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

PA-1010 **[Total No. of Pages : 2**

[5902]-31
S.Y.B.Sc. (Computer Science)
CS 231 : DATA STRUCTURES AND ALGORITHMS - I
(2019 CBCS Pattern) (Semester - III) (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 necessary.***
3) ***Your answers will be values as a whole.***

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

a) Define Data Object.

b) Define stable sorting.

c) List Linear search variations.

d) What is time complexity of merge sort?

e) Define the term null list.

f) Write any two applications of linked list.

g) Write node structure of doubly linked list.

h) What is Top of the stack?

i) Define Recursion.

j) What is circular queue?

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

a) Describe the term ADT.

b) What is the best case and worst case efficiency of quick sort?

c) What is divide and conquer strategy?

d) Justify true or false: “A linked list can only be traversed sequentially”.

e) Define the following terms.

i) Stack overflow.

ii) Stack underflow.

P.T.O.

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

a) Write a program to search an element using linear search algorithm.

b) Write a C function to reverse a string using stack.

c) Write a C function to delete a node from singly circular linked list at any position.

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

a) Sort the following elements using bubble sort algorithm.

89 29 39 79 59 49 69 19

b) Convert the following infix expression into postfix expression.

P * Q + R / S – T

c) Define Deque. List types of Deque and explain any two operations performed on Deque.

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

a) Define the following terms.

i) Data Structure.

ii) Omega Notation.

iii) Time Complexity.

b) Write a short note on priority queue.

♦ ♦ ♦

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

PA-1011 **[Total No. of Pages : 2**

[5902]-32
S.Y.B.Sc. (Computer Science)
CS 232 : SOFTWARE ENGINEERING
(2019 CBCS Pattern) (Semester - III) (23122)

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

Instructions to the candidates:

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

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

a) What is a unified process?

b) What is ASD?

c) List the goals of Software Engineering.

d) What is elicitation?

e) What is negotiation?

f) Draw a symbol of extend.

g) Define : Association.

h) List of UML diagrams (any Two).

i) What is software design?

j) Define : data Abstraction.

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

a) What is system software and Application Software?

b) What are the advantages of scrum?

c) What is class and object?

d) What is Actor?

e) What are the elements of design model?

P.T.O.

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

a) Define terms:

i) Agile Method

ii) Agile Process

b) What is software requirement specification?

c) What is modularity? Explain its benefits.

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

a) Explain advantages and disadvantages of spiral model.

b) Define terms:

i) Active class

ii) Component

iii) Artifact

iv) Node

c) Describe component diagram in brief and draw a component diagram for online shopping.

Q5) Attempt any ONE. **[1×3=3]**

a) Explain any three notation of activity diagram with each notation symbols.

b) Explain water fall model with diagram.

Total No. of Questions : 3]

SEAT No. :

PA-1012

[Total No. of Pages : 2

[5902]-33
S.Y. B.Sc. (Computer Science)
MATHEMATICS
MTC - 231 : Groups and Coding Theory
(23221) (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 indicate full marks.***
3) ***Non-programmable scientific calculator is allowed.***

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

a) Define term 'Group'.

b) Find g.c.d. of 125 and 160.

c) Find remainder after dividing 111^{111} by 2.

d) Let $(\mathbb{Z},+)$ be a group of integers. Find additive identity element of $(\mathbb{Z},+)$.

e) Find equivalence class of $\overline{2}$ in $(\mathbb{Z}_8,+_8)$.

f) Find Hamming distance between 1010101 and 0101010.

g) Find value of x, in $25 \equiv x \pmod 3$

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

a) Let L is set of all lines in plane. Define relation R on L as ${}^{a}R_{b}$ if and only if line a is parallel to line b. Is R equivalence Relation on L? Justify your answer.

b) Find all permutations of group S_3 on A, where $A=\{1,2,3\}$.

c) Let $(Z_{10}^{*},*_{10})$ group of prime integers of 10 under multiplication modulo 10 operation. Find inverse of all elements in Z_{10}^{*}.

d) If $\mu = (1\ 3\ 5\ 7)$ and $\sigma = (2\ 4\ 6\ 8)$ in S_8, find $\mu\sigma\mu^{-1}$.

e) Consider the encoding function $e_H : B^2 \to B^5$ with group codes $N = \{00000,\ 10101,\ 01011,\ 11110\}$ decode the words 11101 and 01110.

P.T.O.

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

a) i) Using encoding function $f(x) = 3x + 23 \bmod 26$ encode the word 'MAN'.

ii) Let $\mathbb{Z}_{12} = \{\bar{0}, \bar{1}, \bar{2}, \ldots \overline{11}\}$ be the group of residue classes under addition modulo 12. Find all non-trivial subgroups of Z_{12}.

b) Find g.c.d. of 4027 and 2997. Find integers *m* & *n* such that (4027, 2997) = *m* (4027)+*n*(2997).

Total No. of Questions : 5]

SEAT No. :

PA-1013

[Total No. of Pages : 2

[5902]-34
S.Y. B.Sc. (Computer Science)
MATHEMATICS (Paper - II)
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 questions out of seven: **[5×2=10]**

a) Find percentage error of the number 5/9 whose approximate value is 0.56.

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

c) Let $f(x) = 1/x$, find divided difference [*a, b, c*]

d) Given that $f(1) = 1,\ f(2) = 4,\ f(3) = 9,\ f(4) = 16$ and $f(5) = 25.$ Find $\int_1^5 f(x)\,dx$ using Trapezoidal rule.

e) Using Euler's method find $y(0,1)$ given that $\frac{dy}{dx} + 2y = 0$ with $y(0)=1$.

f) Write Simpson's $(3/8)^{th}$ formula for numerical integration.

g) Evaluate Δx^2 with $h = 1$.

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

a) Derive Newton's forward Interpolation formula for equal intervals.

b) Find the real root of the equation $x^3 - x - 4 = 0$ in the interval $[1, 2]$ correct upto 2 decimal places by using Regula Falsi method.

c) Using Lagrange's Interpolation find $f(2)$ given that $f(1) = 1,\ f(3) = 27,\ f(4) = 64.$

d) Evaluate $\int_0^6 \frac{1}{1+x}\,dx$ by using Simpson's $(1/3)^{rd}$ rule. Take $h = 1$.

P.T.O.

e) Find the missing value of the data:

x	1	2	3	4	5
$f(x)$	7	-	13	21	31

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

a) Evaluate $\sqrt{12}$ correct upto four decimal places by Newton-Raphson method.

b) Derive Trapezoidal rule of integration for the function $f(x)=0$.

c) Solve $\frac{dy}{dx} = x + y$ with $y(0)=1$. Find $y(0.1)$ and $y(0.2)$ by using Runge-Kutta method of fourth order.

Total No. of Questions : 5]

SEAT No. :

PA-1014

[Total No. of Pages : 2

[5902]-35
S.Y. B.Sc. (Computer Science)
ELECTRONICS (Paper - I)
ELC - 231 : Microcontroller Architecture &Programming
(2019 Pattern) (Semester - III) (23321)

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 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 address and data bus of 8051 Microcontroller?

b) Define step angle of stepper motor.

c) Which special function register is used to keep track of priority of interrupts?

d) Which Pin of LCD is used for controlling its contrast?

e) List any two assembler directives of 8051 microcontroller?

f) State the role of $C/\overline{T}$ in TMOD register?

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

a) Explain the function of following pins of 8051 microcontroller?

i) ALE

ii) $\overline{PSEN}$

iii) $\overline{EA}$

iv) RESET

v) RXD

b) Explain addressing modes of 8051 micro controller. (Any Five)

P.T.O.

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

a) Write 8051 C - program to generate 4 kHz square wave on port pin $P_{1.2}$ using timer 0 in auto reload mode? [Assume XTAL = 12 MHz]

b) Explain the function of following instructions.

i) Mov A, @ Ro

ii) CPL bit

iii) djNz R_2, Next

iv) RR A

v) SUBB A, B

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

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

b) Write any five features of 8051 micro controller.

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

a) Stepper motor.

b) Register banks in 8051 micro controller.

c) Data types used for 8051 C-program.

d) Logical instructions. (any three)

e) TCON register.

Total No. of Questions : 5]

SEAT No. :

PA-1015

[Total No. of Pages : 2

[5902]-36
S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC - 232 : Digital Communication and Networking
(23322) (2019 Pattern) (Semester - III) (Paper - II)

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

Q1) Attempt any five. **[5×1=5]**

a) What is meant by Noise Figure?

b) What is quantization error in PCM?

c) Define multiplexing technique.

d) What is meant by CSMA/CD?

e) List any two types of Ethernet.

f) Comment : "Star topology is widely used in LAN".

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

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

b) Explain concept of TDM.

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

a) Differentiate between asynchronous and synchronous communication.

b) Explain OSI model in brief.

P.T.O.

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

a) List any five features of FDMA.

b) Describe in brief LAN and WAN.

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

a) Any two internal noise.

b) Channel capacity and data rate.

c) Token passing protocol.

d) Reservation protocol.

e) Bus topology.

f) Switch networking device.

Total No. of Questions : 3]

SEAT No. : ____

PA-1016

[Total No. of Pages :1

[5902]-37

S.Y. B.Sc.(Computer Science/Bio-technology/B.C.A./Animation)

ENGLISH ABILITY ENHANCEMENT COURSE

AECC-II : Language Communication - I

(CBCS) (2019 Pattern) (Semester - III) (23922)

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) Describe the last scene of the story A Shadow.

b) Write a detailed note on the supernatural element used in the poem La Belle Dame Sans Merci.

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

a) As an anchor for the Prize Distribution Ceremony at your college, introduce the chief guest of the programme.

b) Frame a dialogue on the police authorities refusing the permission to organize a public meeting on the street.

c) As a Fitness Trainer describe your daily routine.

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

a) Write a resume for the rest of a website developer.

b) Write a note on the tips and techniques of Group Discussion.

c) Prepare a power point presentation of five slides on newly laurened electric vehicle.

◆◆◆

P.T.O.

Total No. of Questions : 5]

SEAT No. :

PA-2655

[Total No. of Pages : 4

[5902]-38

S.Y. B.Sc. (Computer Science)/(Biotech.)/(Animation) (HS)/B.C.A.

(ABILITY ENHANCEMENT COMPULSORY COURSE)

AECC - Environmental Awarness / Studies

(2019 Pattern) (2021 Pattern) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

Q1) **Attempt any Five of the following :** **[5]**

a) Define Environment. **[1]**

b) What is an aquifer? **[1]**

c) Define Ecology & Ecosystem? **[1]**

d) Define Eutrophil? **[1]**

e) What is Red data book? **[1]**

f) What is the full form of NBPGR. **[1]**

Q2) **Answer the following :**

a) What are renewable & Non-renewable resources? Give example. **[6]**

b) What is the Scope of Environmental Studies? **[4]**

Q3) **Answer the following :**

a) Discuss the models of energy flow in an ecosystem. **[6]**

b) What are the major threats to Biodiversity. **[4]**

P.T.O.

Q4) **Answer the following :**

a) What is mean by Insitu & Exsitu conservation of Biodiversity? Give example. **[6]**

b) What are Hotspots of Biodiversity. **[4]**

Q5) **Write a short note on any Four of the following :** **[10]**

a) Scope of Environmental Study **[2½]**

b) Soil erosion. **[2½]**

c) Ecological Succession. **[2½]**

d) Food chain & food web. **[2½]**

e) Trophic level. **[2½]**

f) Deforestation.

▽▽▽▽

Total No. of Questions : 5]

PA-2655

[5902]-38

S.Y. B.Sc. (Computer Science)/(Biotech.)/(Animation) (HS)/B.C.A

(ABILITY ENHANCEMENT COMPULSORY COURSE)

AECC - Environmental Awarness / Studies

(2019 Pattern) (2021 Pattern) (Semester - III) (Paper - I)

(मराठी रूपांतर)

वेळ : 2 तास] *[एकूण गुण : 35*

सूचना : 1) प्रश्न क्रं. 1 अनिवार्य आहे.

2) प्रश्न क्रं. 2 ते 5 मध्ये कोणतेही तीन प्रश्न सोडवा.

3) प्रश्न क्रं. 2 ते 5 यांना समान गुण आहेत.

प्रश्न 1) खालीलपैकी कोणतेही पाच प्रश्न सोडवा. **[5]**

अ) पर्यावरण म्हणजे काय? **[1]**

ब) जलयुक्त खडक म्हणजे काय? **[1]**

क) पर्यावरणशास्त्र व परिसंस्था म्हणजे काय? **[1]**

ड) युट्रॉफिकेशन म्हणजे काय? **[1]**

इ) रेड डाटा बुक म्हणजे काय? **[1]**

फ) एन्.बी.पी.जी.आर चा पुर्ण वाक्य काय आहे? **[1]**

प्रश्न 2) अ) पुननिर्मित होणाऱ्या व पुननिर्मित न होणाऱ्या साधनसंपत्तीची माहिती द्या. **[6]**

ब) पर्यावरणशास्त्राची व्याप्ती म्हणजे काय? **[4]**

प्रश्न 3) अ) ऊर्जा प्रवाह करणारे मॉडेल म्हणजे काय स्पष्ट करा. **[6]**

ब) जैवविविधतेला कोणत्या गोष्टींचा धोका आहे? **[4]**

प्रश्न 4) अ) जैवविविधतेचे अधिवास बाह्य व अधिवास अंतर्गत संबधीत म्हणजे काय? उदाहरणासहीत स्पष्ट करा. **[6]**

ब) जैवविविधतेची संपन्न ठिकाणे कोणती? **[4]**

P.T.O.

प्रश्न 5) खालीलपैकी कोणतेही चार वर टिपा लिहा. **[10]**

अ) पर्यावरणशास्त्राची व्याप्ती स्पष्ट करा. **[2½]**

ब) जमिनीची धूप **[2½]**

क) पर्यावरणीय उत्तराधिकार / परिस्थितीकीय अनुक्रमण **[2½]**

ड) अन्नसाखळी व अन्नजाळे **[2½]**

इ) ऊर्जाप्रवाह स्तर **[2½]**

फ) जंगलतोड / वृक्षतोड **[2½]**

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

PA-1017

[Total No. of Pages :2

[5902]-41
S.Y. B.Sc. (Computer Science)
CS-241 : DATA STRUCTURES & ALGORITHMS - I
(CBCS) (2019 Pattern) (Semester - IV)

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

Instructions to the candidates :

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

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

a) Define degree of a tree.

b) Define the term left skewed binary tree.

c) What is height balance tree?

d) List 2 applications of graph.

e) What is topological sorting?

f) Define Bucket.

g) What is collision?

h) Define complete Binary tree.

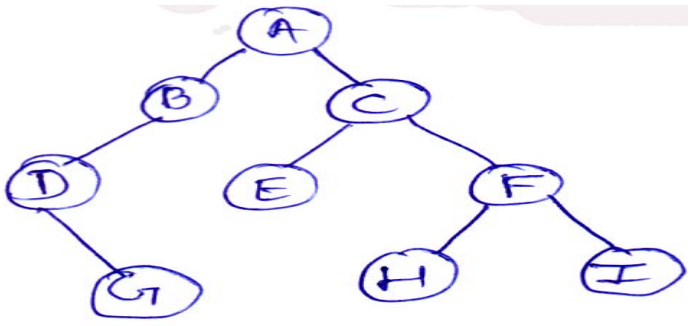
i) What is weighted graph?

j) Explain open addressing concept in hash table.

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

a) Traverse the following binary tree using given traversal technique

i) Inorder ii) Postorder.



P.T.O.

b) Compare B tree & B+ tree.

c) Define indegree & outdegree of vertex with example.

d) Explain the concept of hushing & rehashing in Hash table.

e) Explain concept of Red - Black Tree.

Q3) Attempt any two: **[2 × 4 = 8]**

a) Write C program to represent graph as adjacency matrix.

b) Write C Program to compare two BST.

c) Write a program to find minimum value node from the BST.

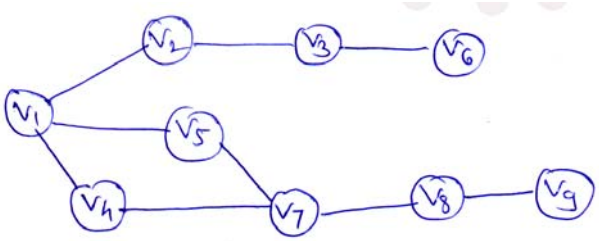
Q4) Attempt any two: **[2 × 4 = 8]**

a) Write a program to insert an element into binary tree.

b) Construct AVL tree for the following:

{Mon, Sun, Thur, Fri, Sat, Wed, Tue}

c) Consider the following graph.



Give i) DFS Traversal

ii) BFS Traversal.

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

a) Write note on quadratic probing

b) Compare the data structures.

Tree & Graph.

◆◆◆

Total No. of Questions : 5]

SEAT No. : ____

PA-1018

[Total No. of Pages : 2

[5902]-42

S.Y. B.Sc.

COMPUTER SCIENCE

CS-242: Computer Networks - I (Paper - II)

(2019 Pattern) (Semester - IV) (24122)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***

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

a) List components of data communication.

b) What is data communication?

c) Define Protocols.

d) List any two channelization protocols.

e) State any two applications of wireless LAN.

f) What is bandwidth?

g) Define congestion.

h) What is Routing?

i) What is a Port Number?

j) What is internetworking?

P.T.O.

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

a) What is Computer Network? Write any four characteristics of Computer Network.

b) What is LAN? Write any two advantages of LAN.

c) Consider a noiseless channel with a bandwidth of 4000 Hz transmitting a signal with two signal levels. What will be the maximum bit rate?

d) Write any four application of Bluetooth technology.

e) Change the following IPv4 address from binary notation to dotted decimal notation.

i) 10000001 00001011 00001011 11101111

ii) 11000001 10000011 00011011 11111111

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

a) Compare OSI Reference Model and TCP/IP model.

b) Explain the important design issues of the data link layer.

c) Explain the different services offered by the Network layer.

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

a) Write any four differences between Fast ethernet and Gigabit ethernet.

b) Write any eight features of IPv6 protocol.

c) Explain any four features supported by TCP.

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

a) Explain datagram format of UDP.

b) Define Pulling.

Total No. of Questions : 3]

SEAT No. : ____

PA-1019

[Total No. of Pages : 2

[5902]-43
S.Y. B.Sc. (Computer Science)
MATHEMATICS (Paper - I)
MTC-241: Computational Geometry
(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 indicate full marks.***
2) ***Non-programmable scientific calculator is allowed.***

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

a) Find homogenous co-ordinate of point A = [1, 2].

b) If $A(\Delta ABC) = 5$ sq. unit is reflected through $y = x$ line, find Area of transformed object.

c) Find Foreshortening factor f_y of the transformation Matrix for Axonometric projection.

$$[T] = \begin{bmatrix} 0.5 & 0.43 & 0 & 0 \\ 0 & 0.86 & 0 & 0 \\ 0.86 & 0.25 & 0 & 0 \\ 0.58 & 0.75 & 0 & 1 \end{bmatrix}$$

d) Find direction cosines of the plane $x + y + z = 0$.

e) Write types of all Axonometric parallel projections.

f) Define projection in three-Dimensional space.

g) Find Initial point of part of circle $x^2 + y^2 = 16$ in second quadrant.

P.T.O.

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

a) Show that 2 × 2 matrix $[T] = \begin{bmatrix} 2t & \frac{1}{t} \\ t & \frac{1}{t} \end{bmatrix}$

represents pure rotation in two-Dimensional space.

b) If circle $(x-1)^2 + (y+1)^2 = 9$ is transformed by translation in X-direction by 2 and Y-direction by 3 then find centre of transformed circle.

c) Find concatenated transformation matrix for the following sequence of transformation, First shearing in Y-direction proportional to x and z co-ordinate with 1 and 3 units respectively. Followed by Reflection through xz plane (i.e. $y = 0$ plane).

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

e) Develop the bottom view of the line segment AB where A = [0 0 1] and B = [1 0 1].

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

a) Find the parametric equation of Be'zier curve determine by four control points B_0 [0 2], B_1 [2 3] B_2 [3 2] and B_3 [2 0]. Also find position vectors of the point on the curve corresponding to parametric values $t = 0.2, 0.4, 0.6$.

b) i) Generate equispaced 3 points on the circle $x^2 + y^2 = 36$ in second quadrant only.

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. : ____

PA-1020

[Total No. of Pages : 4

[5902]-44
S.Y. B.Sc. (Computer Science)
MATHEMATICS
MTC - 242 : Operations Research
(2019 Pattern) (Semester - IV) (Paper - II) (24222)

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

Instructions to the candidates :

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

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

a) Use north-west corner rule to obtain Initial Basic Feasible Solution of the following transportation problem :

Destination → / Origin ↓	D_1	D_2	D_3	Supply
O_1	5	1	8	12
O_2	2	4	0	14
O_3	3	6	7	4
Demand	9	10	11	

b) Write dual form of the following Linear Programming Problem :

Minimize $Z = 10\,x_1 + 6x_2 + 2x_3$

Subject to :

$$-x_1 + x_2 + x_3 \geq 1$$
$$3x_1 + x_2 - x_3 \geq 2$$
$$x_1, x_2, x_3 \geq 0$$

P.T.O.

c) Solve following assignment problem for Maximization :

Jobs → Persons ↓	I	II	III
A	1	4	5
B	2	3	3
C	3	1	2

d) What is degeneracy in the transportation problem?

e) Write the mathematical formulation of assignment problem.

f) Write the standard form of 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 :

Maximize $Z = 3x + 2y$

Subject to :

$$x - y \leq 1$$
$$x + y \geq 3$$
$$x, y \geq 0$$

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

a) Obtain Initial Basic Feasible Solution of the following transportation problem by Vogel's approximation method.

Warehouses → Factory ↓	W_1	W_2	W_3	W_4	Supply
F_1	30	25	40	20	100
F_2	29	26	35	40	250
F_3	31	33	37	30	150
Requirement	90	160	200	50	

b) Solve the following assignment problem :

	A	B	C	D	E
M_1	4	6	10	5	6
M_2	7	4	-	5	4
M_3	-	6	9	6	2
M_4	9	3	7	2	3

c) Solve the following linear programming problem by graphically :

Maximize $Z = 3x + 5y$

Subject to :

$x + 2y \leq 2000$

$x + y \leq 1500$

$y \leq 600$

$x, y \geq 0$

d) Solve the following Linear Programming Problem by Big-M method.

Maximize $Z = x + 4y$

S.t.

$x + 2y \leq 2$

$4x + 3y \geq 12$

$x, y \geq 0$

e) Solve following assignment problem for minimum cost :

	I	II	III	IV	V
1	3	8	2	10	3
2	8	7	2	9	7
3	6	4	2	7	5
4	8	4	2	3	5
5	9	10	6	9	10

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

a) Obtain optimal solution of the following Transportation Problem by modified distribution method.

1 (20)	2	1 (10)	4
3	3 (20)	2 (20)	1 (10)
4	2 (20)	5	9

Also obtain alternate optimal solution

b) Solve the following linear programming problem by simplex method :

Maximize $Z = 3x_1 + 2x_2 + 5x_3$

Subject to :

$$x_1 + 2x_2 + x_3 \leq 430$$

$$3x_1 + 2x_3 \leq 460$$

$$x_1 + 4x_2 \leq 420$$

$$x_1, x_2, x_3 \geq 0$$

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

PA-1021

[Total No. of Pages : 2

[5902]-45
S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC - 241 : Embedded System Design
(2019 Pattern) (Semester - IV) (Paper - I) (24321)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right 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) State any two characteristics of an embedded system.
b) What is SoC?
c) State any two Features of Raspbian OS.
d) List the logical operators in python.
e) What is the significance of GPIO·cleanup ( ) Function?
f) State applications of PIR sensors.

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

a) i) Explain time·ctime ( ), time·clock ( ) and time. Striuct_time functions used in python. **[3]**
ii) Write a python program for the division of two numbers. **[2]**
b) Draw neat block diagram of Single Board Computer and explain any three blocks. **[5]**

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

a) Write a short on peripherals used in BCM2835. **[5]**
b) Explain the following statements. **[5]**

i) Break ii) Pass
iii) Continue iv) Try
v) Range

P.T.O.

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

a) Explain the interfacing of a switch to Raspberry Pi with the help of neat diagram and write a python program for the same. **[5]**

b) List at least four types of Keyboards. Explain membrane and mechanical Keyboard in detail. **[5]**

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

a) Types of memories.

b) Branch prediction and folding.

c) Bitwise operators used in python.

d) Operating systems used for Raspberry Pi.

e) CPU pipeling stages.

f) Bluetooth Module.

▽▽▽▽

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

PA-1022 **[Total No. of Pages : 2**

[5902] - 46

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

ELECTRONICS

ELC 242 - Wireless Communication and Internet of Things

(2019 Pattern) (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) Attempt **any Five** of the following : **[5 × 1 = 5]**

a) State the technique used to avoid interference between the neighbouring base stations.

b) Which type of RFID tag uses battery?

c) State the name of the topology not supported by Zigbee network.

d) What is full form of IoT?

e) What do you mean by M2M communication?

f) State any two challenges faced while implementing IoT.

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

a) Draw neat diagram and explain architecture of smart home system.

b) Write comparison between Bluetooth and Zigbee.

P.T.O.

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

a) Explain three segments of GPS.

b) i) State the advantages of wireless communication.

ii) What is frequency reuse concept of cellular telephony system.

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

a) Compare wired and wireless communication.

b) Differentiate between M2M and IoT.

Q5) Write a short note on **<u>any Four</u>** of the following : **[4 × 2½ = 10]**

a) Public Cloud.

b) Secure Connectivity and secure data storage in IoT.

c) Disadvantages of Zigbee.

d) The error sources of GPS to locate position.

e) Classes of GPRS devices.

f) "Handoff" in cellular telephony system.

Total No. of Questions : 3]

SEAT No. :

PA-2899

[Total No. of Pages : 1

[5902]-47

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

AECC-II : LANGUAGE COMMUNICATION - II

(2019 Pattern) (Semester - IV) (Paper - I) (24922)

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

Instructions to the candidates :

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

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

a) How did the narrator realize that Todd has completely forgotten that he owed the narrator a Dollar?

b) What message do you get by the last stanza of the poem

'Stopping by Woods on a Snowy Evening'?

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

a) NSS Department of your college has organized Blood Donation Camp. Draft a notice to all the students of your college for inviting them to donate blood.

b) As a secretary of students council, prepare the minutes of the meeting on 'Planning of extra-curricular activities'.

c) Explain the importance of content writing in Blogs and social media sites.

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

a) Without soft skills, hard skills doesn't have any importance. Discuss.

b) Why it is important to do SWOT analysis before any venture?

c) Explain Project Management.

▽▽▽▽

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

PA-2656 **[Total No. of Pages : 4**

[5902]-48

S.Y. B.Sc./B.C.A.

(Computer Science/Biotech./HS)

ENVIRONMENTAL SCIENCE

AECC - Environmental Awareness

(2019 Pattern) (Semester - IV)

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

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions from 2 to 5 carries equal marks.***

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

a) Define the term air pollution?

b) What is meant by solid waste management?

c) What is the main aim of Qyoto protocol?

d) Name two gases that are mainly responsible for acid rain?

e) Which layer of atmosphere contains the ozone layer?

f) Why Environmental Laws are important?

Q2) a) Write causes, effects and control measures for water pollution? **[6]**

b) How human health risks caused by nuclear hazards. **[4]**

Q3) a) Discuss the role of Indian and other religions and cultures in Environmental conservation. **[6]**

b) What are the aims and objectives of Environmental Protection Act? **[4]**

P.T.O.

Q4) a) Describe human wildlife conflicts in Indian context. **[6]**

b) Explain chipko movement? **[4]**

Q5) Write short note on any four of the following : **[10]**

a) Natural reserved areas

b) Climate change

c) Water (prevention and control of pollution) Act

d) Convention on biological diversity

e) Bishnois of Rajsthan

f) Soil pollution

▽▽▽▽

Total No. of Questions : 5]

PA-2656

[5902]-48
S.Y. B.Sc./B.C.A.
(Computer Science/Biotech./HS)
ENVIRONMENTAL SCIENCE
AECC - Environmental Awareness
(2019 Pattern) (Semester - IV)
(मराठी रूपांतर)

वेळ : 2 तास] *[एकूण गुण : 35*

सूचना : *1) प्रश्न 1 अनिवार्य आहे.*
2) प्रश्न 2 ते 5 कोणतेही तीन प्रश्न सोडवा.
3) प्रश्न 2 ते 5 मधील प्रश्नांना समान गुण आहेत.

प्रश्न 1) खालीलपैकी कोणतेही पाच प्रश्न सोडवा. **[5]**

अ) वायू प्रदूषण या शब्दाची व्याख्या करा?

ब) घनकचरा व्यवस्थापन म्हणजे काय?

क) क्योटो प्रोटोकॉल चे मुख्य उद्दिष्ट काय आहे?

ड) आम्ल पावसासाठी मुख्यत: जबाबदार असलेल्या दोन वायूंची नावे सांगा?

इ) वातावरणाच्या कोणत्या थरात ओझोन चा थर असतो?

फ) पर्यावरणीय कायदे महत्वाचे का आहेत?

प्रश्न 2) अ) जलप्रदूषणाची कारणे, परिणाम आणि नियंत्रणाचे उपाय लिहा. **[6]**

ब) आण्विक धोक्यांमुळे मानवी आरोग्याला कसा धोका निर्माण होतो? **[4]**

प्रश्न 3) अ) पर्यावरण संवर्धनामध्ये भारतीय आणि इतर धर्म आणि संस्कृतींच्या भूमिकेची चर्चा करा? **[6]**

ब) पर्यावरण संरक्षण कायद्याची उद्दिष्टे काय आहेत? **[4]**

प्रश्न 4) अ) मानवी वन्यजीव संघर्षाचे भारतीय संदर्भ घेऊन वर्णन करा? **[6]**

ब) चिपको आंदोलनाचे स्पष्टीकरण द्या? **[4]**

P.T.O.

प्रश्न 5) खालीलपैकी कोणतेही चार लहान टीप लिहा. **[10]**

अ) नैसर्गिक राखीव जमिनी

ब) हवामान बदल

क) पाणी (प्रदूषण प्रतिबंध आणि नियंत्रण) कायदा

ड) जैविक विविधतेवरील अधिवेशन

इ) राजस्थान चे बिश्नोई

फ) भूमी प्रदूषण

▽▽▽▽