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

PD499 **[Total No. of Pages : 2**

[6468]-31
S.Y.B.Sc. (Computer Science)
CS- 231 : DATA STRUCTURES AND ALGORITHMS - I
(Revised 2019 Pattern) (Semester - III) (Paper - I) (23121)

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 necesary.***

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

a) What is Data object?

b) Write node structure of singly linked list.

c) State True or false: “Peek operation removes first element from queue”.

d) Write any two applications of stack.

e) What is circular queue?

f) Define Big on (O) notation.

g) What is Recursion?

h) Name the two basic search methods.

i) Define generalized linked list.

j) What is the best case and worst case time complexity of quick sort?

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

a) Differentiate between singly linked list and Doubly linked list.

b) Define the following terms:

   i) Stack overflow

   ii) Stack underflow

c) What is linear data structure & non-linear data structure? Write example of each .

d) Define stable sorting. List any 2 methods that support stable sorting.

e) Explain operations performed on Dequeue.

P.T.O.

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

a) Write a 'C' function to implement bubble sort algorithm.

b) Write a 'C' function to reverse a singly linked list.

c) Write a 'C' function to implement push ( ) & pop ( ) of dynamic stack. (Use dynamic implementation)

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

a) Sort the following elements using insertion sort: 35, 75, 45, 25, 85, 55, 65, 15.

b) Convert following Infix expression to postfix expression using stack:

p * q – r/s

Also evaluate the converted postfix expression

(Let P = 1, q = 3, r = 4, s = 2)

c) Explain insert & delete operations for static implementation of linear queue.

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

a) Explain circular linked list.

b) Compare stack and queue data structure.

Total No. of Questions : 5]

SEAT No. : ____

PD500

[Total No. of Pages : 2

[6468]-32
S.Y.B.Sc. (Computer Science)
CS-232 : SOFTWARE ENGINEERING
(Revised 2019 Pattern) (Semester - III) (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 necessary.***

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

a) List the objective of structured analysis.

b) List any two advantages of SRS.

c) What is system.

d) State the purpose of testing.

e) What do you mean by system development life cycle?

f) List any two umbrella activities of software process.

g) List any two key XP activities.

h) What are the different building blocks of UML?

i) Write any two Agile principles.

j) What is importance of Design Model.

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

a) List the goal of Requirement Engineering.

b) State difference between structured & unstructured interview.

c) What is functional independence? Which qualitative criteria is applied to accessed independence?

d) Explain the purpose of Activity diagram.

e) Write advantages of spiral model.

P.T.O.

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

a) Write a short note on XP process.

b) Explain negotiation requirement in detail.

c) Explain component model with suitable diagram.

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

a) What is modularity? Explain categories of modularity.

b) Draw UML use case diagram for online Digital library system.

c) Explain types of design patterns.

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

a) What is prototyping? Explain the steps of prototyping with suitable diagram.

b) Draw UML class Diagram for Ticket vending machine (TVM).

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Total No. of Questions : 3]

SEAT No. :

PD501

[Total No. of Pages : 2

[6468]-33
S.Y.B.Sc. (Computer Science)
MATHEMATICS
MTC- 231 : Groups and Coding Theory
(Revised 2019 Pattern) (Semester - III) (Paper - I) (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) List the elements of the subgroup <10> in Z_{30}.

b) State true or false with justification "Every cyclic group is not abelian".

c) Check whether the given permutation $\sigma = (1, 4, 5)\,(2, 3)$ is even or odd.

d) If a/b and a/c then $a/b+c$.

e) Find the hamming distance between x and y where $x = 110110$, $y = 000101$.

f) Prepare Cayley table of U(12).

g) Find the generator of group $G = \{1, -1, i, -i\}$ under complex multiplication.

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

a) Prove that : There are infinitely many pairs of x and y satisfying $x + y = 100$ and $gcd\,(x, y) = 5$.

b) Compute $\sigma^{-1}\tau\sigma$ in s_9 where

$\sigma = (1\ 3\ 5)\,(1\ 2)$ $\tau = (1\ 5\ 7\ 9)$

c) Find all the code words of the code determined by the parity check matrix H

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

d) Let $a, b \in z$ if binary operation '*' is defined as $a * b = a + b - ab$ then show that G is an abelian group under operation '*'.

e) Let R be a relation on z, then set of integers defined as $x\,R_y$ if and only if $5x + 6y$ is divisible by 11. Show that R is an equivalence relation.

P.T.O.

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

a) Find gcd of 4999 and 1109. Also find the integers m and n s.t $(4999, 1109) = m(4999) + n(1109)$.

b) i) Let $p = 11$, $q = 5$ and $e = 7$ using RSA method encode the word 'GOOD' .

ii) If $a, b, c, d \in z$, $n \in N$ and $a \equiv b \pmod{n}$

$C \equiv d \pmod{n}$ then prove that

1) $a + c \equiv (b + d) \pmod{n}$

2) $ac \equiv bd \pmod{n}$

Total No. of Questions : 3]

SEAT No. : ____

PD502

[Total No. of Pages : 2

[6468]-34
S.Y.B.Sc. (Computer Science)
MATHEMATICS
MTC- 232 : Numerical Techniques
(Revised 2019 Pattern) (Semester - III) (Paper - II) (23222)

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 programmable scientific calculator is allowed.***

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

a) Find the absolute and relative errors, if $x = 0.0578934$ is rounded - off to three decimal places.

b) Prove that = $\nabla = 1 - E^{-1}$

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

d) Find the recursive formula to find the n^{th} root of a using Newton's Raphson Method.

e) Prepare the divided difference table for the following data:

x :	1	3	6	10	11
y :	3	31	223	1011	1343

f) Using Trapezoidal rule, evaluate $\int_0^3 f(x)dx$

Where x :	0	1	2	3
$f(x)$:	0	1	4	9

g) By using Euler's method, solve $Y' + 2y = 0$ at $x = 0.1$. Given $y(0) = 1$, h =0.1.

P.T.O.

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

a) Find the real root of the equation $x^3 - 3x + 1 = 0$ by using Regula Falsi Method. (Correct upto three decimal places).

b) Estimate the missing term in the following table:

x :	1	2	3	4	5	6	7
y :	2	4	8	–	32	64	128

c) Using Lagrange's interpolation formula, find y(10) from the following table.

x :	5	6	9	11
y :	12	13	14	16

d) State and prove Newton's backward interpolation formula for equal interval.

e) Using Euler's modified method, solve $\frac{dy}{dx} = 1 - y$ with y(0) = 0 for $y(0.1)$ (Take h = 0.1).

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

a) Given $\frac{dy}{dx} = x + y, y(0) = 0$ Find y (0.2) and y (0.4) by using Runge-Kutta method of fourth order.

b) i) Evaluate the integral $\int_0^4 e^x dx$ by using simpson's one-third rule (Take h = 1).

ii) Derive simpson's $\frac{3^{th}}{8}$ rule for numerical integration.

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Total No. of Questions : 5]

SEAT No. : ____

PD503

[Total No. of Pages : 2

[6468]-35
S.Y.B.Sc. (Computer Science)
ELECTRONIC SCIENCE
ELC-231 : Microcontroller Architecture and Programming
(Revised 2019 Pattern) (Semester - III) (23321) (Paper - I)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions fram 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 DPTR register in 8051 microcontroller?

b) Which pin of LCD is used for controlling the contrast?

c) State the roll of PCON register in serial communication.

d) Define step angle of stepper motor.

e) Give function of ORG and DB directive.

f) Which is the highest priority interrupt in 8051 microcontroller?

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

a) With the help of suitable diagram, explain RAM organization of 8051 microcontroller.

b) Explain the function of following pins of 8051.

i) VCC

ii) RXD

iii) RESET

iv) XTAL1

v) ALE

P.T.O.

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

a) Write 8051 C-program to generate 1 KHz square wave on port pin p1.4 using timer 1, mode 1. [Assume XTAL frequency = 12MHz]

b) Explain function of the following instructions.

i) NOP

ii) CLR P1.2

iii) RLC A

iv) DA A

v) ADDC A,B

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

a) Draw block diagram to interface DAC 0808 with 8051 microcontroller. Write 8051 C-program to generate triangular waveform.

b) Draw bit format of TMOD register and explain each bit.

Q5) Write a short note on any four of the following. **[4×2.5=10]**

a) Addressing modes of 8051 (any - 3)

b) Block diagram of LCD interfacing with 8051.

c) Flag register of 8051.

d) Arithmatic instruction.

e) Asynchronous Communication.

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Total No. of Questions : 5]

SEAT No. : ____

PD1569

[Total No. of Pages : 2

[6468]-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) State the range of voice frequency band.

b) Define the term de - modulation.

c) What is guard band in communication?

d) Write the full form of DSSS.

e) Give the roll of switch.

f) List the types of Ethernet.

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

a) Design even parity Hamming code for message 1010.

b) Draw and explain the block diagram of FHSS.

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

a) Draw and explain the block diagram of QPSK.

b) Discuss following network devices.

i) Repeater

ii) Gateway

P.T.O.

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

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

b) Explain in brief.

i) Reservation protocol.

ii) Polling protocol.

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

a) Noises in communication.

b) FSK

c) Spread spectrum

d) FDMA

e) MAN

f) TCP/IP protocol

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Total No. of Questions : 5]

SEAT No. :

PD1570

[Total No. of Pages : 2

[6468]-41

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

CS - 241 : DATA STRUCTURES AND ALGORITHMS - II

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

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.***
4) ***Your answers will be values as a whole.***

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

a) State any two applications of the graph.

b) What is hash function?

c) Define balance factor.

d) The indegree of root node of tree is always zero. Justify (T/F).

e) Define skewed binary tree.

f) What is multiway search tree?

g) Define binary search tree.

h) List tree traversal methods.

i) What data structure is used in BFS and DFS traversal in graph?

j) What is topological sort in graph?

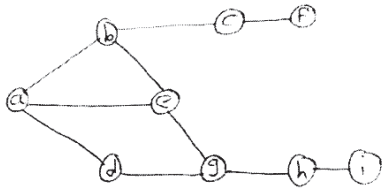
Q2) Attempt any Four of the following : **[4×2=8]**

a) Explain chaining with help of diagram.

b) List the properties of the red-black tree.

c) What is B-tree? List two properties of B tree.

d) Traverse the following graph by using DFS method.



e) Define:

i) Height of tree

ii) Level of tree

P.T.O.

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

a) Write a program to sort n randomly generated elements using heap sort method.

b) Write a program that accepts the vertices and edges of a graph. Create an adjacency list & display the adjacency list.

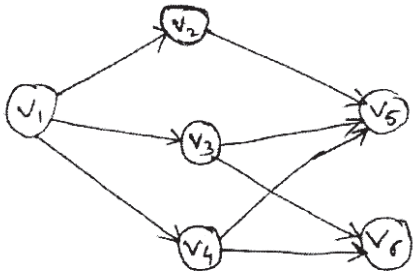
c) Write C function to create binary search tree for n number of elements.

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

a) Construct AVL tree for the following data.

50, 40, 20, 100, 80, 200, 150

b) Consider the following graph



i) Write adjacency matrix.

ii) Draw adjacency list.

iii) Write topological sort order of the vertex.

c) Write recursive C function to count leaf nodes of the binary tree.

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

a) Define the following terms.

i) Bucket

ii) Spanning tree

iii) Connected graph

b) Construct binary search tree for the following data.

Mon, Tue, Wed, Thu, Fri, Sat, Sun

Total No. of Questions : 5]

SEAT No. : ____

PD-1571

[Total No. of Pages : 2

[6468] - 42
S.Y. B.Sc.
COMPUTER SCIENCE
CS-242: Computer Network - I
(Rev.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 drawns jf neccessary.***

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

a) Define Routing.

b) Give header size of UDP Packet

c) State the strategies used to avoid collision.

d) Which device operates in physical layer?

e) If the bandwidth of the channel is 10kbps, how long does it take to transmit a frame of 100000 bits?

f) State any 2 applications of UDP

g) State the class of IP addresses 128.89.0.28

h) What is Protocol?

i) What are the services provided by Network layer?

j) What is socket address?

P.T.O.

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

a) Define NAT and explain how does it work?

b) Compare TCP and UDP.

c) Write any two application of Bluetooth technology.

d) State advantages and Disadvantages of Mesh Topology.

e) Explain types of address of IPV6.

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

a) Explain the concept of multiplexing &demultiplexing used in process to process delivery.

b) Describe IPV6 protocol with Packet format.

c) Explain Pure ALOHA & Slotted ALOHA with example.

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

a) Explain the modes of data Communication.

b) What is Random Access Methods? Explain any one mechanism.

c) Explain Host id & Net id of IP address classes.

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

a) Explain Datagram Format of UDP.

b) Explain Reservation method used in controlled access.

Total No. of Questions : 3]

SEAT No. : ____

PD-504

[Total No. of Pages : 2

[6468]-43

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

MATHEMATICS

MTC-241 : Computational Geometry

(Rev.2019 Pattern) (Semester - IV) (24221)

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-programmable, scientific calculator is allowed.***

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

a) Write any two properties of Be'zier curve.

b) Write point in three dimensional space whose homogeneous co-ordinate is $\left[2 \quad 1 \quad 3 \quad \frac{1}{5}\right]$

c) Write transformation matrix for shearing in y-co-ordinate proportional to x and z-co-ordinate by factors – 3 and –2 respectively.

d) Write transformation matrix for cabinet projection with angle of inclination is 35º.

e) Write parametric equation of circle whose analytical equation is $(x-2)^2 + (y+3)^2 = 25$.

f) Find the angle of rotation about origin so that the line $y=3x$ coincide with x-axis.

g) Write any two types of Parallel Projection.

P.T.O.

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

a) Find combine transformation matrix [T] for the following sequence of transformations.

i) Scaling in x-direction by factor 2.

ii) Rotation about origin by an angle 90º.

iii) Reflection through *x* - axis

Apply [T] on the point P[1 2].

b) If line L with slope *m* is transformed to line L' with slope m' under 2×2 transformation matrix $[T]=\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then show that $m'=\dfrac{b+dm}{a+cm}$

c) Rotate line segment AB where A[3 3 3] and B[5 5 5] about local X-axis passing through the point P[2 3 1] by an angle 75º.

d) Develope rear view of the object whose position vector matrix is

$$[X]=\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

e) Find combine transformation matrix for the following sequence of transformations in three dimensional space.

i) Translation in *x*,*y* and *z*-directions by factors –1, 2, 1 respectively.

ii) Scaling in *x* and *z*-co-ordinates by factors $\dfrac{1}{3}$ and 2 units respectively.

iii) Reflection through *yz*-plane.

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

a) Find parametric equation of Be'zier curve determined by control points B_0[0 2], B_1[2 3], B_2[3 2] and B_3[2 0]. Also find position vector of point at $t = 0.2$

b) Generate uniformly spaced three points in first quadrant of the circle $x^2+y^2 = 4$.

c) Determine isometric projection for $\phi = -45^\circ$ and $\theta = 35.26^\circ$. Apply it on the point P[1 2 1].

Total No. of Questions : 3]

SEAT No. : ____

PD-505

[Total No. of Pages : 4

[6468]-44

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

MATHEMATICS

MTC-242 : Operations Research

(Rev. 2019 Pattern) (Semester - IV) (24222)

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

Instructions to the candidates :

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

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

a) Find any one feasible point of the constraint $x + y \leq 10$.

b) Write any two applications of operational research.

c) Find dual of the Linear programming problem

Maximize $Z = x + y$

such that $x - y \leq 10$

$$x + y \leq 20$$

$x , y \geq 0$.

d) Explain the term "unbalanced transportation problem.

e) Find missing term of cost of Assignment problem to have minimum cost is 10.

1	1	1
1	–	1
1	1	1

P.T.O.

f) Convert following Linear programming problem from maximization type to minimization type.

Maximize $Z = x + y - z$

such that $2x + y - z \leq 20$

$x - y \geq 10$

$y + z \leq 5$

g) In set of feasible solutions $F = \{-10, -5, 0, 5\}$ find maximum profit of feasible solution.

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

a) Solve following linear programming problem by graphical method.

Maximize $Z = x + 3y$

such that $3x + 6y \leq 8$

$5x + 2y \leq 10$

$x, y \geq 0$.

b) Solve following linear programming problem by simplex method.

Maximize $Z = 3x + 5y$

such that $3x + 2y \leq 18$

$x \leq 4$

$y \leq 6$

$x, y \geq 0$.

c) Obtain initial basic feasible solution for the following transportation problem by North West corner rule.

destination / origine	P	Q	R	S	Supply
A	6	5	8	5	30
B	5	11	9	7	40
C	8	9	7	13	50
Capacity	35	28	32	25	

d) Solve following assignment problem for minimum cost.

	P	Q	R	S
A	20	30	40	50
B	40	50	60	70
C	70	80	90	80
D	30	50	80	40

e) Obtain initial Basic feasible solution of transportation problem by Vogel's approximation method.

Production \ wear house	P	Q	R	S	Availability
A	20	21	16	18	10
B	17	28	14	16	9
C	29	23	19	20	7
Capacity	6	10	4	5	

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

a) Find minimum cost of following assignment problem. If exists find alternate solution.

	P	Q	R	S
A	0	7	14	21
B	12	17	22	27
C	12	17	22	27
D	18	22	26	30

b) Use following feasible solution to find optimum solution by MODI method, hence find minimum cost of following transportation problem.

	P	Q	R	S
A	19 (5)	30	50	10 (2)
B	70	30	40 (7)	60 (2)
C	40	8 (8)	70	20 (10)

Total No. of Questions : 5]

SEAT No. : ____

PD-506

[Total No. of Pages : 2

[6468]-45

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

ELECTRONICS SCIENCE

ELC-241 : Embedded System Design

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

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***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) Write python instruction used for selecting physical pin of GPIO?

b) List any two standard data types in python?

c) What is the size of ARM11J6HZF-S?

d) Define : SBC

e) List any 2 loop control statements used in python programming.

f) Which function is to generate delay in python code?

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

a) Explain blocks diagram of single Board computer (SBC)?

b) Enlist any five bitwise operators used in python programming.

P.T.O.

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

a) With proper circuit diagram explain LED interfacing to Raspberry Pi? **[5]**

b) i) Write any two differences between microprocessor and microcontroller. **[2]**

ii) Explain the concept of Branch Folding. **[3]**

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

a) Explain in brief CPU pipeline stages? **[5]**

b) i) Draw circuit diagram of PIR sensor with Raspberry Pi? **[2]**

ii) Write a python program to find area of triangle with sides *a*,*b* and *c*? **[3]**

Q5) **Write short note on any four of the following.** **[4 × 2.5 = 10]**

a) Ethernet.

b) GPU overview.

c) Operating systems (any -2)

d) Features of Raspberry. Pi - 2.

e) Ultrasonic sensors.

f) Bluetooth module.

Total No. of Questions : 5]

SEAT No. : ____

PD-507

[Total No. of Pages : 2

[6468]-46

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

ELECTRONICS

ELC-242 : Wireless Communication and Internet of Things

(Rev. 2019) (Semester - IV) (Paper - II) (24322)

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 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) State full form of “LTE” in wireless communication.

b) What is full form of RFID?

c) State the names of different type of cloud.

d) What is “Cell” in mobile communication?

e) State the maximum range of bluetooth.

f) State the examples of sensor used in IoT based irrigation system.

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

a) State the features of 3G W-CDMA.

b) Draw and explain GPS architecture.

P.T.O.

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

a) Draw and explain 5-layered architecture of z-wave protocol.

b) State any five features of LPWAN.

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

a) State any five features of 5 G-wireless communication.

b) With the help of suitable block diagram explain the concept of smart city system using IoT.

Q5) **Write a short notes (Any four) :** **[4 × 2.5 = 10]**

a) Hand over in GSM.

b) Infrastructure as service (IaaS).

c) GPRS devices based on functionalities.

d) Software as service (SaaS).

e) Limitations of RFID.

f) Zig Bee Mesh topologies.

Total No. of Questions : 5]

SEAT No. : ____

PD-1572

[Total No. of Pages : 2

[6468]-51

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

CS-351 : OPERATING SYSTEMS- I

(Rev. 2019) (Semester - V) (New CBCS) (Paper - I)

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

Instructions to the candidates :

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

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

a) What is System call?

b) In Peer-to-Peer computing, clients and servers are not distinguished from one another. State True / False and Justify.

c) Where the information about the state of a process, its program counter, stack pointer and other information are stored?

d) What is the purpose of Boot-strap program?

e) Which scheduler controls the degree of multiprogramming?

f) What is aging?

g) What is race condition?

h) List any two advantages of microkernels.

i) What is the value of relocation register, if logical address is 346 and physical address is 14346?

j) List any two thread libraries.

P.T.O.

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

a) What is dynamic linking and dynamic loading in operating system?

b) State a system call used for process creation and process termination.

c) What is segmentation? State any two advantages of segmentation.

d) Differentiate between FCFS and priority CPU scheduling algorithm.

e) What is Internal Fragmentation and External Fragmentation?

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

a) Define process? Explain process state diagram.

b) Consider the following snapshot of a system:

Process	Arrival Time	CPU Burst Time
P1	1	4
P2	0	2
P3	2	1
P4	3	3
P5	10	3

Compute average turnaround time and average waiting time using Round Robin (RR) CPU scheduling algorithm with time quantum 2, also draw the Gantt chart.

c) What is distributed operating system? States its advantages and disadvantages.

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

a) Explain bounded buffer problem of synchronization in detail.

b) Consider the page reference string 3, 2, 3, 1, 5, 3, 4, 5, 2, 3, 5, 3. How many page faults occur for the following page replacement algorithm, assuming 3 frames?

i) FIFO

ii) Optimal Page Replacement (OPT)

c) What is thread? Explain any 2 multithreading models in brief with diagram.

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

a) Explain different CPU scheduling criteria that scheduling algorithms must have.

b) Which three requirements must be satisfied while designing a solutions to the critical section problem? Explain in brief.

Total No. of Questions : 5]

SEAT No. :

PD-1573

[Total No. of Pages : 2

[6468]-52
T.Y.B.Sc.
COMPUTER SCIENCE
CS-352 : Computer Networks- II
(Revised 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) State the types of resolution.

b) What is the use of DNS?

c) List the types of domain.

d) Which techniques are used for audio compression?

e) What is VoIP?

f) Define symmetric key cryptography.

g) What is use of massage digest?

h) What is the objective of internet security?

i) Which are the IPSec modes?

j) Define security association.

P.T.O.

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

a) Write a short note on key rings.

b) State comparision between conventional sign and digital sign.

c) Explain traditional cipher technique.

d) Define jitter and timestamp.

e) Write down the types of domain name.

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

a) Explain format of email in detail.

b) Write a note on encryption model.

c) Which services provided by PGP.

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

a) Explain types of resolution.

b) How the JPEG compression is performed?

c) Define firewall, State its type.

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

a) Explain VoIP.

b) Explain the steps of RSA.

Total No. of Questions : 5]

SEAT No. : ____

PD-508

[Total No. of Pages : 2

[6468]-53
T.Y.B.Sc. (Computer Science)
CS-353 Web Technologies- I
(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.***

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

a) What is Lambda function?

b) Which function read the data from files with the assumption that it is properly formatted in csv and puts data into an array?

c) Write a name of function that enables you to print the contents of a file without even having to call fopen().

d) What is use of SMTP component, Mail Transfer Agent?

e) What are compound data types in PHP?

f) Write syntax to define a constant in PHP.

g) What is use of CSS selectors?

h) What is use of Post Office Protocol 3?

i) What is use array_flip() function?

j) Which function is use to reposition the file pointer to the beginning of the file?

P.T.O.

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

a) Explain following functions

i) var_dump()

ii) Trim()

b) Define the types of web pages?

c) Explain List in HTML.

d) What is Casting of Operators?

e) Find the Output

```
<?php
$a1=array("a"=>"red","b"=>"green","c"=>"blue","d"=>"yellow");
$a2=array("a"=>"purple","b"=>"orange"),
array_splice($a1, 0, 2, $a2);
print_r($a1);
?>
```

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

a) Explain features of PHP.

b) Accept number from user and check number is perfect number or not using function.

c) Explain the following functions with example

i) implode()

ii) explode()

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

a) Write PHP program that accept file in csv format and display its content.

b) Write a PHP program to sort array on marks, (Array contains names and marks).

c) Assume database EmpDb is already exists. Write a PHP script using Postgres to increment salary of all employees by 10%. Consider table emp(no, ename, salary).

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

a) Explain with example PEAR DB basics.

b) Explain mail() function with syntax.

Total No. of Questions : 5]

SEAT No. :

PD-1574

[Total No. of Pages : 2

[6468]-54

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 354 : Foundations of Data Science

(2019 Revised) (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) ***Neat diagrams must be drawn wherever necessary.***

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 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 in Python.

e) List 3V's of data science.

P.T.O.

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

a) What do you mean by data Transformation? Explain any three strutegies for data transformation.

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 to visualize geospatial data? Explain in detail.

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

a) What do you mean by Data reduction? Explain data cube aggregation method.

b) Calculate the Standard Deviation for the below data:

Interval	0-10	10-20	20-30	30-40	40-50
Frequency	30	12	5	11	7

Total No. of Questions : 5]

SEAT No. : ____

PD-1575

[Total No. of Pages : 2

[6468]-55

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

CS - 355 : Object Oriented Programming Using Java - I

(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.***

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

a) What is the purpose of the final keyword when applied to variables?

b) What is the purpose of the javap tool in Java?

c) How is a 1D array declared in Java?

d) What is the Object class in Java?

e) What is a wrapper class in Java?

f) What is the role of the extends keyword in Java?

g) What is the purpose of BufferedResder Class?

h) Define Exception

i) Name the package used for event handling in java.

j) Name any two GUI components used in Swing.

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

a) What are constructors in Java? Explain constructor overloading and how the this keyword is used in constructors.

b) Write a Java program to demonstrate inheritance and the use of the super keyword.

c) Explain the difference between FileReader and FileWriter in Java.

d) What are the different types of layouts in Swing? Discuss any two of them.

e) Explain command line arguments with suitable example.

P.T.O.

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

a) Explain how event handling works in Swing with an example using ActionListener

b) Write a Java program to define a class 'Doctor' with data members doctorId,doctorName and doctorSpecialization. Accept the data for 'n' objects using array of objects and display it.

c) Design a screen in Java using Swing to handle mouse events such as MOUSE_MOVED and MOUSE_CLICK and display the x and y co-ordinate of mouse click in a textfield.

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

a) Write a Java program to print the contents form one file into another file in reverse order.

b) What is Interface? Explain with example code.

c) Write a Java program using Swing to create a simple graphical user interface (GUI) with buttons, labels, and text fields.

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

a) Explain the process of creating and accessing packages in Java. Write a program to demonstrate package usage.

b) Write a program that demonstrates the creation and handling of custom exceptions in Java.

Total No. of Questions : 5]

SEAT No. :

PD1576

[Total No. of Pages : 2

[6468]-56

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

CS - 356 : THEORETICAL COMPUTER SCIENCE

(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.***

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

a) Write the smallest possible string accepted by regular expression. ab(a+b)ab*.

b) Satet true or false: Pumping lemma is used to show that language is not regular.

c) Define ambiguous grammar.

d) Define GNF?

e) State any two operations on languages.

f) Find nullable symbols in the following CFG.

$S \rightarrow AB \mid aBb$

$A \rightarrow aA \mid \varepsilon$

$B \rightarrow AD \mid aAb$

$D \rightarrow bD \mid \varepsilon$

g) Give diagrammatic representation of TM.

h) Write RE for the set A = {ab, aabb, aaabbb....}

i) Describe in English the set accepted by the following FA.

j) DFA cannot have more than one final state. State True or False.

P.T.O.

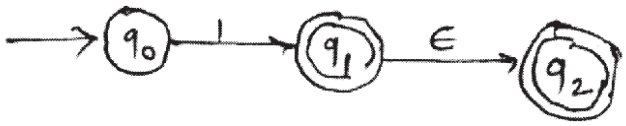
Q2) Attempt any Four of the following (out of Five) : **[4×2=8]**

a) Name the types of languages accepted by PDA.

b) What is Unit Production?

c) Construct FA for regular expression 1.0* + 0*.1.

d) Write down the $\in$- closure of each state from the following FA.



e) State two differences between Melay and Moore Machine.

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

a) Construct DFA to accept strings having substring 'aba' in it over $\Sigma = \{a, b\}$.

b) Convert the following CFG into GNF

$S \rightarrow aAS \mid a$

$A \rightarrow SbA \mid SS \mid bA$

c) Design TM for language

$L = \{a^n b^n a^n \mid n \geq 1\}$

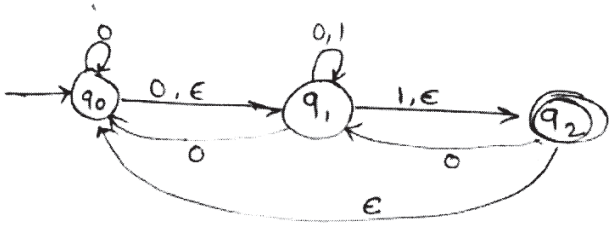
Q4) Attempt any Two of the following (out of Three) : **[2×4=8]**

a) Construct a PDA for the language

$L = \{a^n b^{2n+1} \mid n \geq 1\}$

b) Construct Melay machine to convert each occurrence of substring 101 by 100 over $\Sigma = \{0,1\}$.

c) Construct equivalent DFA for the following NFA.



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

a) Define Regular Grammar. Explain its types.

b) Construct CFG for : $\{a^n b^n c^i \mid n \geq i,\ i \geq 0\}$.

Total No. of Questions : 5]

SEAT No. : ____

PD1577

[Total No. of Pages : 2

[6468]-57
T.Y.B.Sc. (Computer Science)
CS-3510 : PYTHON PROGRAMMING
(Revised 2019 Pattern) (Semester -V)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figure to the fight indicate full marks.***

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

a) What is the purpose of range ( ) function?

b) What is a list? Explain with suitable example.

c) What is copysing ( ) function?

d) How are tuples created?

e) What is a uniform ( ) method?

f) How to create a package?

g) What is a 'wb' mode in file?

h) What is the use of finally block?

i) Give the use of index ( ) method of string.

j) Python is a scripting language comment.

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

a) Explain the filter function with example

b) Explain any two list methods with example

c) Explain any two basic string methods.

d) Explain the concept of slicing with suitable example

e) What are modules? Explain with example how to import modules.

P.T.O.

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

a) Which methods are used to read from file? Explain any two of them with example.

b) Write a python program to check if a given string as palindrome or not.

c) Write a program to find GCD of number using recursion.

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

a) List the various methods of re package explain any two methods in detail with example.

b) Write a python program to find sum of digits of a number (Accept number from user)

c) Write a python program to append the contents of file 2 to file 1. Acept file names from user

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

a) What will be the output of the following code

```
r = lambda q : q*2
s= lambda q : q*3
x = 2
x = r(x)
x = s(x)
x = r(x)
print (x)
```

b) What will be the output of the following.

code

```
count = 1
def do This ( ) :
global count
for i in (1 , 2, 3)
    Count + =1
do This ( )
print (Count)
```

Total No. of Questions : 5]

SEAT No. : ____

PD-1578

[Total No. of Pages : 2

[6468] - 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 : **[8 × 1 = 8]**

a) What is Bitcoin?

b) What is the hash function?

c) What is DAO?

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

e) What is Nonce?

f) Which algorithm is used by Bitcoin to verify transactions?

g) Define immutable ledger.

h) What is Ether?

i) Define consensus.

j) Define soft fork.

P.T.O.

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

a) Write a short note on the life cycle of smart contracts.

b) Explain symmetric & asymmetric key cryptography.

c) Describe the consensus mechanism in detail.

d) Write a short note on ICO.

e) Describe EVM with the help of a neat diagram.

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

a) Explain the Blockchain generation.

b) Write a short note on Byzantine fault tolerance.

c) Explain Digital Signature with its working principle.

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

a) Which are the different types of Blockchain?

b) With the help of diagram describe the process of SHA-256.

c) Differentiate between blockchain and database.

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

a) Explain the concept of competing chain in detail.

b) Write notes on:

i) Proof of Work(PoW)

ii) Proof of Stake(PoS)

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

PD509 **[Total No. of Pages : 3**

[6468]-61
T.Y.B.Sc. (Computer Science)
CS- 361 :OPERATING SYSTEMS - II
(Revised 2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

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

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

a) What is the name of the direct edge from resource Ri to process Pi in resource allocation graph?

b) Which necessary condition of deadlock does Resource Ordering forprevention of deadlock?

c) What is absolute path name in directory structure?

d) Which file operation involves removing all data from a file, leaving the file empty?

e) Which disk scheduling algorithm minimized the average seek time over a number of disk arm movements.

f) What is size scalability in distributed systems?

g) List any two types of cloud.

h) What is distributed transaction processing?

i) Write any two special constrain of mobile operating system.

j) Define native level programming.

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

a) If process P1 is holding resource R1 and waiting for resource R2 held by process P2, while process P2 is holding resource R2 and waiting for resource R1 held by process P1. Draw the resource allocation graph and check that system is in deadlock state or not.

b) Explain any two disk performance parameters.

P.T.O.

c) What is directory? List any two types of directory.

d) How does grid computing differ from cluster computing?

e) Explain in brief, any two special service requirements of mobile oprating system.

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

a) Consider a system with 5 processes {P1, P2, P3, P4, P5} and three resource types {A, B, C}. The allocation and maximum demand matrices are as follows:

	Allocation		
	A	B	C
P1	2	1	0
P2	2	0	1
P3	2	1	2
P4	2	1	1
P5	0	0	2

	Max		
	A	B	C
P1	6	5	3
P2	3	2	2
P3	7	1	2
P4	2	2	2
P5	4	3	3

Available		
A	B	C
2	2	1

Answer the following questions using Banker's Algorithm

i) What are the contains of Need matrix?

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

b) Explain contiguous and linked file allocation methods.

c) Differentiate between ARM architecture and x86 architecture.

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

a) Explain any four free space management methods used in file system management.

b) Explain deadlock recovery methods in details.

c) List down the architectural styles in distributed operating system & explain any one in detail.

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

a) Suppose that a disk drive has 200 cylinders, numberd 0 to 199 and order of request is: (82, 170, 43, 140, 24, 16, 190). And current position of Read/Write head is : 50. Starting from the current head position, what is the total distance that the disk arm moves to satisfy all the pending requests, for FCFS/FIFO disk scheduling Algorithms?

b) Explain the benefits or advantages of distributed systems.

Total No. of Questions : 5]

SEAT No. :

PD510

[Total No. of Pages : 2

[6468]-62
T.Y. B.Sc. (Computer Science)
CS-362 : SOFTWARE TESTING
(Revised 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 indicates full marks.***
3) ***Assume suitable data if necessary.***

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

a) List any two objectives of software testing.

b) What is the difference between fault and error.

c) What is black box testing?

d) Define test case.

e) What do you mean by performance testing?

f) List the types of integration testing.

g) Define web application testing.

h) List the dimensions of quality.

i) List any two Agile principles.

j) What is basic path testing?

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

a) What are the methods used in Agile testing?

b) Explain navigation testing in detail.

c) What is accessibility testing? State the purpose of accessibility testing?

d) What is cyclomatic complexity? Explain with example.

e) Explain verification and validation.

P.T.O.

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

a) Explain life cycle of software testing with diagram.

b) Explain test case with example.

c) What is regression testing? State its advantages and disadvantages.

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

a) Define system testing. How it test the system also list its different types?

b) What are the techniques used for web application testing? Describe any two in details.

c) Explain with diagram relation between faults, errors and failures.

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

a) Differentiate between traditional testing and Agile testing.

b) Explain with diagram the concept of internationalization testing.

Total No. of Questions : 5]

SEAT No. :

PD511

[Total No. of Pages : 2

[6468]-63
T.Y. B.Sc. (Computer Science)
CS-363 : WEB TECHNOLOGIES - II
(Revised 2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

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

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

a) What is AJAX polling?

b) What are XML namespace?

c) List the features of CodeIgniter.

d) What are the ways of send () method used for XMLHttpRequest?

e) Which information is stored by $_FILES?

f) List the applications of JavaScript.

g) What is CodeIgniter?

h) Define Page Redirection.

i) What is the difference between COOKIE and SESSION?

j) State True/False: “We can have empty XML tags.”

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

a) What is callback function?

b) What are the features of jQuery?

c) Write the Naming Rules for XML.

d) What is DOM?

e) List the special operators used in JavaScript.

P.T.O.

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

a) Explain Popup Boxes with the proper example.

b) Explain the concept of session handling with example.

c) What is self-processing page in PHP? Explain with proper example.

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

a) Write PHP script to read book.xml file which contain book number, name of book, name of author, publisher, price. Print book details of book in tabular format after accepting name of author as input.

b) Write php code to show the message "Welcome to PHP Programming" with CSS property: {background color-Pink, font color: Green, font size: 18px} on Button Click using jQuery.

c) Write an html form to accept student name, age and mobile number from user. Using JavaScript validate the following: Age must between 19 to 40 and name should not be empty.

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

a) What are the effects methods used in jQuery?

b) What is the use of header()? Explain header attribute used to SET Response Header.

Total No. of Questions : 5]

SEAT No. : ____

PD512

[Total No. of Pages : 2

[6468]-64
T.Y.B.Sc.(Computer Science)
CS- 364 : DATA ANALYTICS
(Revised 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.***
3) ***Neat diagrams must be drawn wherever necesary.***

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

a) List types of Data Analytics.

b) Define Data Analysis.

c) What is Accuracy?

d) What is Deep learning?

e) Define Artificial Intelligence.

f) What is regression?

g) List Applications of outlier Analysis.

h) What is the purpose of Apriori algorithm?

i) Define term stemming.

j) What is Link prediction?

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

a) What is tokenization? Give example.

b) What is cluster Analysis? Explain with suitable example.

c) StateApplications of machine learning.

d) Explain Association Rule Mining.

e) What is predictive Analytics?

P.T.O.

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

a) Write a short note on Exploratory Data Analytics.

b) Explain challenges of social media analytics.

c) Write a short note on text analytics.

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

a) Explain sentiment Analysis.

b) Explain any two classification Techniques.

c) Differentiate between supervise learning and unsupervise learning.

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

a) Consider the following transactional database and find out frequent itemsets using Apriori algorithm with minimum support count = 2

TID	Item Purchased
T_1	{Apple, Mango, Banana}
T_2	{Mango, Banana, Cabbage, Carrot}
T_3	{Banana, Carrot, Maango}
T_4	{Carrot, Mango}

b) Write a short note on Natural Language processing.

Total No. of Questions : 5]

SEAT No. :

PD513

[Total No. of Pages : 2

[6468]-65

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

CS-365 : OBJECT ORIENTED PROGRAMMING USING JAVA - II

(Revised 2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

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

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

a) What is collection?

b) Define JDBC.

c) What is default priority in multithreading?

d) Give syntax of doGet() method.

e) List any two implicit objects in JSP.

f) Give any two application of spring framework.

g) State constructors of treeset class.

h) Write the use of yield().

i) What is purpose of class for Name().

j) Define session in servlet.

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

a) Differentiate between thread class and runnable interface.

b) What is use of commit() in transactions in Java.

c) Write a general syntax of include directive in JSP.

d) Write purpose of setcontent Type().

e) Differentiate between set and list interface.

P.T.O.

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

a) Write a JSP program to accept the details of teacher (tid, name, salary, subject) from user and store it into the database.

b) Write a java program to display the even numbers between 1 to 100. Each number should display after 5 seconds. [use sleep()]

c) Write a java a program to accept details of employee (Eid, Name, Salary) from user and store it into the database.

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

a) Explain the life cycle of thread.

b) Write a java program to accept n numbers from user store them into the linkedlist collection and display only negative integers.

c) Write a JSP program to display all the perfect numbers between 1 to n in blue color.

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

a) Explain JDBC process in details.

b) Explain inter thread communication in details.

Total No. of Questions : 5]

SEAT No. :

PD514

[Total No. of Pages : 2

[6468]-66
T.Y. B.Sc. (Computer Science)
CS-366 : COMPILER CONSTRUCTION
(Revised 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 indicates full marks.***

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

a) Define cross compiler.

b) What are classes of SDD?

c) State the need of augmented grammar.

d) List the phases of compiler in sequence.

e) Construct LR(0) item for $A \rightarrow \in$.

f) Give advantages of boot strapping.

g) State True or False. Number of states in SLR parser and LR(1) parser are same.

h) What is the use of DAG. (Directed Acyclic Graph).

i) Define the term dependency Graph.

j) Define dead code

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

a) Write any four functions of Lexical analyzer.

b) Write two difference between top-down parser and bottom-up parser.

c) Find regular expression for Hexa decimal number accepted in C language.

d) Compute first and follow for following grammar.

$S \rightarrow a\ AB|bA$

$A \rightarrow aAb|\in$

$B \rightarrow bB|c$

e) Eliminate the left Recursion from given grammar.

$S \rightarrow a\ BAab|aBb$

$A \rightarrow Aa|b$

$B \rightarrow bB|b$

P.T.O.

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

a) Write RDP parser for the following grammar.

$A \rightarrow 0A0|A1|AA|1$

b) Construct Annotated parse Tree for input string 5 + 3 * 4 by using following grammar rules :

Production	Semantic Rules
$L \rightarrow E$	L.val = E.val
$E \rightarrow E_1 + T$	$E.val = E_1.val + T.val$
$E \rightarrow T$	E.val = T.val
$T \rightarrow T_1 * F$	$T.val = T_1.val * F.val$
$T \rightarrow F$	T.val = F.val
$F \rightarrow (E)$	F.val = E.val
$F \rightarrow$ digit	F.val = digit.lexval

c) Check whether the given grammar is LL(1) or not?

$S \rightarrow iEtSS'|a$

$S' \rightarrow eS|\in$

$E \rightarrow b$

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

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

$S \rightarrow A|B$

$A \rightarrow aA|b$

$B \rightarrow dB|b$

b) Consider the following operator grammar.

$S \rightarrow S + S|\ S*S|id$

Create operator precedence table and draw precedence function graph.

c) Consider the expression $a = b * (-C) + b * (-C)$ give Triple representation and Quadruple representation.

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

a) Write a lex program to count total number of vowels and total number of consonants from the input stream.

b) Define DAG. Construct DAG for following Basic block.

$a = b + c$

$b = b - c$

$c = c + d$

$x = b + c$

Total No. of Questions : 5]

SEAT No. :

PD515

[Total No. of Pages : 2

[6468]-67
T.Y. B.Sc. (Computer Science)
CS-3610 : SOFTWARE TESTING AND TOOLS
(Revised 2019 Pattern) (Semester - VI) (Paper - VII)

Time : 2 Hours] *[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. (out of Ten) **[8×1=8]**

a) Define Test Automation.

b) What is extra coding?

c) What is simple loop testing?

d) What is logical bug?

e) What is structural testing?

f) Define coverage in white-box testing.

g) Whenever any new defect is found in application it define as 'Start' state. State TRUE or FALSE.

h) What is Test scenario?

i) What is test incident report?

j) Enlist any two characteristics of Redmine tools.

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

a) What is Code Coverage? Explain.

b) Define test criteria and explain its types.

c) List any two parameters based on that testing tools classify.

d) Define priority defect and its different levels.

e) Write any two features of Bugzilla tool.

P.T.O.

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

a) What are different types of loop testing? Explain in details.

b) How to make use of automation tools?

c) Explain reasons because of bug can be arise.

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

a) Create case study for verify the functionality of amazon login page.

b) Consider following code and apply decision coverage testing create use cases.

```
Input (int x, int y)
        {
                Int z=((x+y/200)* 100;
                If(z>80)
                        Print("Distinction")
                else if(60<z<80)
                    Print("First class")
                else
                Print("pass")
        }
```

Test case 1: x =60 y=70

Test case 2: x=80 y=90

c) Explain advantages of Branch Coverage.

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

a) Write about Sikuli and Apache JMeter testing tools.

b) Write short note on Classification of Defects.