Attempt all questions. **[12]**

a) Write a code (Main Activity. java) to insert customer Details (custid, name, Address) in SQ Lite database using Android App. **[5]**

b) Write a short note on features of phone Gap. **[5]**

c) What is Array Adapter. **[2]**

Q5) Attempt all questions. **[12]**

a) How can you create radio button in Android GUI? Explain with syntax. **[5]**

b) What is Swift? Describe the features of Swift. **[5]**

c) Explain any two advantages of phoneGap. **[2]**

Q6) Attempt all questions. **[12]**

a) Write a short note on AsyncTask in Android. **[5]**

b) What is parsing? Explain XML parsing and JSON. **[5]**

c) How to create Menu in Android. **[2]**

Q7) Attempt any two of the following. **[12]**

a) Write a short note on Notification in Android. **[6]**

b) Explain CRUD operations of SQLite database. **[6]**

c) Explain IOS Application life cycle with diagram. **[6]**

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Total No. of Questions : 7]

SEAT No. : ____

PC3975

[Total No. of Pages : 2

[6346]-203
M.Sc. - I
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 5 questions from Q.2 to Q.5.***
3) ***Q.2 to Q.7 carry equal marks.***
4) ***Neat diagrams must be drawn whenever necessary.***

Q1) Answer the following. (any five) **[2×5=10]**

a) Define milestone.

b) Define cost variance (CV)

c) State the outputs of the Administrative closure process.

d) What are the different types of contracts?

e) Which factors affects the quality of IT project?

f) Enlist the attributes of project.

Q2) Attempt the following.

a) Write a short note on project integration management. **[5]**

b) Explain project scope management. **[5]**

c) What are triple constraint on project. **[2]**

Q3) Attempt the following.

a) Write a short note on TSP. **[5]**

b) Define metric plan. Explain the components of metric plan. **[5]**

c) Given the following informations for one year project. **[2]**
answer the following questions:

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) Attempt the following.

a) Define software reliability. Explain the characteristics of software reliability. **[5]**

b) Write a short note on stakeholder analysis. **[5]**

c) What is Resource loading and Resource leveling. **[2]**

Q5) Attempt the following.

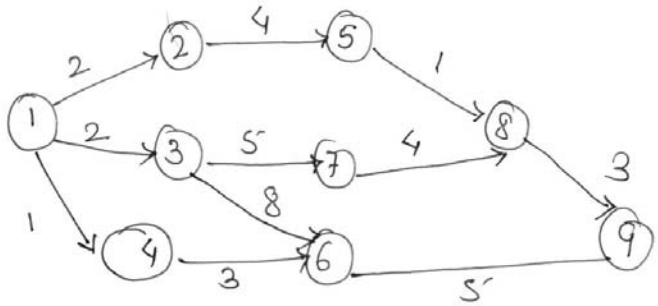
a) Explain size-oriented metrics with example. **[5]**
b) Define risk identification. Explain the contents of risk register. **[5]**
c) Define measure of software. **[2]**

Q6) Attempt the following.

a) Explain is brief tools and methods used to improve productivity. **[5]**
b) What are the different types of powers in HR Management. **[5]**
c) Define software quality. **[2]**

Q7) Attempt (any 2) **[2×6=12]**

a) Explain Key Process Area's in detail.
b) Write a short note on change control board.
c) Define critical path. Find critical path for the following Network diagram.



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Total No. of Questions : 5]

SEAT No. : [ ]

PC3976

[Total No. of Pages : 4

[6346]-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 1 is compulsory.***
2) ***Solve any 3 questions from Q2 to Q5.***
3) ***Question 2 to Q5 carry equal marks.***

Q1) Solve Any 5 of the following: **[5]**

a) What is meant by Drag & Drop Action?

b) What is meant by List Inlay?

c) What is Ergonomics?

d) Who are stackholders?

e) Differentiate Dragged object versus drop target.

f) What is meant by multi-level tools?

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

a) i) What are the activities in the waterfall model of the software life cycle? **[2]**

ii) Explain in detail about waterfall model of software development life cycle. **[4]**

b) List the parts of human eye. **[4]**

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

a) i) Who are Actors in drag & drop? **[2]**

ii) What is the purpose of drag & drop? **[4]**

b) Write a note on WIMP interface. List it's elements. **[4]**

P.T.O.

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

a) Define:

i) 1) Application context **[2]**

2) Utility context

ii) Explain importance of color with user interface. **[4]**

b) What are three main approaches to prototyping? **[4]**

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

a) Explain in detail about the standards, guidelines & golden rules for interactive system design?

b) Explain GOMS with example.

c) Write a note on World Wide Web.

Total No. of Questions : 5]

PC3976

[6346]-204

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 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 are the properties of fuzzy sets?

b) What is TLN?

c) Explain about artificial neuron.

d) Explain the characteristics of ANN.

e) Define Hidden layer in ANN.

f) Explain the mutation operator in GA.

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

a) i) Differentiate between classical sets and fuzzy sets. **[2]**

ii) Compare Biological Neuron and Artificial Neuron. **[4]**

b) Explain the differences between traditional and genetic algorithm. **[4]**

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

a) i) What are the applications of GA. **[2]**

ii) Explain feed forward 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_1	y_1	y_2	y_3	y_4
x_1	0.3	0	0.7	0.3
x_2	0	1	0.2	0

R_2	z_1	z_2	z_3
y_1	0.1	0.2	0.4
y_2	0.8	0.3	1
y_3	0.7	0.9	0.6

i) Find max-min composition.

ii) Find max product composition.

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

a) i) Explain different cross over operations performed in GA **[2]**

ii) Discuss about the supervised learning strategy. **[4]**

b) Consider the fuzzy relation matrix R. **[4]**

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

Perform λ-cut operations for the values λ = [1, 0.2, 0.4, 0.7].

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

a) What is fuzzy set? Explain about the cardinalities in fuzzy sets.

b) What are the limitations of "Perceptron" model? Explain.

c) What is Pattern Recognition? Explain.

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Total No. of Questions : 5]

SEAT No. : ____

PC-3977

[Total No. of Pages : 2

[6346]-301

M.Sc. (Computer Science)

CSUT-231: SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

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

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***The figures to the right indicate fullmarks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) **Attempt any TEN of the following** **[10 × 1 = 10]**

a) Define GRASP responsibilities.

b) What is mean by Intent in design pattern?

c) Enlist Behavioral Patterns.

d) Draw structure of Factory Design Pattern

e) Define is GOF?

f) What is implicit invocation?

g) Define Design Pattern.

h) What is Inversion of Control?

i) Give the factors for describing design pattern.

j) Define UML.

k) Can we create a clone of a singleton object?

l) Define Low coupling

Q2) **Attempt Any Five of the following:** **[5 × 2 = 10]**

a) Define Software Architecture.

b) List any 2 structural things and draw it's notation

c) What are design patterns and why are they useful?

d) Define Spring Framework

e) Enlist Advantages of Spring.

f) List three categories of GOF design pattern

P.T.O.

Q3) **Attempt Any Four of the following:** **[4 × 5 = 20]**

a) What do you mean Façade Pattern? When it is used?

b) Write a Short note on Blackboard Model.

c) How we can use pattern in software architecture? Explain.

d) Explain factory and decorator with suitable examples.

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) Why software architecture is important?

c) Explain spring framework Architecture with suitable diagram

d) Describe intent and applicability of Command design pattern.

e) Assume a factory that manufactures teacups. There are about four types of teacups. They differ only by shape and colour, the ingredients and quality are the same. The factory manufactures around 1000 items in one batch for one type of teacup. In this case, creating 4000 teacups from the scratch is an inefficient task. Draw the UML diagram considering appropriate design pattern.

Q5) **Attempt Any One of the following:** **[1 × 10 = 10]**

a) i. List participants and structure of observer design pattern. **[5]**

ii. Enlist Advantages of Spring. **[3]**

iii. Write a short note on pipes and filters architecture style. **[2]**

b) i. Differentiate in between service oriented architecture (SOA) and microservices architecture. **[5]**

ii. Structure of Decorator Pattern. **[3]**

iii. Structural Things. **[2]**

Total No. of Questions : 7]

SEAT No. : ____

PC3978

[Total No. of Pages : 2

[6346]-302
Second Year M.Sc. (Computer Science)
CSUT - 232 : MACHINE LEARNING
(2019 Pattern) (Semester - III)

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) What is dendrogram?

b) What is feature scaling?

c) Define bias and variance.

d) What is F1-score?

e) What is reinforcement learning?

f) List out the steps of data preprocessing in Machine Learning?

g) What are the types of ANNs?

Q2) Attempt all.

a) Explain overfitting and underfitting. **[7]**

b) Explain Naive Bayes classification. **[5]**

Q3) Attempt all.

a) Write a short note on association rules. **[7]**

b) Discuss components and types of ANN in detail. **[5]**

P.T.O.

Q4) Attempt all.

a) Write a short note on accuracy measure of a classifier. **[7]**

b) Differentiate between agglomerative and divisive clustering techniques. **[5]**

Q5) Attempt all.

a) Explain concept behind SVM and application of SVM. **[7]**

b) Find the frequent itemset and the association rules with minsup = 2 and confidence level = 70%. **[5]**

TID	Items
1	A,C,D
2	B,C,E
3	A,B,C,E
4	B,E

Q6) Attempt all.

a) Explain K means algorithm and limitations of K means. **[7]**

b) Differentiate between supervised and unsupervised learning. **[5]**

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

a) PCA (Principle Component Analysis)

b) Convolution Neural Network (CNN)

c) Random forest algorithm

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Total No. of Questions : 7]

SEAT No. :

PC3979

[Total No. of Pages : 2

[6346]-303

M.Sc. - II (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 question 2 to question 7 of the following.***
3) ***Questions 2 to 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. **[10]**

a) What is Stream?

b) What is Django?

c) What is Callback?

d) What is event loop in Node.js?

e) What is URL Mapping?

f) State different advantages of Node.js.

Q2) Attempt all of the following: **[12]**

a) Describe Math. Date and String Objects with example. **[7]**

b) What is REST? Explain functions used in REST. **[5]**

P.T.O.

Q3) Attempt all of the following: **[12]**

a) What architecture does Django use? Explain it in detail. **[7]**

b) Create a node.js file that Select all records from the "customers" table, and display the result object on console. **[5]**

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

a) What is Callback and Promises in JavaScript? Explain with suitable example. **[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 notcontain 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 will convert the Output "Hello! I am learning Node.js" into lower-case letters. **[5]**

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

a) Explain CRUD operation in MySQL using Node.JS. **[7]**

b) Create a Simple Web Server using Node.js. **[5]**

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

a) Methods of the EventEmitter class.

b) MVT architecture.

c) Async/Await in JavaScript

Total No. of Questions : 5]

SEAT No. : ____

PC3980

[Total No. of Pages : 2

[6346]-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) ***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 Hadoop'?

b) Define name node in Hadoop

c) What is sharding?

d) State time window slicing.

e) Why do we need Apache Pig?

f) What is Map-reduce in the context of Big Data.

g) What is difference between structured and unstructured data?

h) What is Jobtracker in Hadoop?

i) What arc the two core components of Hadoop?

j) What is the purpose of replication in HDFS?

Q2) Attempt any Four of the following: **[4×2=8]**

a) Discuss various sources of Big Data.

b) Explain the different phases of CRISP - DM methodology.

c) Write a short note on RDBMS vs Non Relational Databass.

d) Write a short note on scale - out architecture.

e) List different configuration files in Hadoop.

P.T.O.

Q3) Attempt any Two of the following : **[2×4=8]**

a) What are the different data integration patterns and explain their characteristics?

b) Explain YARN architecture with it's key components.

c) What is In - Memory Data Grid? Explain it's architecture with it's key features.

Q4) Attempt any Two of the following: **[2×4=8]**

a) Explain 3V's of Big Data.

b) Describe the structure of HDFS in a Hadoop ecosystem using a diagram.

c) Define Big data. Explain it's characteristics.

Q5) Attempt any One of the following: **[1×3=3]**

a) Explain challenges of Big data.

b) Explain Big Data Warehouse and analytics.

Total No. of Questions : 5]

SEAT No. : ____

PC3981

[Total No. of Pages : 2

[6346]-305

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) ***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) Write the different types of web analytics?

b) How to find where visitors are clicking most?

c) What is Google Analytics' Conversion Report mean?

d) Explain E-commerce?

e) Write the names of data collection levels of Google Analytics.

f) Define the term Funnel.

g) What are the different elements in event tracking?

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) What are the types of Metrics for every Dashboard.

b) What is search engine?

c) What are KPI' s and how do you find them?

d) What is 4-Q survey?

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) What is click stream analysis? Discuss its 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.

Q4) Attempt any Two of the following: **[2×4=8]**

a) Discuss the factors that affect web crawling.

b) Explain the Web Analytics Frameworks in detail.

c) Justify "Online survey is powerful way to get feedback in all ecommerce application".

Q5) Attempt any One of the following: **[1×3=3]**

a) Discuss requirement of web trafficking model.

b) What are different CI Data sources? Explain any 2 in detail.

c) What is Data Segmentation? How the Segmentation is carried out using total traffic?

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