

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. $A/B \wedge C + D * E - A * C$
- 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.



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[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)

PTO.

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.



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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 $H = \{\bar{0}, \bar{2}\}$ 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 $e_H : B^2 \rightarrow B^5$.

- 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 :
- $ax \equiv bx \pmod{n}$
 - $(a+x) \equiv (b+x) \pmod{n}$

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 $f(x) = (3x + 7) \pmod{26}$.

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Total No. of Questions : 3]

SEAT No. :

P5140

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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 $\left(\frac{1}{3}\right)^{\text{rd}}$ 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 $\left(\frac{3}{8}\right)^{\text{th}}$ 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.

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SEAT No. :

P5141

[5823] - 305

[Total No. of Pages : 2

**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.



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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

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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.

PTO.



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Q5) Write short notes on any four 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



[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 or 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.

[$8 \times 1 = 8$]

- 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.

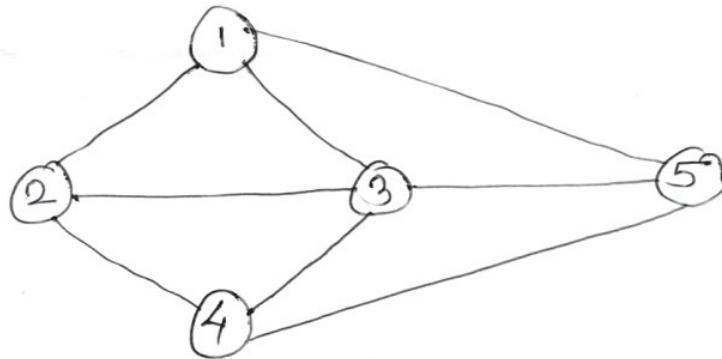
Q2) Attempt any Four of the following.

[$4 \times 2 = 8$]

- 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]

- Write a program to sort 'n' randomly generated elements using heapsort method.
- Write a program that accepts the vertices and edges of graph and store it as an adjacency matrix. Display adjacency matrix.
- Write a function to search an element in binary search tree.

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

- Construct an AVL tree for the following data.

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

- Consider the following adjacency matrix.

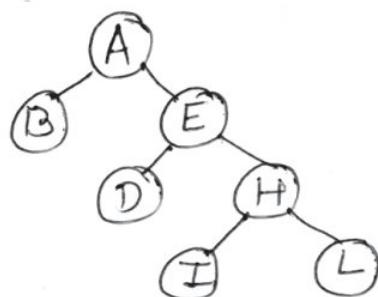
$$\begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \end{bmatrix} \end{matrix}$$

- Draw the graph
- Draw Adjacency list.
- Write a C function to traverse a graph using BFS.

Q5) Attempt any ONE of the following.

[$1 \times 3 = 3$]

- 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.



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- d) Define following Data communication standards:
 - i) De Facto
 - ii) De Jure
- e) Apply bit stuffing on Pattern 011011111111110010

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 $\begin{bmatrix} 1 & 2 & 3 & \frac{1}{2} \end{bmatrix}$.
- 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 $\theta = 45^\circ$.

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

- a) Generate equispaced 4 points on the curve of circle $(x - 1)^2 + (y + 1)^2 = 9$.
- b)
 - i) Find parametric equation of curve determined 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 :

$$\text{Maximize } Z = x_1 + 3x_2$$

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 :

$$\text{Minimize } Z = x_1 + x_2 + x_3$$

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 :

$$\text{Max } Z = 3x - 2y$$

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 :

$$\text{Maximize } Z = 3x_1 - x_2$$

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.

$$\text{Max. } Z = 9x + 13y$$

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.

$$\text{Max. } Z = 6x + 3y$$

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

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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.



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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 any four 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 scalability 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 Identify 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



Total No. of Questions : 3]

SEAT No. :

P4650

[Total No. of Pages : 1

[5823]-407

S.Y. B.Sc. Com. Sci./Biotechnology/S.Y.B.C.A.

**AECC - II : ENGLISH ABILITY ENHANCEMENT COURSE
Language Communication - II**

(2019 Pattern) (CBCS) (Semester - IV)

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) Why did the speaker fear that there was little prospect of him getting back the dollar in the story 'My Lost Dollar'.
- b) Summarize the central idea of the poem 'Stopping by Woods on a Snowy Evening'.

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

- a) Write a note on content writing.
- b) What is an agenda.
- c) Write a notice to all the students of your college to participate in annual sports and cultural activities.

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

- a) Write the importance of soft skills and hard skills in professional life. **[6]**
- b) Discuss the importance of setting long term and short term goals in your life.
- c) Do a SWOT analysis of your college.

