Total No. of Questions : 5]

SEAT No. : ____

P5137

[Total No. of Pages : 2

[5823]-301

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

CS-231 : DATA STRUCTURES AND ALGORITHMS-I

(2019 Pattern) (Semester - III) (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) ***Neat diagrams must be drawn whenever necessary.***

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

a) Define Data object.

b) Define In-place sorting.

c) What is circular linked list?

d) State the principle used in 4-queen problem.

e) Define Queue.

f) What is time complexity?

g) What is best case & worst case time complexity of merge sort algorithm?

h) "Linked list can be accessed randomly" state true/false. Justify.

i) Round-robin algorithm is example of which type of queue?

j) List any two applications of stack.

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

a) Define Big Oh (O) and Big Omega (Ω) Notations.

b) Define Array. List of an array.

c) Differentiate between singly linked list and doubly linked list.

d) Convert following expression to equivalent postfix and prefix notation.

$(A+B)*C-(D-E) \wedge (F+G)$

e) What are operations performed on dequeue?

P.T.O.

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

a) Define Data structure and explain types of Data structure.

b) Sort the following data using bubble sort method:
30, 40, 10, 50, 25, 35, 15

c) Write a 'C' function to create doubly linked list.

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

a) Show the stack contents and output while converting following infix expression to postfix expression. A/B∧C+D∗E–A∗C

b) What is linear queue? How to implement it? Explain in detail.

c) List the variants of sequential search. Explain any one with an example.

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

a) List advantageous & disadvantageous of circular queue.

b) Write a short note on generalized linked list.

Total No. of Questions : 5]

SEAT No. :

P5138

[Total No. of Pages : 2

[5823]-302

S.Y. B.Sc. (Computer Science)
CS -232 : SOFTWARE ENGINEERING
(New CBCS 2019 Pattern) (Semester-III) (Paper-II)

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) Define process Flow.

b) List any two agile principles.

c) What are the different building blocks of UML?

d) Write any two purposes served by SRS.

e) Define abstraction.

f) List the advantages of waterfall model.

g) What is requirement validation?

h) Write the purpose of activity diagram.

i) List any two umbrella activities of software process.

j) Define Artifacts.

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

a) What is Functional independance? Which qualitative criteria is applied to assessed independance.

b) Define diagrams. Write classification of UML diagrams.

c) List the elements of Andysis model.

d) Write the role of scrum.

e) Write advantages of RAD model.

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

a) Explain spiral model in detail.

b) Explain different approaches for requirements elicitation.

c) Draw UML use case diagram for online shopping. (credit card processing)

P.T.O.

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

a) Explain phases of xp process with suitable diagram.

b) Draw UML class diagram for railway reservation system.

c) Define unified process. Explain phases of unified process.

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

a) Explain types of design patterns.

b) Explain the human factors considered during agile software development.

❖ ❖ ❖

Total No. of Questions : 3]

SEAT No. :

P5139

[Total No. of Pages : 2

[5823]-303
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) If $a|b$ and $a|c$, then show that $a|(b+c)$.

b) Find all generators of the group $(\mathbb{Z}_6,+_6)$.

c) Check whether the permutation $\sigma=(1\ 2\ 5\ 4\ 6\ 3)(7\ 8)$ is even or odd. Justify?

d) Let $G=(\mathbb{Z}_4,+_4)$ be a group and $H=\{\overline{0},\overline{2}\}$ be a subgroup of G. Find all right cosets of H in G.

e) Find the hamming distance between x and y, where $x=1100010$, $y=1010001$.

f) Prepare composition table of addition for $(\mathbb{Z}_5,+_5)$.

g) State whether the following statement is True or False:

"Union of two subgroups is a subgroup." Justify your answer with proper example.

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

a) Let G be a group such that $a^2=e,\forall a\in G$. Then prove that G is abelian.

P.T.O.

b) Let $\sigma = (1\ 5\ 2)(4\ 3)$, $\tau = (6\ 1\ 9\ 7)$ be two permutations. Compute $\sigma\tau\sigma^{-1}$.

c) Let $H = \begin{bmatrix} 0 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ be a parity check matrix. Determine (2, 5) group code $e_H : B^2 \to B^5$.

d) Let R be a relation on $\mathbb{Z}$ defined by xRy if and only if $5x + 6y$ is divisible by 11, for $x, y \in \mathbb{Z}$. Show that R is an equivalence relation on $\mathbb{Z}$.

e) Let $a, b, x, y \in \mathbb{Z}$. If $a \equiv b \pmod{n}$, then prove that :

i) $ax \equiv bx \pmod{n}$

ii) $(a + x) \equiv (b + x) \pmod{n}$

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, the binary operation $*$ is defined as $a * b = \frac{ab}{3}$. Show that $(\phi^+, *)$ is an abelian group.

ii) Encrypt the message "URD" using $f(x) = (3x + 7) \pmod{26}$.

Total No. of Questions : 3]

SEAT No. :

P5140

[Total No. of Pages : 2

[5823]-304
S.Y. B.Sc. (Computer Science)
MATHEMATICS
MTC - 232 : NUMERICAL TECHNIQUES
(2019 Pattern) (Semester - III) (23222)

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 the trapezoidal rule for numerical integration.

b) Given that, $y' = x^2 + y^2$ with $y(0) = 1$. Find $y(0.1)$ by Euler's Method.

c) Prove that, $(1+\Delta)(1-\nabla) = 1$ by usual notation.

d) Find relative error of the number 5/7 whose approximate value is 0.714.

e) Write the Newton-Raphson formula for square root of any real number.

f) Given that, $y(10) = 130, y(20) = 180, y(30) = 200, y(40) = 275, y(50) = 450$. Prepare Newton's Backward difference table.

g) Write Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule for numerical integration.

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

a) Derive divided difference interpolation formula.

b) Evaluate $\int_1^7 (1 + \log x)\, dx$ by using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule (Take $h = 1$).

P.T.O.

c) Given that, $y(1)=2,\ y(2)=4,\ y(3)=8,\ y(4)=16,\ y(5)=32$. Obtain $y(1.5)$ by using Newton Forward interpolation formula.

d) Find real root of equation $x^3-4x-9=0$ in the interval [2, 3] correct upto 2 decimal places by using Regula - Falsi method.

e) Given that $y(1)=0,\ y(3)=1,\ y(4)=48,\ y(6)=180,\ y(10)=900$. Obtain $f(5)$ by using Lagrange's interpolation formula.

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

a) Given that, $\frac{dy}{dx}=1+xy^2, y(0)=1, h=0.1$. Find $y(0.1), y(0.2)$ by using Runge - Kutta method of fourth order.

b) i) Find the real root of the equation $x\cdot\sin x+\cos x=0$ correct to three decimal places using Newton - Raphson method (Take $x_0=2.5$)

ii) Given that, $y'=x^2+y, y(0)=1$. Obtain $y(0.1)$ by using Euler's Modified Method.

Total No. of Questions : 5]

SEAT No. : ____

P5141

[Total No. of Pages : 2

[5823] - 305
S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC 231 : Microcontroller Architecture and Programming
(2019 Pattern) (Semester - III)

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

Instructions to the candidates:

1) ***Question No.1 is compulsory.***
2) ***Solve any three Questions from Q.No. 02 to Q.No. 05.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***

Q1) Attempt any five of the following. **[5×1=5]**

a) Which port of 8051 requires external pull up resistors?

b) Which registers are used as data pointer in indirect addressing mode.

c) What extension is used to save 'C' Language program.

d) Name the timer register of 8051 microcontroller used as bit addressable.

e) Define step angle of stepper motor.

f) In half duplex, data is transmitted in only one direction at a time-comment.

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

a) Draw and explain interfacing of external 16 kb RAM with 8051 microcontroller?

b) Explain function of following instructions.

i) CLR A

ii) NOP

iii) RR A

iv) SUBB A, # 05 H

v) SWAP A

P.T.O.

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

a) Explain internal RAM organisation of 8051 microcontroller.

b) Write 8051 C program to generate square wave with 2500 Hz frequency on pin 2.7. Use Timer 1 in mode 2. Assume XTAL frequency = 12 MHz.

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

a) Explain in brief classification of 8051 instructions. (any 5)

b) Write C program for LCD interface to 8051 for displaying 'ELECTRONICS'.

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

a) Difference between LCALL and ACALL (any 2).

b) Timer mode 2 of 8051.

c) Immediate addressing mode.

d) Interrupts in 8051.

e) Difference between simplex and full duplex.

f) Input output (I/O) ports of 8051.

Total No. of Questions : 5]

SEAT No. : ____

P5142

[Total No. of Pages : 2

[5823]-306

S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC -232 : Digital Communication and Networking
(2019 Pattern) (Semester-III)

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) ***Neat diagram must be drawn wherever necessary.***
5) ***Use of calculator is allowed.***

Q1) Attempt any five **[5×1=5]**

a) Define bit rate.

b) What is modulation?

c) What is TDMA?

d) How many voice channels are multiplexed together in the basic group of FDM.

e) What is MAN?

f) In which topology networking devices connected together at center point.

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

a) Explain with block diagram electronic communication system.

b) Differentiate between Asynchronous and synchronous transmission.

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

a) Explain QPSK modulator.

b) Give any five features of FDMA.

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

a) Explain FDM technique used in communication system.

b) What is networking devices? Explain router end hub.

P.T.O.

Q5) Write short notes on <u>any four</u> of the following. **[4×2½=10]**

a) Modulation Index

b) DSSS (Direct Sequence Spread Spectrum)

c) Ring topology

d) CSMA protocol

e) Types of noise

f) Networking device switch

❖ ❖ ❖

Total No. of Questions : 3]

SEAT No. :

P4649

[Total No. of Pages : 1

[5823]-307

S.Y. B.C.A./S.Y. BSc. (Computer Science/Biotechnology)

English Ability Enhancement Course

AECC- II : LANGUAGE COMMUNICATION - I

(2019 Pattern) (CBCS) (Semester - III) (LA - 231)

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 one of the following in about 150-200 words : **[15]**

a) Compare and contrast Sambu and his Mother's reactions and memories to various scenes in the film.

b) What qualities does Rabindranath Tagore wish his country to have and why?

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

a) Anushree and her mother meet her college professor Dr. Priya Mahate in the mall while they are in line for the same movie. Anushree introduces them to each other. Write a dialogue for this situation.

b) Sejal, Suvarna and Ramesh Share their thoughts on how best to make time for exercise whilst attending college classes and participating in extracurricular activities.

c) Shirish apologises to his boss for reaching office late. Write a dialogue for this situation.

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

a) Discuss various techniques for effective participation in Group discussion.

b) Explain the significance of Audio of Visual Aids in presentation.

c) Explain five tips to prepare for an Interview.

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

P5143 **[Total No. of Pages : 3**

[5823]-401

S.Y.B.Sc.

COMPUTER SCIENCE

CS 241 : Data Structure and Algorithms - II

(2019 CBCS Pattern) (Semester - IV)

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

Instructions to the candidates:

1) ***Figures to the write indicate full marks.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Your answers will be values as a whole.***

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

a) Define Heap.

b) List tree traversal methods.

c) Define node of tree.

d) What is height balance tree?

e) Define balance factor.

f) Define Spanning tree.

g) Define in-degree & out-degree of vertex.

h) What is weighted graph.

i) Define Bucket

j) What do you mean by rehashing.

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

a) Write any two properties of hash function.

b) Define i) Degree of vertex

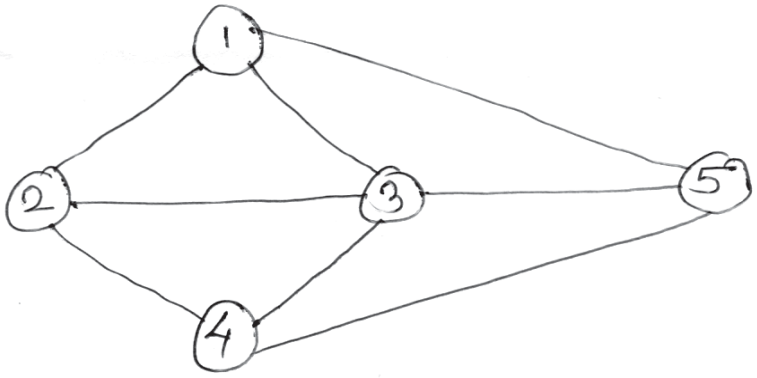
ii) Subgraph

c) List any two applications of tree data structure.

d) What is skewed binary tree.

P.T.O.

e) Convert the following undirected graph into adjacency matrix.



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

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

b) Write a program that accepts the vertices and edges of graph and store it as an adjacency matrix. Display adjacency matrix.

c) Write a function to search an element in binary search tree.

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

a) Construct an AVL tree for the following data.

70, 50, 30, 90, 80, 130, 120

b) Consider the following adjacency matrix.

	1	2	3	4
1	0	1	1	0
2	1	0	1	0
3	0	0	0	1
4	1	0	0	0

i) Draw the graph

ii) Draw Adjacency list.

c) Write a C function to traverse a graph using BFS.

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

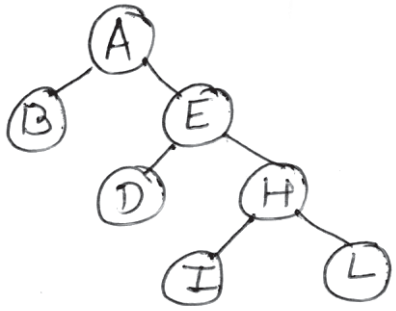
a) Define the following terms.

i) Height of tree

ii) Forest

iii) Siblings of tree

b) Traverse the following tree using preorder, inorder and postorder traversal techniques.



Total No. of Questions : 5]

SEAT No. : ____

P5144

[Total No. of Pages : 2

[5823]-402

S.Y. B.Sc.

COMPUTER SCIENCE

CS - 242 : Computer Networks - I

(2019 Pattern) (Semester - IV)

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) What is Port address?

b) What is the size of IPv4 & IPv6 Address?

c) List application Layer Protocol.

d) "UDP is Connection Oriented Protocol." State the statement is true / false.

e) What is the function of Presentation layer?

f) What is Protocol?

g) Which devices operates at physical layer.

h) What is Bandwidth?

i) What is CSMA/CD?

j) Define Masking.

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

a) Define Terms :

i) Jitter

ii) Latency

b) Write Nyquist & Shannon's formula for calculating data rate of a channel.

c) Define routing.

P.T.O.

d) Define following Data communication standards:

i) De Facto

ii) De Jure

e) Apply bit stuffing on Pattern 01101111111111110010

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

a) Explain Multiplexing & De_multiplexing in transport Layer.

b) What is Taxonomy for Media Access Protocol?

c) Which are the methods of framing.

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

a) Write note on Circuit Switching.

b) For the given IP address 205.16.37.39/28 in some block of address, Calculate :

i) Address Mask

ii) First Address of block

iii) Last address of block

iv) Number of addresses in the block

c) Write note on UDP

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

a) What is BSS & ESS? Explain in detail.

b) Explain TCP/IP Model in detail.

Total No. of Questions : 3]

SEAT No. : ____

P5145

[Total No. of Pages : 2

[5823]-403

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

MATHEMATICS

MTC-241 : Computational Geometry

(2019 Pattern) (Semester - IV)

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 transformation matrix of rotation about origin through an angle 45° in clockwise direction.

b) Find the slope of line which is perpendicular to the line $2x + y = 3$.

c) Find point in three dimensional space whose homogenous co-ordinate is $\left[1 \quad 2 \quad 3 \quad \frac{1}{2}\right]$.

d) Write matrix of overall scaling by factor 3 in three dimensional space.

e) Define foreshortning factors in projection.

f) If foreshortning factor along z-direction is $F_z = \frac{1}{2}$. What is the angle ϕ required to rotate about Y-axis to construct a dimetric projection.

g) Write any two properties of Be′zier curve.

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

a) Obtain concatenated transformation matrix [T] for Axonometric projection.

b) If the line segment AB is scaled uniformly by factor 3 then find mid-point of transformed line segment A'B'. Where A = [4 9] and B = [3 2].

P.T.O.

c) Obtain combined transformation matrix for the following sequence of transformation. First Reflection through x-axis, followed by Rotation about origin through an angle 270°, followed by scaling in x and y direction by factors 2 and –1 units respectively.

d) Obtain transformation matrix to Reflect the object through plane $x = -2$.

e) Obtain transformation matrix to rotate the line which is parallel to y-axis and passing through point (0, 4, 0), by an angle $\theta = 45°$.

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

a) Generate equispaced 4 point on the curve of circle $(x - 1)^2 + (y + 1)^2 = 9$.

b) i) Find parametric equation of curve determine by control points $B_0[3, 4]$, $B_1[0, 1]$ and $B_2[2, -1]$. Also find position vector of the point on the curve corresponding to parametric value t = 0.3.

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

Total No. of Questions : 3]

SEAT No. :

P5146

[Total No. of Pages : 4

[5823]-404

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 indicates full marks.***
3) ***Non-programmable scientific calculator is allowed.***

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

a) Write two applications of Linear programming problem.

b) How an assignment problem with certain restrictions can be solved?

c) Write dual form of the following Linear programming problem :

Maximize $Z = x_1 + 3x_2$

Subject to

$3x_1 + 2x_2 \leq 6$

$3x_1 + x_2 = 4$

$x_1, x_2 \geq 0$

d) Obtain Initial Basic Feasible solution of the Transportation Problem using Matrix Minima Method.

Destination → Origin ↓	D_1	D_2	D_3	Supply
O_1	10	13	6	10
O_2	16	7	13	12
O_3	8	22	2	8
Demand	6	11	13	30

P.T.O.

e) Solve the following Assignment Problem for minimization :

Jobs → Persons ↓	I	II	III
A	7	3	5
B	2	7	4
C	6	5	3
D	3	4	7

f) Write the standard form of the following linear programming problem :

Minimize $Z = x_1 + x_2 + x_3$

Subject to :

$$x_1 - 3x_2 + 4x_3 = 5$$
$$x_1 - 2x_2 \leq 3$$
$$2x_1 - x_3 \geq 4$$
$$x_1, x_2, x_3 \geq 0$$

g) Draw the Feasible region for the following constraints :

Max $Z = 3x - 2y$

Subject to

$$x + y \leq 1$$
$$2x + 2y \geq 4$$
$$x, y \geq 0$$

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

a) Solve the following assignment problem to minimize the cost such that Machine. M_2 cannot be assigned Job - C and Machine M_3 cannot be assigned Job - A.

	A	B	C	D	E
M_1	9	11	15	10	11
M_2	12	9	-	10	9
M_3	-	11	14	11	7
M_4	14	8	12	7	8

b) Solve the following Linear Programming Problem by Big-M method :

Maximize $Z = 3x_1 - x_2$

Subject to :

$$2x_1 + x_2 \geq 2$$

$$x_1 + 3x_2 \leq 3$$

$$x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

c) Solve the following assignment problem For minimum cost :

	A	B	C	D	E
M_1	7	5	9	8	11
M_2	9	12	7	11	10
M_3	8	5	4	6	9
M_4	7	3	6	9	5
M_5	4	6	7	5	11

d) Solve the Linear Programming Problem by graphically.

Max. $Z = 9x + 13y$

Subject to :

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

$$2x + y \leq 10$$

$$x, y \geq 0$$

e) Solve Transportation Problem by north - west corner rule.

	I	II	III	IV	V	VI	Capacity
A	9	12	9	8	4	3	5
B	7	3	6	8	9	4	8
C	4	5	6	8	10	14	6
D	7	3	5	7	10	9	7
E	2	3	8	10	2	4	3
Requirement	3	4	5	7	6	4	

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

a) Find Initial Basic Feasible solution by vogel's Approximation method. Obtain the optimal solution by Modified Distribution method of the following transportation problem.

Ware houses → Factory ↓	w_1	w_2	w_3	w_4	Supply
F_1	19	30	50	10	7
F_2	70	30	40	60	9
F_3	40	8	70	20	18
Requirement	5	8	7	14	34

b) i) Solve the following Linear Programming problem by simplex method.

Max. $Z = 6x + 3y$

Subject to :

$2x + y \leq 8$

$3x + 3y \leq 18$

$y \leq 3$

$x, y \geq 0$

ii) Write an algorithm to solve assignment problem

Total No. of Questions : 5]

SEAT No. : ____

P5147

[Total No. of Pages : 2

[5823]-405

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

ELECTRONICS

ELC-241 : Embedded System Design

(2019 Pattern) (Semester - IV) (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 wherever necessary.***
5) ***Use of calculator is allowed.***

Q1) Attempt any five. **[5 × 1 = 5]**

a) Define an Embedded system.

b) Which processor is used in Raspberry pi.

c) What is the difference between Lists and Tuples?

d) What is the use of 'time' function?

e) How physical numbering scheme is selected on Raspberry pi?

f) Write the use of GSM module.

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

a) i) Explain following functions of Python **[3]**

I) eval (str)

II) GPIO.input (channel)

III) GPIO-setup (channel, GPIO.OUT)

ii) Write Python program for LED interfacing to Raspberry pi **[2]**

b) Explain any two types of SBC in detail. List the advantages and disadvantages of SBC. **[5]**

P.T.O.

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

a) i) Write the functions of following blocks of Raspberry pi **[5]**

I) HDMI

II) Micro SD Card

III) USB ports

IV) Ethernet

V) Processor

b) List different types of operators used in Python. Explain any three operators in detail. **[5]**

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

a) Draw the neat diagram of architecture of SOC. Explain any three blocks of it. **[5]**

b) Explain different types of Network Access devices used for SBC along with their features. **[5]**

Q5) Write a short note on <u>any four</u> of the following : **[4 × 2.5 = 10]**

a) Raspberry pi and Beagle Bone SBC.

b) ARM 1176JZF-S.

c) GPIO functions.

d) Standard data types used in Python.

e) 'elif' statement.

f) Python Dictionary.

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

P5148 **[Total No. of Pages : 2**

[5823]-406

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

ELECTRONICS

ELC 242 - Wireless Communication and Internet of Things

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

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

Instructions to the candidates:

1) ***Q. 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) Define femtocell.

b) Give any two example of public cloud.

c) What is full form of MQTT?

d) Define scalabity of IOT system.

e) What is the use of the RFID module?

f) Which modulation technique is used in bluetooth?

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

a) Explain following topologies used in ZigBee

i) Star ii) Tree

iii) Cluster tree iv) Mesh

What is ZigBee coordinator?

b) Draw and explain smart irrigation system for agricultural field.

P.T.O.

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

a) What is GSM? Give function of following blocks of NSS of GSM.

i) Visitor location Register (VLR)

ii) Home location Register (HLR)

iii) Equipment Indentify Register (EIR)

iv) Authentication Centre (AUC)

b) Write in detail transport layer of Z-wave.

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

a) Compare LoRaWAN & Sig fox technologies.

b) Draw and explain GPRS architecture.

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

a) Private cloud

b) Home Automation using IoT.

c) Scatternet of Bluetooth.

d) Draw block diagram of mobile handset.

e) Limitation of RFID system.

f) Frequency reuse