Total No. of Questions : 5]

SEAT No. : ____

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[Total No. of Pages : 2

[6155]-31
S.Y. B.Sc. (Computer Science)
CS-231 : DATA STRUCTURES AND ALGORITHMS - I
(Rev.2019) (Semester-III) (23121)

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

Instructions to the candidates :

1) ***Figures to the right indicate full marks.***
2) ***Neat diagrams must be drawn wherever necessary.***

Q1) **Attempt any EIGHT of the following:** **[8 × 1 = 8]**

a) 'Q' notation is used to denote upper of the time complexity, state true/ False.

b) Define Data structure.

c) What is In-place sorting?

d) State the time complexity of merge sort?

e) Write structure definition for singly circular linked list.

f) Write postfix expression for a given infix expression.
((((P+Q)/R)*L)*M)

g) "Doubly linked list need more merely than singly linked List" state true/ false.

h) What is priarity queue?

i) Wha is Double ended Queue?

j) Define stack.

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

a) List different types of data structures.

b) What is time complexity?

c) Explain Divide and Conquer strategy.

d) Write representation of polynomial using linked list with suitable example.

e) List applications of stack.

f) Differentiate between circular queue & linear queue

P.T.O.

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

a) Write a recussive function in 'C' for binary search.

b) Write a function in 'C' to delete a node from singly linked list by value.

c) Write functions definition in "C" for push() and POP() to implement static stack.

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

a) Apply selection sort to the following data:

98, 22, 79, 36, 47, 26, 82

b) Write a function in 'C' to implement insert operation of a dynamic queue.

c) Evaluate following postfix expression show all steps

A/B/C+D*E

Assume A=16, B=2, C=4, D=1, E=2

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

a) What is generalized linked List? Represent the given List (a,(b,c,d),e,f).

b) Show the contents of queue at each step of the following program statements:

```
int x = 20, y = 30;
    init ();
    enqueue (6);
    enqueue (x)
    y = dequeue ();
    y = dequeue ();
    enqueue (y+3);
    x = y+30
    enqueue (x);
    enqueue (x–1);
    enqueue (x);
```

Total No. of Questions : 5]

SEAT No. : ____

P6377

[Total No. of Pages : 2

[6155]-32

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

CS-232 : SOFTWARE ENGINEERING

(New CBCS 2019 Pattern) (Semester -III) (Paper - II) (23122)

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 neccesary.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) List the activities of spiral model.

b) What is class & object?

c) What does ASD stands for?

d) Define Agility.

e) Draw a symbol of component.

f) Name any two key XP activities.

g) "A design notation is a symbolic representational System". Justify.

h) What is meant by structural analysis?

i) Define : Pattern.

j) What are the common notation for deployment diagram?

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

a) What is negotiation?

b) Describe the terms cohesion & coupling.

c) State the purpose of use case diagram.

d) Write a short note on concurrent deployment model.

e) What are the elements which are used in activity diagram?

P.T.O.

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

a) State difference between structure & unstructured Interviews.

b) Draw sequence diagram for student registration system.

c) Explain umbrella activities of software engineering.

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

a) Explain RAD model with diagram.

b) What is an agile process model?

c) Define : Software Requirements specification (SRS).

Q5) Attempt any one of the following. **[1×3=3]**

a) Draw UML class diagram for railway reservation system.

b) Explain any three different types of design classes in software engineering.

❄ ❄ ❄

Total No. of Questions : 3]

SEAT No. : ____

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[Total No. of Pages : 2

[6155]-33
S.Y. B.Sc. (Computer Science)
MATHEMATICS
MTC-231 : Groups and Coding Theory
(2019 Pattern) (Semester - III) (23221)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Non-programmable scientific calculator is allowed.***

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

a) State Euclids Lemma.

b) Find Hamming distance between x and y, where $x = 110110$ and $y = 011101$

c) Check whether the permutation $\tau = (1, 2, 3, 4, 6)\ (8, 9)$ is even or odd? Justify.

d) Define term 'Group'.

e) Find all generators of the group (z_8, t_8)

f) If $(a, b) = 1$ and $b|ac$ then show that $b|c$.

g) Let $G = (z_4, t_4)$ be a group and $H = \{\bar{0}, \bar{2}\}$ be a subgroup of G. Find two right cosets of H in G.

Q2) Attempt any three of the following : **[3 × 5 = 15]**

a) In any group (G, *). Prove that there exists unique inverse for any element $a \in G$.

b) Let p = 11, q = 5 and e = 7. Using RSA method encode the word 'Good'.

c) If $\sigma = (1\ 7\ 3)\ (4\ 9)$, $\tau = (2\ 4\ 6\ 8)$ in Sg, find $\sigma\tau\sigma^{-1}$.

d) Let R be relation on Z defined as xRy if and only if $5x + 2y$ is divisible by 7. Show that R is an equivalence relation on Z.

e) Let $a, b, x, y \in Z$, $n \in N$. If $a \equiv b (\text{mod } n)$, $c \equiv d\ (\text{mod} n)$

then (i) $a + c \equiv b + d\ (\text{mod } n)$

(ii) $ac \equiv bd\ (\text{mod } n)$

P.T.O.

Q3) Attempt any one of the following : **[1 × 10 = 10]**

a) Find gcd of 4999 and 1109 and also find integers m,n such that (4999, 1109) = m(4999) + n(1109).

b) i) For the set $\phi^+ = \phi - \{0\}$, of non-zero rationals, then the binary operation * is defined as $a*b=\frac{ab}{3}$. Show that (ϕ^+, *) is an abelian group.

c) Determine the group code $e_H : B^3 \rightarrow B^6$ whose given parity check matrix is,

$$H=\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Total No. of Questions : 3]

SEAT No. : ____

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[6155]-34

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

MATHEMATICS

MTC - 232 : Numerical Techniques

(Revised 2019) (Semester - III) (23222) (Paper - II)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any five questions out of seven. **[5×2=10]**

a) Round off the number 84.25732 to five significant digits. Find the corresponding relative and percentage error.

b) Prove that $\nabla E = \Delta$ with usual notations.

c) State Newton's forward difference interpolation formula for equal intervals.

d) Given that $y' = 2x + y$ with y (0) = 1. Find y (0-1) by Euler's method.

e) Find $\int_0^1 x^2\, dx$ using Trapezoidal rule. Take h = 0.5.

f) State Simpson's (3/8)th rule for numerical integration.

g) Write Newton Raphson formula to find the cube root of a number N.

Q2) Attempt any three of the following: **[3×5=15]**

a) Find the root of the equation x^3-5x+3 = 0 in the interval (0,1) by Regula Falsi method. (Perform three iterations).

b) Find the cubic polynomial from the given data using Lagrange's interpolation formula

x	0	1	2	4
y	1	1	2	3

P.T.O.

c) Derive Simpson's $(1/3)$ rd rule of Numerical integration.

d) Apply Newton's Divided difference interpolation formula to find the value of f(3) by using the given data :

x	0	1	4	5
$f(x)$	8	11	68	123

e) Apply Newton's Backward interpolation formula to find the value of f(58) by using the given data:

x	45	50	55	60
$f(x)$	0.7071	0.7660	0.8192	0.8660

Q3) Attempt any one of the following: **[1×10=10]**

a) Solve the equation $y' = x + y$ with y (0) = 1 by Runge kutta method of fourth order. Find y (0,1), y(0,2).

b) i) Using Simpson's $(3/8)$ th rule evaluate $\int_0^1 \frac{1}{1+x}\,dx$ with $h = \frac{1}{6}$

ii) Using Euler's modified method, compute y (0,01) for the differential equation $y' = -y$ with y (0) = 1, Take h = 0.01.

Total No. of Questions : 5]

SEAT No. :

P-6380

[Total No. of Pages : 2

[6155]-35
S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC-231 : Microcontroller Architecture and Programming
(Revised 2019) (Semester - III) (23321) (Paper - I)

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

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of calculator is allowed.***

Q1) **Attempt any five :** **[5 × 1 = 5]**

a) What is the size of on chip ROM in 8051?

b) Define addressing mode.

c) What is the role of $C/\overline{T}$ bit of TMOD register?

d) What is the use of SBUF in serial communication?

e) Define step angle of stepper motor.

f) In serial communication which register is used to set the baud rate.

Q2) **Answer the following :** **[2 × 5 = 10]**

a) Explain in brief internal RAM organisation of 8051 microcontroller.

b) Explain the function of following instructions.

i) ANL a, #05H

ii) DEC @RO

iii) NOP

iv) MOVX a, @DPTR

v) MOV a, @RO

Q3) **Answer the following :** **[2 × 5 = 10]**

a) Define and explain assembler directive with the help of suitable example.

b) Write a 8051 'C' program to generate 24Hz square wave on port pin $p_{1.3}$ using timer 0 in mode 2(XTAL = 12 MHz).

P.T.O.

Q4) **Answer the following :** **[2 × 5 = 10]**

a) Draw bit format of TCON register and explain function of each bit.

b) List the various interrupts in 8051 microcontroller and write their corresponding vector addresses with priority.

Q5) **Attempt any Four of the following :** **[4 × 2.5 = 10]**

a) Differentiate between synchronous and asynchronous serial communication.

b) Write a short note on : Arithmatic Instructions.

c) Explain function of following pins of LCD.

i) RS

ii) E

iii) R/W

d) Write a short note on Interrupt service routine.

e) Explain in brief Register banks in 8051.

f) Write a short note on - ports in 8051.

Total No. of Questions : 5] **SEAT No. :**

P6381 **[Total No. of Pages : 2**

[6155]-36
S.Y. B.Sc. (Computer Science)
ELECTRONIC SCIENCE
ELC-232 : Digital Communication and Networking
(2019 Revised Pattern) (Semester - III) (Paper - II) (23322)

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) ***Figures to the right indicates full marks.***
4) ***Neat diagrams must be drawn whenever necessary.***
5) ***Use of calculator is allowed.***

Q1) Attempt any five **[5×1=5]**

a) What is sampling?

b) Define data rate.

c) State any two digital modulation techniques.

d) Define Backoff time in pure ALOHA.

e) What is working principle of WDM?

f) What is the function of Repeater?

g) Define network topology.

Q2) Answer the following. **[2×5=10]**

a) Explain with block diagram electronic communication system.

b) State any five features of CDMA.

Q3) Answer the following. **[2×5=10]**

a) Explain simplex and full duplex modes of transmission of communication system.

b) Explain with block diagram QPSK modulator.

P.T.O.

Q4) Answer the following. **[2×5=10]**

a) Explain FDM technique used in communication system.

b) Compare OSI and TCP/IP model.

Q5) Write a short note on any four of the following. **[4×2½=10]**

a) Signal and channel bandwidth

b) Need of modulation

c) FSK transmitter

d) Token Passing Protocol

e) TDM

f) Star topology

♦ ♦ ♦

Total No. of Questions : 3] **SEAT No. :**

P7388 **[Total No. of Pages : 1**

[6155]-37

S.Y. BCA/B.Sc. (Computer Science/ Bio - Technology/ Animation)

ENGLISH

AECC-II : Language Communication - I

(Revised 2019) (Semester - III) (23922)

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

Instructions to the candidates:

1) ***All the questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any one out of the following in about 150-200 words. **[15]**

a) Comment on the end of the story A shadow.

b) Discuss Where the Mind is Without fear as a poem about patriotism.

OR

Q2) Attempt any two out of the following in about 50-80 words. **[10]**

a) Introduce yourself to the colleges of a newly joined software company.

b) As a student secretary of Library committee of your college, write a dialogue on refusing the permission to use mobile phones in the college library.

c) Frame a dialogue on expressing your apology for not attending your cousin's wedding ceremony.

Q3) Attempt any two out of the following in about 50-80 words. **[10]**

a) Write a job application letter for the past of a Data analys in a multinational company.

b) Write any ten 10 points of "Interview Ettiquettes".

c) Prepare a power print presentation on any one of the social media platform.

♦ ♦ ♦

P.T.O.

Total No. of Questions : 5]

SEAT No. :

P6383

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[6155]-41

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

CS 241 : DATA STRUCTURES AND ALGORITHMS - II

(Revised 2019) (Semester - IV) (24121)

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

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***Neat diagrams must be drawn whenever necessary.***

Q1) Attempt any eight of the following: **[8×1=8]**

a) "Binary tree contains every node with minimum two child nodes". State true/false.

b) Define : left skewed binary tree.

c) What is degree of a graph?

d) Name datastructure used to implement depth first search (DFS) of a graph.

e) What is complete binary tree?

f) Define : balance factor.

g) Write properties of a good hash function.

h) Write any two applications of graph.

i) "Complete graph contains n(n–1)/2 number of edges". State true/false.

j) What is synonym of Hashing?

P.T.O.

Q2) Attempt any four of the following. **[4×2=8]**

a) What is splay tree?

b) Explain Mid = Square function in hashing with suitable example.

c) What is inverse adjacency list?

d) Show the steps of creating a binary search tree for the following data 15, 30, 20, 5, 10, 2, 7

e) Consider the following adjacency matrix Draw the graph from it.

	v_1	v_2	v_3	v_4	v_5
v_1	0	1	1	1	1
v_2	0	0	1	0	0
v_3	0	0	0	1	1
v_4	0	0	1	0	1
v_5	0	0	0	0	0

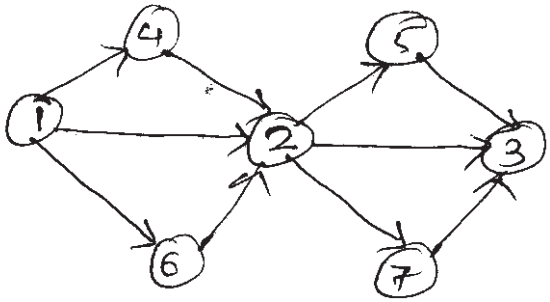
Q3) Attempt any two of the following. **[2×4=8]**

a) Construct red black tree for the following.

50, 40, 30, 20, 10, 35, 5

b) Write a recursive function in 'c' to display and count leaf nodes of a binary search tree.

c) Consider the following graph:



i) Draw Adjacency List

ii) Write BFS and DFS traversal

Q4) Attempt any two of the following. **[2×4=8]**

a) Write a 'c' function to insert a node in binary search tree.

b) Construt AVL tree for the following data :

XYZ, PQR, LMN, QBC, ABC, STR, UVW, BMC.

c) Store following values in Hash table:

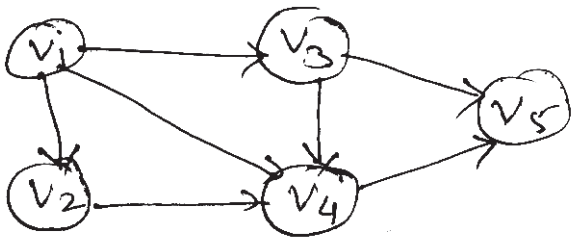
13, 45, 24, 113, 161, 207, 211.

Use division method of hashing with table size 11. Number of slots is 1 in each bucket. Apply linear probing to resolve over flow. Show hash table contents.

Q5) Attempt any one of the following. **[1×3=3]**

a) Differentiate between B and B+ tree.

b) What will be the topological order of activities for the AOV network given below?



Total No. of Questions : 5]

SEAT No. :

P-6384

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[6155]-42
S.Y. B.Sc.
COMPUTER SCIENCE
CS-242 : Computer Networks - I
(2019 Pattern) (Semester - IV) (24122)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagram must be drawn if necessary.***

Q1) **Attempt any EIGHT of the following (Out of TEN) :** **[8 × 1 = 8]**

a) Which is connection oriented transport layer protocol?

b) Identify the class of the IP addresses 192.168.60.12 and 10.11.1.1

c) Define congestion.

d) What is fragmentation?

e) Convert dotted decimal IP address to binary address : 255.255.0.0

f) What is socket address?

g) How many maximum no. of computers are used to create piconet?

h) Apply bit stuffing on the pattern :

01001111111101111110

i) What is Ethernet?

j) What is network?

Q2) **Attempt any FOUR of the following (Out of FIVE) :** **[4 × 2 = 8]**

a) List different task performed by the network layer.

b) What are the three phases of Mobile IP?

c) List classes for classful IP addressing.

d) What are the functions of transport layer?

e) What is TCP?

P.T.O.

Q3) **Attempt any TWO of the following (Out of THREE) :** **[2 × 4 = 8]**

a) What are the types of CSMA Protocols?

b) Write the advantages of computer network.

c) Explain the distinct steps involved in circuit switching.

Q4) **Attempt any TWO of the following (Out of THREE) :** **[2 × 4 = 8]**

a) Write the policies adopted by open loop congestion control.

b) Explain IPv6 Address types.

c) Which services are provided by TCP?

Q5) **Attempt any ONE of the following (Out of TWO) :** **[1 × 3 = 3]**

a) Write & Draw bluetooth frame format.

b) Explain multiplexing & demultiplexing at the transport layer.

Total No. of Questions : 3]

SEAT No. : ____

P6385

[Total No. of Pages : 2

[6155]-43
S.Y. B.Sc. (Computer Science)
MATHEMATICS
MTC - 241 : Computational Geometry
(2019 Pattern) (Semester - IV) (24221) (Paper - I)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Non-programable scientific calculator is allowed.***

Q1) Attempt any five of the following. **[5×2=10]**

a) If $A(\Delta ABC) = 25$ sq. units is uniformly scaled by 5 units then what is area of transformed triangle.

b) Give any two examples of parallel projection.

c) Find the initial point on the part of circle $x^2 + y^2 = 16$ in 3rd quadrant.

d) Define the term "solid body transformation".

e) Find homogenuous co-ordinate of the point $A = [1, 2]$.

f) Write the transformation matrix for scaling in x and z co-ordinate by factor ½ and 3 units respectively.

g) Write types of oblique projection.

Q2) Attempt any three of the following. **[3×5=15]**

a) If the line AB with slope m is transformed to the line A*B* with slope m* using 2×2 transformation matrix $[T] = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then show that slope of transformed line is $m^* = \dfrac{b + dm}{a + cm}$.

b) Obtain the transformation matrix to reflect the object through the line $x = 4$.

P.T.O.

c) Obtain the concatenated matrix for the following sequence of transformation. First translation in x, y and z direction by –1, 2, 1 units respectively, followed by a rotation about z – axis by 90° followed by a reflection in z=0 plane.

d) Obtain the cavalier projection of the object $[x]=\begin{bmatrix}1 & 1 & 1\\ 1 & 0 & 1\\ 1 & 1 & 0\end{bmatrix}$ with horizontal inclination angle 35°.

e) Find isometric projection of object for $\theta>0$ and $\phi>0$ where

$$[x]=\begin{bmatrix}2 & 0 & 0\\ 1 & 0 & 1\\ 4 & -1 & -1\\ 0 & 3 & -1\\ 1 & 1 & 1\end{bmatrix}$$

Q3) Attempt any one of the following. **[1×10=10]**

a) Find the parametric equation of Bezier curve determine by Four control points B_0 [0, 2], B_1 [2, 3] B_2 [3, 2] and B_3 [2, 0]. Also find position vector of the points on the curve corresponding to parametric value t = 0.1, t = 0.2 and t = 0.5.

b) i) Generate equi spaced four points on the circle $x^2+y^2=49$.

ii) Write the transformation matrix for dimetric projection with $fz=\frac{3}{8}(\theta<0,\ \phi<0)$.

Total No. of Questions : 3]

SEAT No. : ____

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[6155]-44

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

MATHEMATICS

MTC - 242 : Operations Research

(2019 Pattern) (Semester - IV) (Paper - II) (24222)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Non-programmable scientific calculator is allowed.***

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

a) Write the Mathematical Formulation of Transportation problem.

b) Explain how an assignment Problem with maxization of objective function is solved.

c) Write the canonical form of the following Linear Programming Problem.

Maximize $Z = 3x + 5y$

Subject to

$x - 3y = 4$

$-x + y \geq 1$

$x, y \geq 0$

d) Write the dual of the following linear programming problem

Minimize $Z = 3x_1 + 25x_2$

Subject to

$2x_1 + 4x_2 \geq 40$

$3x_1 + 2x_2 \geq 50$

$x_1, x_2 \geq 0$

P.T.O.

e) Solve the following Assignment Problem for Minimization.

Machines → Jobs ↓	I	II	III
A	8	6	7
B	15	10	5
C	4	13	6

f) Obtain initial basic feasible solution of the transportation problem using north west corner method.

	D_1	D_2	D_3	Supply
O_1	4	5	1	40
O_2	3	5	3	60
O_3	6	2	8	70
Demand	70	40	60	170

g) Give any two fields where operations research is used.

Q2) Attempt Any Three of the following : **[3 × 5 = 15]**

a) Solve the following assignment problem for minimization.

Machines

Jobs	A	B	C	D
J_1	10	10	-	7
J_2	12	9	7	8
J_3	14	8	10	-
J_4	12	7	11	12

b) Solve the linear programming problem by graphical method :

Maximize $Z = 40x + 35y$

Subject to

$2x + 3y \leq 60$

$4x + 3y \leq 96$

$x, y \geq 0$

c) Obtain an initial basic feasible solution to the following transportation problem by least cost entry method.

	D_1	D_2	D_3	D_4	Supply
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
Demand	20	40	30	10	

d) Solve the following linear programming prolem by Big-M method.

Maximize $Z = x + 4y$

Subject to

$x + 2y \leq 2$

$4x + 3y \geq 12$

$x, y \geq 0$

e) Find an initial basic feasible to the following transportation problem using Vogel's Approximation method.

	P	Q	R	Supply
A	9	6	0	5
B	5	1	0	20
C	3	2	4	10
D	7	5	2	15
Demand	25	10	15	

Q3) Attempt Any One of the following : **[1 × 10 = 10]**

a) Obtain the optimal solution for the following. Transportation problem using Modified Distribution Method. Is it degenerate?

	X	Y	Z	Supply
A	8	7	3 (60)	60
B	3 (50)	8	9 (20)	70
C	11	3 (80)	5	80
Demand	50	80	80	210

b) i) Solve the following linear programming problem by Simplex Method

Maximize $Z = 5x_1 + 3x_2$

Subject to

$x_1 + x_2 \leq 2$

$5x_1 + 2x_2 \leq 10$

$3x_1 + 8x_2 \leq 12$

$x_1, x_2 \geq 0$

ii) Write an algorithm to solve assignment problem by Hungerian method.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

P6387

[Total No. of Pages : 2

[6155]-45

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

ELECTRONICS

ELC - 241 : Embedded System Design

(2019 Pattern) (Semester - IV) (Paper - I) (24321)

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) ***Figures to the right indicates full marks.***
4) ***Neat diagrams must be drawn whenever necessary.***
5) ***Use of calculator is allowed.***

Q1) Attempt any five **[5 × 1 = 5]**

a) What is FPGA?

b) What is the use of crystal oscillator in SoCS?

c) List any two operators in python.

d) State use of HDMI port in Respberry Pi.

e) What is the use of 'ord (x)' instruction in python?

f) State significance of pull down resistor in LED interfacing to Respberry Pi.

Q2) Answer the following : **[2 × 5 = 10]**

a) What is interrupt controller? Write a python program for addition of two numbers.

b) Draw the proper circuit diagram for interfacing of LED to GPIO24 pin of Respberry Pi & write a python program for blinking of LED.

Q3) Answer the following : **[2 × 5 = 10]**

a) With neat block diagram explain single Board computer.

b) Explain Branch prediction & folding.

P.T.O.

Q4) Answer the following : **[2 × 5 = 10]**

a) What are standard datatypes in python? Explain any two.

b) With proper circuit diagram explain GSM interfacing to Respberry Pi.

Q5) Write a short note on any four of the following : **[4 × 2½ = 10]**

a) Microprocessor.

b) BeagleBone Black.

c) Digital signal processor. (DSP)

d) CPU pipeline.

e) Library functions in python.

f) Ethernet.

Total No. of Questions : 5]

SEAT No. :

P-6388

[Total No. of Pages : 2

[6155]-46

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

ELECTRONICS

ELC-242 : Wireless Communication and Internet of Things

(2019 Pattern) (Semester - IV) (24322) (Paper - II)

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

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q2 to Q5.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***

Q1) **Answer the following in one or two sentence each (any five) : [5 × 1 = 5]**

a) What is IoT?

b) Name the shape of the cell present in the cellular system.

c) Which modulation scheme is used in Bluetooth?

d) What do you mean by M2M?

e) Name any two sensors used for smart city.

f) Write approximate time taken by the GPS for one complete orbit.

Q2) **Answer the following :** **[2 × 5 = 10]**

a) Explain any two challenges in IoT.

b) Explain following topologies used in Zigbee.

i) Star ii) Tree

Q3) **Answer the following :** **[2 × 5 = 10]**

a) Draw and explain block diagram of RFID system.

b) Differentiate between wired and wireless communication.

P.T.O.

Q4) **Answer the following :** **[2 × 5 = 10]**

a) What is GSM? Give functions of following blocks of GSM

i) Visitor Location Register (VLR)

ii) Home Location Register (HLR)

iii) Authentication Centre (AUC)

b) Compare LoRaWAN and sigfox technologies.

Q5) **Write a short notes (any four) :** **[4 × 2½ = 10]**

a) Public cloud

b) Piconet

c) Smart parking using IoT

d) Co-channel interference

e) Transport layer of z-wave protocol stack

f) Write features of 5G

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Total No. of Questions : 3]

SEAT No. :

P-7389

[Total No. Of Pages : 1

[6155]-47

S.Y.B.Sc.(Computer Science\Biotechnology\Animation)B.C.A.

ENGLISH

LA - 241 : Ability Enhancement Compulsory Course

(2019 Pattern) (Semester - IV)

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

Instructions to the candidates :

1) ***All the questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) **Attempt any ONE of the following in about 150 - 200 words:** **[15]**

a) Discuss the humour in the story 'My Lost Dollar'.

b) What is the poet's prayer in the poem 'The Bird Sanctuary'?

Q2) **Attempt any TWO of the following in about 50 - 80 words:** **[10]**

a) Write a note on content writing in social media platforms.

b) Prepare the minutes of the meeting held to discuss sales promotion strategies of the computer manufacturing company.

c) Write a note on Agenda with a suitable example of agenda.

Q3) **Attempt any TWO of the following in about 50 - 80 words:** **[10]**

a) Differentiate between 'Soft Skills' and 'Hard Skills'.

b) Explain the importance of Interpersonal Skills.

c) Prepare a SWOT/C analysis for yourself.

Total No. of Questions : 5]

SEAT No. : ____

P6390

[Total No. of Pages : 2

[6155]-51

T.Y. B.Sc. (Computer Science)

CS-351 : OPERATING SYSTEMS-I

(Revised 2019 Pattern) (Semester-V)

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) Define I/O bound process.

b) What is the purpose of fork ( ) system call?

c) What is Bootstrap Loader?

d) Define context switch.

e) "Priority scheduling suffers from starvation", True/False Justify.

f) What is Mutual Exclusion.

g) What is race condition?

h) Define Limit register?

i) What is Frame?

j) List the advantages of open-source operating system?

Q2) Attempt any FOUR of the following. **[4×2=8]**

a) What is critical section problem?

b) What is the role of dispatcher?

c) Write the benefits of virtual memory?

d) Explain any two advantages of multithreding?

e) Write the system calls under the category of process management?

P.T.O.

Q3) Attempt any TWO of the following. **[2×4=8]**

a) What is process? Explain in different types of process states?

b) What is fragmentation? Explain the types of Fragmentation.

c) Consider the following set of processes with the length of CPU burst time and arrival time given in milliseconds.

Process	Burst time	Arrival time
P_1	4	2
P_2	6	0
P_3	2	1

Illustrate the execution of these processes using Round Robin (RR) CPU scheduling algorithm consider the time quantum is 3. calculate average waiting time and average turn-around time. Also draw the Gantt chart.

Q4) Attempt any TWO of the following. **[2×4=8]**

a) What is semaphore? Explain the dining philosopher's problem.

b) Which are the different types of schedulers? Explain the working of short-term scheduler?

c) Consider the following page replacement

String : 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 3

How many page faults would occur for the following page replacement algorithms assuming three frames?

i) FIFO

ii) LRU

Q5) Attempt any ONE of the following. **[1×3=3]**

a) Write a short note on MMU.

e) Explain Layered structure of the operating system.

Total No. of Questions : 5]

SEAT No. : ____

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[Total No. of Pages : 2

[6155]-52

T.Y. B.Sc. (Computer Science)

CS - 352 : COMPUTER NETWORKS - II

(2019 Pattern) (CBCS) (Semester - V)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Draw neat and labelled diagrams wherever necessary.***
3) ***Use of calculators is not allowed.***

Q1) **Attempt any EIGHT of the following (Out of TEN).** **[8 × 1 = 8]**

a) What is Jitter?

b) Name the two parts of Email?

c) Why MIME protocol is required?

d) List the types of MPEG frames.

e) What is frequency masking?

f) What do you mean by Proxy firewall?

g) What do you mean by cryptography and cryptoanalysis?

h) List the PGP services.

i) What is the difference between plaintext and cipher text?

j) List the services of user agent.

Q2) **Attempt any FOUR of the following (Out of FIVE).** **[4 × 2 = 8]**

a) Explain VPN in detail with example.

b) Distinguish between message integrity and message authentication.

c) What is firewall? Explain its types.

d) Write a short note on message access agent: IMAP & POP.

e) Explain in detail use of FTP and HTTP.

P.T.O.

Q3) **Attempt any TWO of the following (Out of THREE). [2 × 4 = 8]**

a) Write a short note on DNS.

b) Explain the header format of the authentication header in transport mode.

c) Explain the concept of key rings in PGP.

Q4) **Attempt any TWO of the following (Out of THREE). [2 × 4 = 8]**

a) Explain in detail RTCP-Message types.

b) Explain substitution cipher with example.

c) Explain how a packet filter firewall filters packets.

Q5) **Attempt any ONE of the following (Out of TWO). [1 × 3 = 3]**

a) Write a short note on Real time interactive audio/video-.

b) Using columnar transposition convert the ciphertext

"STMTCRCCOVUSITEEYPEHCILDIIOAAE" to plain text. The key is CIPHER.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

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[6155]-53

T.Y.B.Sc.

COMPUTER SCIENCE

CS-353 : Web Technologies - I

(2019 Pattern) (Semester - V) (CBCS)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following. **[8×1=8]**

a) Which HTML tag is used to create hyperlink?

b) Define Web Browser.

c) What is the use of = = and = = =operators in PHP?

d) Which keyword is used for creating a function?

e) How to check if given variable is array or not.

f) How to read file in PHP?

g) What is POP3?

h) What is associative array?

i) What is use fileatime() function?

j) Which function is used to get a file name out of a file path?

Q2) Attempt any FOUR of the following. **[4×2=8]**

a) Find the Output

```
<?php
    $city= 'pune';
    $string = 'I like $city very much!';
    echo $string;
?>
```

P.T.O.

b) Find the Output

```
<?php
$file=fopen("samp1e.txt", "w");
echo fwrite($file, "Hello! How are you Rahul?");
fclose($file);
?>
```

c) Find output of following code:

```
<?php
$a= "1E3 points of light" + 1;
var_dump($a);
?>
```

d) What is use of var_dump( ) function?

e) What is use of mail( ) function? Give syntax of it.

Q3) Attempt any TWO of the following. **[2×4=8]**

a) Explain two syntax and proper example of for each loop.

b) Explain types of strings in PHP.

c) How to get array of keys and array of values from an associative array? Explain with proper example.

Q4) Attempt any TWO of the following. **[2×4=8]**

a) Create HTML form for accepting employee number, name, age, gender. Use proper controls of HTML.

b) Write a PHP program to read two arrays of integer values merge two arrays and display only unique values in it.

c) Consider the following relational database: student (rollno, name, age) and marks (rollno, mark1, mark2, mark3, total, per). Write a PHP script which display rollno, name, mark1, mark2, mark3, total and percentage in tabular format.

Q5) Attempt any ONE of the following. **[1×3=3]**

a) What is use of pg_fetch_row( ) and pg_fetch_array( ).

b) What are the different types of CSS?

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Total No. of Questions : 5]

SEAT No. :

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[6155]-54
T.Y. B.Sc.
COMPUTER SCIENCE
CS-354 : Foundations of Data Science
(Rev.2019) (CBCS) (Semester - V)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) **Attempt any eight of the following :** **[8 × 1 = 8]**

a) What do you mean by Primary Data?

b) What do you mean by Data Quality?

c) Define outlier.

d) Define Interquartile range.

e) What do you mean by missing values?

f) What are uses of zip files?

g) What do you mean by XML Files data format?

h) Define data discretization.

i) What is tag cloud?

j) What is visual encoding?

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

a) Explain different applications of Data Science.

b) Explain null and alternate hypothesis.

c) What do you mean by Noisy data? Explain any two causes of noisy data.

d) What do you mean by data visualization? Give example of any two data visualization libraries.

e) Explain 3V's of data science.

P.T.O.

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

a) Explain data cube aggregation method in context of data reduction.

b) What is mean, mode, median and range for the following list of values:

24, 29, 24, 25, 24, 27, 25, 32, 24

c) Explain any four data visualization tools.

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

a) Differentiate between structured and unstructured data.

b) What do you mean by Data attributes? Explain types of attributes with example.

c) How do you visualize geospatial data? Explain in detail.

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

a) What do you mean by Data transformation? Explain strategies of data transformation.

b) What are the different methods for measuring the data dispersion?

□□□

Total No. of Questions : 5]

SEAT No. : [ ]

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[Total No. of Pages : 2

[6155]-55

T.Y.B.Sc.

COMPUTER SCIENCE

CS - 355 : Object Oriented Programming Using Java - I

(Revised 2019) (CBCS) (Semester - V) (Paper - V)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following: **[8×1=8]**

a) A final keyword can not be overriden state true/false and justify.

b) Give the types of access specifiers.

c) Differentiate between Scanner and Buffered Reader class.

d) What is Layout Manager?

e) Write the purpose of this keyword.

f) List any two types of checked Exception.

g) What is listener ? State any two Listeners.

h) What are command line arguments?

i) Differentiate between throw and throws keyword.

j) Write the purpose of jab.

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

a) What is constructor? List its types.

b) Differentiate between class variables and instance variables.

c) Write the purpose of abstract keyword.

d) Which class and interface are at topmost position in Exception hierarchy.

e) Give the syntax of J File Chooser class.

P.T.O.

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

a) Write a java program to delete the files having extension. txt. (Use command line arguments)

b) Write a java program using swing to accept the details of project (PID, P Name, duration) from user and display it by clicking on a button.

c) Define an abstract class Shape with abstract method area ( ). Write a java program to calculate area of Triangle.

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

a) Write a java program to change the text color of Lable to Red by clicking on a button.

b) What is inheritance? Explain multilevel inheritance with an example.

c) How to create and access package in a program? Explain with an example.

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

a) Explain the structure of java program.

b) Explain different types of Dialog Box with an example.

Total No. of Questions : 5]

SEAT No. : ____

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[Total No. of Pages : 3

[6155]-56
T.Y. B.Sc. (Computer Science)
CS - 356 : THEORETICAL COMPUTER SCIENCE
(2019 Pattern) (CBCS) (Semester - V)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any Eight of the following (out of Ten) : **[8 × 1 = 8]**

a) Write the smallest possible string accepted by regular expression. 01 (0 + 1) 01*.

b) State True or False. PDA accepts only non-regular sets.

c) Define ambiguous grammar.

d) What are the types of grammar in Chomsky hierarchy?

e) What is Reduction?

f) State True or False. String consists of only Non-Terminal symbol.

g) Define non-deterministic Turing machine.

h) If A = {∈} find the value of | A |.

i) Write down the ∈-closure of each state from the following FA.

j) State two differences between NFA and DFA.

P.T.O.

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

a) Explain two methods for defining language. Accepted by PDA.

b) Explain types of regular grammar.

c) Construct FA for regular expression ((1+0)* + 100)*.

d) Differentiate between Moore and Melay Machine.

e) State two differences between TM and LBA.

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

a) Construct DFA for language which contains all string with exactly 2 consecutive 1's any where.

b) Convert the following CFG into CNF

$S \rightarrow XYX$

$X \rightarrow aX/\in$

$Y \rightarrow bY/\in$

c) Design TM for language

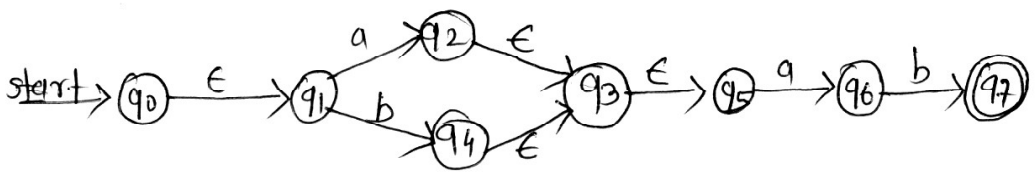
$L = \{a^m\ b^n\ /\ n \geq m$ and $m \geq 1\}$

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

a) Construct a PDA for the language $\{w / na(w) = nb(w)\}$ number of a's is equal to number of b's.

b) Construct Moore machine which outputs even or odd according to number of a's encounted is even or odd.

c) Construct equivalent DFA for the following NFA.



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

a) Show that $L = \{O^n 1^n O^n\}$ is not regular.

b) Eliminate $\in$-production for grammar & also find nullable variable.

$S \rightarrow AB$

$A \rightarrow SA/BB/bB$

$B \rightarrow b/aA/\in$

Total No. of Questions : 5]

SEAT No. : ____

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[Total No. of Pages : 3

[6155]-57
T.Y. B.Sc. (Computer Science)
CS-3510 : PYTHON PROGRAMMING
(Revised 2019 Pattern) (CBCS) (Semester - V)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Total number of questions are five.***

Q1) Attempt any Eight of the following: **[8×1=8]**

a) What is indentation?

b) Write code to print the elements of the list 11 = [10, 20, 30, 40, 50]

c) What is a slice operator?

d) What is variable-length argument?

e) How to add multiple elements at the end of the list?

f) Explain the remove () method.

g) Write a lambda function to add 10 to a given integer.

h) How to raise an exception with arguments.

i) List the methods of re package.

j) What is a wb mode in file?

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

a) What is a package? Explain with example how to create a package.

b) What are the usage of tuples zip (), tuple(), count() and index() functions?

P.T.O.

c) What is an anonymous function? How to create it? Explain with example.

d) Explain the following loops with example.

i) While

ii) For

e) How to perform input output operations? Explain with example.

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

a) Write a program to accept a string from user and display the string in reverse order eliminating the letter ‘s’ from the string.

b) Write a program to raise a user defined exception to check if age is less that 18.

c) Write a Python program to check that a string contains only a certain set of characters (in this case a-z, A-Z and 0-9).

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

a) Write a Python program to add ‘ing’ at the end of a given string (length should be at least 3). If the given string already ends with 'ing', add 'ly' instead. If the string length of the given string is less than 3, leave it unchanged.

b) Write a Python program to combine values in a list of dictionaries. Sample data: [{'item': 'item 1', 'amount': 400}, {'item': 'item2', 'amount': 300}, {'item': 'item1', 'amount': 750}]

Expected Output: Counter ({'item1': 1150, 'item2': 300})

c) Write a Python program to extract year, month, date and time using Lambda.

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

a)
```
Check1 = ['Learn', 'Quiz', 'Practice', 'Contribute']
Check2 = check1
Check3 = check1 [:]
Check2[0] = 'Code'
Check3[1] = 'Mcq'
Count = 0
For c in (check 1, check2 check3):
    if c[0] == 'Code':
        count + = 1
    if c[1] == 'Mcq':
        count + = 10
    print (count)
```

b)
```
Counter = {}
Def add To Counter (Country):
    If country in counter:
        Counter [country] + = 1
Else:
    Counter [country] = 1
Add To Counter ('China')
Add To Counter ('Japan')
Add To Counter ('china')
Print (len(counter))
```

Total No. of Questions : 5]

SEAT No. : ____

P-6397

[Total No. Of Pages : 2

[6155]-58
T.Y. B.Sc.
COMPUTER SCIENCE
CS - 3511: Blockchain Technology
(2019 Revised Pattern) (Semester - V) (CBCS)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) **Attempt any Eight of the following (out of Ten) :** **[8 × 1 = 8]**

a) What is hash function?

b) Define PoW.

c) What is DApp?

d) What is consensus?

e) What is Nonce?

f) What is Ether?

g) Give the name of crypto currencies where blockchain is used.

h) What is DAO?

i) What is plain text and cipher text?

j) What is a smart contract?

P.T.O.

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

a) What are the advantages of smart contract?

b) What is hard fork and soft fork?

c) What is PoS? Which blockchain uses PoS?

d) Explain symmetric & asymmetric key cryptography.

e) Explain the structure of blocks in Blockchain.

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

a) Which are the different types of Blockchain?

b) What are the challenges of Blockchain?

c) Write a short note on ICO.

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

a) Write a short note on digital signature.

b) Explain the working of mining.

c) Write a short note on Byzentine fault tolerance.

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

a) Which are the different data types in solidity?

b) Differentiate between blockchain and database.

Total No. of Questions : 5]

SEAT No. : ____

P-6398

[Total No. of Pages : 2

[6155]-61
T.Y. B.Sc. (Computer Science)
CS361 : OPERATING SYSTEMS - II
(2019 Pattern) (Semester-VI)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) List all dead lock recovery methods.

b) List file system free space management techniques.

c) What is disk scheduling?

d) What is deadlock?

e) Define object-based architecture.

f) List system architectures.

g) List any Four commercial mobile operating systems.

h) What is kernel?

i) What are the features of mobile operating systems?

j) List the types of distributed systems.

Q2) Attempt any Four of the following. (Out of Five) **[4×2=8]**

a) What are the goals of distributed systems.

b) Differentiate scan and c-scan disk scheduling.

c) What is ARM?

d) What is native code?

e) Explain resource - allocation graph with example.

P.T.O.

Q3) Attempt any two of the following. (Out of Three) **[2×4=8]**

a) Consider the following snapshot of system A,B,C,D are the resource types.

	Allocation			
	A	B	C	D
P_0	0	0	1	2
P_1	1	0	0	0
P_2	1	3	5	4
P_3	0	6	3	2
P_4	0	0	1	4

	MAX			
	A	B	C	D
P_0	0	0	1	2
P_1	1	7	5	0
P_2	2	3	5	6
P_3	0	6	5	2
P_4	0	6	5	6

Available			
A	B	C	D
1	5	2	0

Answer the following questions using Banker's Algorithm:

i) What are the contents of need array?

ii) Is the system in safe state? If yes give safe sequence.

iii) If a request from P_1 arrives for (0,4,2,0) can it be granted immediately?

b) Explain the architecture of Android OS.

c) Explain access methods of file system management.

Q4) Attempt any two of the following. (Out of Three) **[2×4=8]**

a) Differentiate Desktop OS and Mobile OS.

b) Explain the necessary conditions of deadlock with suitable example and diagram.

c) Write a short note on directory structure.

Q5) Attempt any ONE of the following. (Out of two) **[1×3=3]**

a) Consider following work queue : 23, 89, 132, 42, 187 & show schedule using following algorithms :

i) SSTF

ii) SCAN

iii) C-LOOK

Also find total head movements in each algorithm.

b) Differentiate between Android OS and iphone OS.

Total No. of Questions : 5]

SEAT No. :

P6399

[Total No. of Pages : 2

[6155]-62
T.Y. B.Sc. (Computer Science)
CS-362 : SOFTWARE TESTING
(Revised 2019) (Semester - VI)

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 the following. **[8×1=8]**

a) Define debugging.

b) Black Box testing is known as glass box testing. Justify T/F.

c) Write advantages of Load Testing.

d) Write difference between Agile and Traditional testing.

e) Write objective of Spike testing.

f) List any 2 objectives of Software Testing.

g) Define Cyclomatic complexity.

h) Define Test plan.

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

a) Explain Top down integration.

b) Write difference between White and Black box testing.

c) List the features of Agile Testing.

d) Write short note on dimension of quality.

e) Write advantages of regression testing.

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

a) Explain V-model in detail.

b) Describe basic path testing with example.

c) What is system testing? How it test the system? Also list it's different types.

P.T.O.

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

a) What is Web application? How it works? Explain diagrammatically.

b) What is unit testing? How it works? Explain with example.

c) What is test case? Explain with example.

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

a) Write a difference between Alpha and Beta testing.

b) Write short note on Agile testing Quadrants.

Total No. of Questions : 5]

SEAT No. : ____

P-6400

[Total No. of Pages : 2

[6155]-63
T.Y. B.Sc. (Computer Science)
CS-363 : WEB TECHNOLOGIES - II
(2019 Pattern) (CBCS) (Semester-VI)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) **Attempt any EIGHT of the following:** **[8 × 1 = 8]**

a) Enlist the characteristics of XML?

b) What do you mean by sticky form?

c) Which information is stored in $_FILES?

d) Justify True or False - XML Parser cannot alter documents or create new documents.

e) What is DOM?

f) Give any two applications of AJAX.

g) What is JQuery?

h) What is CodeIgniter?

i) What is the use of XMLHttpRequest object?

j) What is the use of redirect() function in CodeIgniter?

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

a) What is session? How to start the new session?

b) Explain the structure of well-formed XML document.

c) Explain pop-up boxes in JavaScript.

d) Discuss similarities and differences between GET and POST method.

e) Explain asynchronous mode in Ajax.

P.T.O.

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

a) What is XML parser? Explain it with its types

b) Explain the workflow of MVC Architecture.

c) Write a note on Ajax Web Application model.

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

a) Write a JavaScript code to accept employee's name and age, validate it with name and age should not be null and age should be greater than 18 years.

b) Create Doctor table as follows Doctor (dno, dname, experience).Write Ajax program to print the doctor's details of selected doctor.

c) Write a PHP Script to keep track of number of times the web page has been accessed. (Use Session Tracking)

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

a) Write XMLsyntax rules.

b) What are JQuery selectors ? Explain in brief.

Total No. of Questions : 5]

SEAT No. :

P6401

[Total No. of Pages : 2

[6155]-64
T.Y. B.Sc.
COMPUTER SCIENCE
CS-364 : Data Analytics
(CBCS Rev 2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) State occam's razor principle.

b) Define Data Analytics

c) What is supervise learning?

d) What is TF-IDF?

e) What is frequent itemset?

f) Define stemming.

g) What is Link prediction?

h) State Applications of AI.

i) State types of logistic regression.

j) Define precision

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

a) State types of Machine learning. Explain any one in detail.

b) How Receiver operating characteristic (ROC) curve is created?

c) What is association rule? Give one example.

d) What is Influence Maximization?

e) Explain Knowledge discovery in database (KDD) process.

P.T.O.

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

a) Write a short note on community detection.

b) Explain Apriori algorithm.

c) Short note on challenges in social Media Analytics (SMA)

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

a) Explain phases in Natural language processing (NLP).

b) Explain exploratory data analytics.

c) Explain life cycle of social media Analytics.

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

a) Consider the following transactional database and find out Frequent Itemsets using Apriori algorithem with minimum - support = 50%

TID	Items - Purchased
T_1	$I_1, I_2, I_3,$
T_2	I_2, I_3, I_4
T_3	I_4, I_5
T_4	I_1, I_2, I_4
T_5	I_1, I_2, I_3, I_5
T_6	I_1, I_2, I_3, I_4

b) Write a short note on Text analytics.

Total No. of Questions : 5]

SEAT No. : ____

P-6402

[Total No. of Pages : 2

[6155]-65

T.Y. B.Sc. (Computer Science)

CS-365 : OBJECT ORIENTED PROGRAMMING USING JAVA - II

(2019 Pattern) (CBCS) (Semester-VI) (Paper-V)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) **Attempt any EIGHT of the following:** **[8 × 1 = 8]**

a) What is use of callable Statement?

b) What is thread?

c) How servlet is differ from CGI?

d) Define set.

e) List any two parameter using scriplet.

f) Define spring.

g) Which interface is implemented by Treeset class.

h) List any two method of statement interface.

i) Write the purpose of yield ().

j) What is cookie?

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

a) What is Map interface and how to implement it?

b) What is Data Base Meta Data?

c) Give the name of directives in JSP.

d) State the type of servlet.

e) What are the thread priorities?

P.T.O.

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

a) Write a java program to accept 'N' student name from user, store them in Linked list collection and display in reverse order.

b) Write a java program to accept details of student (rollno, name, percentage). Store it into database & display it.

c) Write a JSP program to accept username & password, if username & password is same then display "Login sucessful" message on the browser other - wise display "Login failed" message.

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

a) Explain Life cycle of thread.

b) What is session tracking? How to implement it.

c) Write a java program to delete the details of given teacher & display remaining records from Teacher Table. Assume teacher table (tid, tname, subject) already created.

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

a) Explain the architecture of spring.

b) Explain the components of JSP.

Total No. of Questions : 5]

SEAT No. :

P6403

[Total No. of Pages : 3

[6155]-66
T.Y. B.Sc. (Computer Science)
CS - 366 : COMPILER CONSTRUCTION
(2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any Eight of the following (out of 10). **[8×1=8]**

a) Define cross compiler.

b) List the two classes of SDD.

c) Define the term dead code.

d) List the differnt types of conflicts that occur in LR parser.

e) State one difference between annotated Parse tree and dependency graph.

f) List the techniques used in code optimization.

g) What is the purpose of augmenting the grammar?

h) Define term Attribute Grammar.

i) What is output of Lexical Analysis?

j) State True or False : Shift - Shift conflict does not occur in LR Parser.

Q2) Attempt any four of the following (out of 5): **[4×2=8]**

a) Compute First and Follow for the following

$S \rightarrow i\ CtSS' | a$

$S' \rightarrow e\ S | \in$

$C \rightarrow b$

P.T.O.

b) Write difference between LL parser and LR Parser.

c) Compute Leading and Trailing symbols of the following Grammar:

$S \rightarrow (T) \mid a \mid \wedge$

$T \rightarrow T, S \mid \$$

d) Write execution steps of VACC program.

e) Give two difference between synthesized and inherited attributes.

Q3) Attempt any Two of the following (out of 3) **[2×4=8]**

a) Write a Recursive Descent Parser (RDP) for the following grammar.

$E \rightarrow E+T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

b) Construct DAG for following expression.

i) $b*(a+c)+(a+c)*d$

ii) $y+(y+x)/(x-z)*(x-z)$

c) Check whether the following Grammar is LL(1) or not?

$S \rightarrow a \mid \wedge \mid (R)$

$T \rightarrow S, T \mid S$

$R \rightarrow T$

Q4) Attempt any two of the following (out of 3) **[2×4=8]**

a) Check whether the given grammar is SLR (1) or not.

$S \rightarrow A \mid B$

$A \rightarrow aA \mid b$

$B \rightarrow dB / b$

b) Construct triples and Quadruples for the following expression :

(a+b)*(m–n) ↑ (m+n)

c) Consider the following SDD and construct Annotated Parse tree for input string $3*5*2$

Production	Semantic Rules
$E \rightarrow TE'$	$E'.inh = T.val$ $E.val = E'.syn$
$E' \rightarrow +TE'$	$E'_1.inh = E'.inh+T.val$ $E'_1.syn = E'_1.syn$
$E' \rightarrow \in$	$E'.syn = E'.inh$
$T \rightarrow FT'$	$T'.inh = F.val$ $T.val = T'.syn$
$T' \rightarrow *FT'$	$T'_1.inh = T'.inh * F.val$ $T_1'.syn = T'_1.syn$
$T^1 \rightarrow \in$	$T'.syn = T'.inh$
$F \rightarrow digit$	$F.val = digit.lexval$

Q5) Attempt any one of the following (out of 2). **[1×3=3]**

a) Write a LEX program to find factorial of a given number.

b) Eliminate left-Recursion from following grammar:

$S \rightarrow Aa \mid b$

$A \rightarrow Ac \mid sd \mid \in$

Total No. of Questions : 5]

SEAT No. :

P-6404

[Total No. of Pages : 2

[6155]-67
T.Y. B.Sc. (Computer Science)
CS-3610 : Software Testing and Tools (Paper - VII)
(Revised 2019) (CBCS) (Semester - VI)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) **Attempt any Eight of the following (Out of Ten) :** **[8 × 1 = 8]**

a) What is software testing?

b) Enlist any two features of Bugzilla tool?

c) State any two advantages of statement coverage.

d) Define test Plan.

e) Define entry criteria and exit criteria in a test case.

f) Define error.

g) Enlist the types of defects.

h) Define Manual Testing.

i) What is test suite?

j) What is a test report?

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

a) Explain any two test case design techniques.

b) Enlist four objective of writing test cases.

c) What are the critical defects?

d) What is difference between manual testing and automation testing?

e) State features of JIRA tool.

P.T.O.

Q3) **Attempt any TWO of the following (Out of Three) :** **[2 × 4 = 8]**

a) How to design test cases in MS Excel? Describe with example.

b) Write a note on path coverage testing.

c) Explain steps for writing test cases.

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

a) Explain defect life cycle with the help of detailed diagram.

b) Consider following code -

i) input(intx, inty) {

ii) sum = x+y;

iii) if (sum >0)

iv) Printf (This is positive
results);

v) else

vi) Printf(This is negative
result);

vii) }

Test case 1: x = 6, y = 2

Test case 2: x = –4, y = –3

Consider above test cases scenarios and find the percentage of statement coverage.

c) Explain different types of Automation testing tools? Explain two of them in short.

Q5) **Attempt any ONE of the following (Out of Two) :** **[1 × 3 = 3]**

a) How to prepare test plan?

b) Explain unstructured loop testing.

Total No. of Questions : 4]

SEAT No. : ____

P8766

[Total No. of Pages : 2

[6155]-101

S.Y. B.Sc.

COMPUTER SCIENCE

CS - 212 : Relational Database Management System

(2013 Revised Pattern) (Semester - I) (21122) (Paper - II)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt all of the following: **[10×1=10]**

a) Define Trigger.

b) What do you mean by time stamp?

c) Define System Log.

d) Name any two Armstrong axioms.

e) List various states of a transaction

f) Define cursor.

g) What is downgrading?

h) Define checkpoints.

i) State how to detect deadlock.

j) List the disadvantages of concurrent schedules.

P.T.O.

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

a) Explain client-server architecture benefits.

b) What is transaction? Explain ACID property of transaction.

c) Explain desirable properties of decomposition

Q3) Attempt any 2 of the following: **[2×5=10]**

a) Explain referential integrity.

b) Explain role of DBA with respect to security.

c) Explain DAC (Discretionary Access Control).

Q4) Attempt either (A) or (B): **[1×10=10]**

A) a) Consider the following relation schema: **[5]**

student (sno, sname) teacher (tno, tname, qualification)

Student and teacher are related with many-many relationship.

Write a cursor to list details of students who have taken RDBMS as a subject

b) Discuss how the recovery from catastrophic failure is handled. **[3]**

c) Explain concatenation of strings in PQ/SQL. **[2]**

OR

B) a) Consider the following relational database: **[5]**

Doctor (dno, dname, dcity) Hospital (hno, hname, hcity)

Doc-hosp (dno, hno)

Write a function to return count of number of hospitals located in 'Pune 'City.

b) Explain timestamp based protocol. **[3]**

c) What is stored procedure? Give syntax to create stored procedure. **[2]**

Total No. of Questions : 4]

SEAT No. : ____

P8767

[Total No. of Pages : 2

[6155]-102

S.Y. B.Sc.

COMPUTER SCIENCE

CS - 221 : Object Oriented Concepts Using C++

(Revised 2013 Pattern) (Semester - II) (Paper - I) (22121)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Assume suitable data, if necessary.***

Q1) Attempt all of the following: **[10×1=10]**

a) What do you mean by encapsulation?

b) What is destructor?

c) Give any two benefits of OOP.

d) What is inline function?

e) What is function template?

f) What is the purpose of delete operator?

g) Give the syntax and example of precision() function.

h) What is the purpose of private access specifier?

i) State the purpose of “this” pointer.

j) Which flags should be used to open a binary file for writing only if the file does not exist?

P.T.O.

Q2) Attempt any two of the following: **[2×5=10]**

a) What are different types of inheritance? Explain multilevel inheritance with example.

b) Create a class Fraction containing data members as Numerator and Denominator. Write a C++ program to overload operators to add and multiply two Fraction.

c) Create a C++ class Sumdata to perform following functions:

int sum(int, int) - returns the addition of two integer arguments.

float sum(flaot, float, float) - returns the addition of three float arguments.

int sum(int [ ] ,int) - returns the sum of all elements in an array of size 'n'. Write a C++ program to illustrate the use of above class.

Q3) Attempt any two of the following: **[2×5=10]**

a) Explain runtime polymorphism by a suitable example.

b) What is friend function? What are the features of friend function?

c) Write a C++ program to find maximum of two integer numbers and two float numbers by using function template.

Q4) Attempt any one of the following (A or B): **[1×10=10]**

A) a) What is constructor? List types of constructor. Explain overloading of constructor with suitable example. **[5]**

b) Write a C++ program to merge two text files into one file. **[5]**

OR

B) a) Write and explain block structure of C++ program. **[4]**

b) Explain the Advantages of Exception Handling. **[3]**

c) Write a C++ program to find area and volume of cylinder using Inline function. **[3]**