Total No. of Questions : 5]

SEAT No. : ____

PC-1565

[Total No. of Pages : 2

[6328]-31
S.Y. B.Sc. (Computer Science)
CS-231: DATA STRUCTURES AND ALGORITHMS - I
(Revised 2019)(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 diagram must be drawn wherever necessary.***

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

a) What is ADT?

b) State True or False:- "Binary search performs Faster than sequential search".

c) What is circular linked list?

d) Define: Priority Queue.

e) Which data structure is used in recursion?

f) State the purpose of omega (Ω) notation.

g) Give best case and worst case time complexity of selection sort.

h) Write any two applications of linked list.

i) What is stack?

j) Write any two operations which can be performed on doubly ended queue.

P.T.O.

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

a) Explain the need of data structures.

b) Write a short note on Divide and conquer strategy.

c) What is doubly linked list? Write its node structure.

d) Convert following infix expression to equivalent prefix and postfix rotation: (A+B) * C - D

e) Differentiate between linear queue and circular queue.

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

a) Write a 'C' function for implementing binary search algorithm.

b) Write a 'C' function to insert element in singly linked list (by position).

c) Write a 'C' function to reverse a string using stack.

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

a) Sort the following elements using bubble sort method: 58, 12, 23, 65, 89, 41, 72, 34

b) Evaluate the following postfix expression:

$xy + z - wv* /$ (Let $x = 6$, y = 4, z = 2, w = 3, v = 2)

c) Define data structure and explain various types of data structures in detail.

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

a) Write a short note on priority queue.

b) What is generalized linked list? Represent following polynomial as a generalized linked list:

$x^{10} y^3 z^2 + 2x^8 y^3 z^2 + 3x^8 y^2 z^2 + x^4 y^4 z + 6x^3 y^4 z + 2yz.$

Total No. of Questions : 5]

SEAT No. : ____

PC-1566

[Total No. of Pages : 2

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S.Y. B.Sc.

(COMPUTER SCIENCE)

CS-232: Software Engineering

(Rev. 2019) (Semester - III) (Paper - VII) (23122)

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 <u>Eight</u> of the following:** **[8 × 1 = 8]**

a) Define process flow.

b) What is software engineering?

c) Which symbol is used to denote a node?

d) Write any two purposes served by SRS.

e) Write any two phases of RUP.

f) List the advantages of waterfall model.

g) What is requirement validation?

h) UML is a pure visual programming language T/F justify.

i) Enlist types of requirements.

j) Explain the use of Concurrent Models.

P.T.O.

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

a) State and explain any two framework activities of Software Engineering.

b) Write Advantages of RAD Model.

c) List the elements of analysis model.

d) What is Refactor? Explain with example.

e) Write & explain five principles of active agility.

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

a) Explain Spiral Model in detail.

b) Explain different approaches for requirement elicitation.

c) Explain SDLC in detail.

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

a) Explain phases of XP process with suitable diagram.

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

c) Draw sequence diagram for student registration system.

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

a) What is ASD? Describe Diagrammatically.

b) Draw Activity diagram to order Pizza.

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

PC-1567 **[Total No. of Pages : 2**

[6328]-33
S.Y. B.Sc. (Computer Science)
MATHEMATICS (Paper - II)
MTC-231 : Groups and Coding Theory
(Rev. 2019) (23221) (Semester - III)

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 $(ab)^2 = a^2 b^2$ in a group G, then prove that G is an abelian group.

b) Construct the relation on A= {a,b,c} which is symmetric but not transitive.

c) If $ax \equiv bx \pmod n$ and (x,n) = 1, then prove that $a \equiv b \pmod n$.

d) Find the inverse of i, in group {1,–1, i, –i} under complex multiplication.

e) Find order of permutation $\sigma = (1,4,7)$

f) Write any two subgroup of S_3.

g) Prepare composition table for multiplication with respect to modulo Z^*_8.

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

a) Let $a,b, \in Z$, if binary operation '*' is defined as a * b = ab/2, then show that (G,*) is an abelian group.

b) Let $a,b,x,y \in Z$ and $n \in N$. If $a \equiv b \pmod n$ and $c \equiv d \pmod n$, then show that

i) $(ax + cy) \equiv (bx + dy) \pmod n$

ii) $ac \equiv bd \pmod n$

c) Let p =3, q = 11, e =3. Using RSA method encode the message 'DO'.

d) Show that congruence relation is an equivalence relation.

e) Let $\alpha = (1,2)(4,5)$ and $\beta = (1,6,5,3,2)$ are two permutation in S_6. Compute i) α^{-1}, ii) $\alpha\beta$.

P.T.O.

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

a) Find gcd of 3997 and 2947. Also find integers m and n such that, (3997,2947) = m (3997) + n (2947).

b) i) Let R be a relation on A= {1,2,3} defined as, R = {(1,2) (2,3)}. Obtain transitive closure R*.

ii) Determine the group code $e_H : B^2 \rightarrow B^5$ whose given purity check matrix is,

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

Total No. of Questions : 3]

SEAT No. : ____

PC-1568

[Total No. of Pages : 2

[6328]-34

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

MATHEMATICS

MTC - 232 : Numerical Techniques

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

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

Instructions to the candidates :

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

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

a) Define the terms relative error and percentage error.

b) Obtain $\sqrt{12}$ by Newton Raphson method. With two iteration. Take $x_0 = 3.4$.

c) Using usual notation, Show that $\Delta \equiv E - 1$.

d) State Newton's Backward difference interpolation formula for equal interval.

e) Evaluate $\int_0^1 x^2 dx$, with h = 0.5 by Trapezoidal rule.

f) Prepare divided difference table for following data.

x :	2	4	9	10
y :	4	56	711	980

g) Given $y' = 1 + x$ with $y(0) = 1$, find $y(0.1)$ using Euler's method.

P.T.O.

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

a) Derive Newton's forward difference interpolation formula for equal interval.

b) Find a real root of $x^3 - x^2 - 2 = 0$ correct to three decimal by false position method.

c) Find the cubic polynomial by Lagranges formula for following data.

x :	0	1	2	5
y :	2	3	12	147

d) Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using Simpson's $\frac{3}{8}^{th}$ rule (Take h = 1).

e) Given $\frac{dy}{dx} = x^2 + y$ with y(0) = 1, find y(0.1) by Euler's modified method. (Take h = 0.1).

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

a) Given that $y' = 1 + y^2$ with $y(0) = 0$. Obtain $y(0.2)$ and $y(0.4)$ by using Runge - kutta method of fourth order.

b) i) Derive Simpson's $\frac{1}{3}^{rd}$ rule of numerical integration.

ii) Find the missing terms of following

x :	1	2	3	4	5
y :	7	?	13	?	37

Total No. of Questions : 5]

SEAT No. :

PC-1569

[Total No. of Pages : 2

[6328] - 35
S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC - 231 : Microcontroller Architecture and Programming
(Semester - III) (Paper - I) (23321) (Revised 2019)

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) Which pin is used to demultiplex address and data bus in 8051?

b) In which addressing mode '@' symbol is used?

c) Which bit of IE register (Interrupt Enable) is used to enable all interrupts?

d) Which instruction is used to start and stop the timers in 8051 microcontroller?

e) What is step size of 8-bit ADC if Vin is 2.56 volt?

f) Which pin of LCD selects command and data register?

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

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

i) ALE

ii) $\overline{\text{PSEN}}$

iii) $\overline{\text{EA}}$

iv) RESET

v) RXD

b) Explain addressing modes of 8051 microcontroller?

P.T.O.

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

a) Explain any five types of instructions used in 8051 microcontroller with suitable example?

b) Draw bit format of IP (Interrupt Priority) register and explain function of each bit?

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

a) Write a 8051 'C' program to generate 1KHz square waveform at port pin P1.1 using timer 0 and mode 1. (crystal frequency = 12 MHz)

b) List registers involved in serial communication of 8051 microcontroller. Explain function of each register?

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

a) Differentiate between synchronous and asynchronous communication (Any 3 points)

b) Explain in brief interfacing of DAC with 8051?

c) Explain any 3 assembler directives of 8051?

d) Write a short note on : Internal RAM Organisation.

e) Write any three features of 8051?

f) Draw bit format of TMOD register?

Total No. of Questions : 5]

SEAT No. : ____

PC-1570

[Total No. of Pages : 2

[6328] - 36

S.Y.B.Sc (Computer Science)

ELECTRONICS SCIENCE

ELC - 232 : Digital Communication and Networking

(Semester - III) (Paper - II) (23322) (Revised 2019 Pattern)

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) Define channel bandwidth.

b) Draw the FSK Waveform for the input data 1000111.

c) State any one application of frequency Division Multiplexing.

d) State the full form of 'TDMA'

e) State the use of repeater in Computer Networking.

f) State the disadvantage of ring topolgy.

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

a) Explain simplex and full duplex communication with necessary diagram.

b) Draw and explain the block diagram of Direct Sequence Spread Spectrum (DSSS).

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

a) With suitable diagram explain QPSK Modulator.

b) Explain Bus and Hybrid topology in brief.

P.T.O.

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

a) Draw and explain Block diagram of generalised electronic communication system.

b) Explain with necessary block diagram of Time Division Multiplexing (TDM).

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

a) External Noise

b) Need of Modulation

c) FDM

d) Token Passing?

e) Ethernet.

f) TCP/IP

Total No. of Questions : 5]

SEAT No. :

PC1571

[Total No. of Pages : 2

[6328]-37

S.Y. B.C.A./B.Sc. (Computer Science)/(Biotech.)/(Animation)/ (Hospitality Studies)/(Cyber and Digital Science)

AECC - I : ENVIRONMENTAL AWARENESS

(Revised 2019 Pattern) (Semester - III) (23921)

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) What is mean by sustainable development.
b) What are the effects of deforestation?
c) Define Desert ecosystem.
d) Define the term biodiversity.
e) Enlist the three main parts of ecosystem?
f) Write any two benefits of environment.

Q2) Answer the following.

a) How do different disciplines contribute to environmental studies? **[6]**
b) Why India is rich in natural resources **[4]**

Q3) Answer the following.

a) Explain in detail hydrological cycle. **[6]**
b) What factor affects biodiversity? **[4]**

Q4) Answer the following.

a) Explain in detail terrestrial ecosystem. **[6]**
b) What is mean by trophic structure. **[4]**

Q5) Write a short note on Any four of the following. **[10]**

a) Atmosphere
b) Non – renewable resource
c) Impact of over groping
d) Traditional agriculture
e) Floods
f) Coal

P.T.O.

Total No. of Questions : 5]

PC1571

[6328]-37

S.Y. B.C.A./B.Sc. (Computer Science)/(Biotech.)/(Animation)/ (Hospitality Studies)/(Cyber and Digital Science)

AECC - I : ENVIRONMENTAL AWARENESS

(Revised 2019 Pattern) (Semester - III) (23921)

(मराठी रूपांतर)

वेळ : 2 तास] [एकूण गुण : 35

सूचना :- 1) प्रश्न क्र. 1 अनिवार्य आहे.
2) प्रश्न क्र. 2 ते 5 मध्ये कोणतेही तीन प्रश्न सोडवा.
3) प्रश्न क्र. 2 ते 5 यांना समान गुण आहेत.

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

अ) शाश्वत विकास म्हणजे काय?
ब) जंगलतोडीचे काय परिणाम होतात?
क) वाळवंट परिसंस्था म्हणजे काय?
ड) जैवविविधता म्हणजे काय?
इ) परिसंस्थेचे तीन मुख्य भाग कोणते आहेत?
फ) पर्यावरणाचे कोणतेही दोन फायदे लिहा?

प्र.2) खालील प्रश्नाचे उत्तरे द्या.

अ) पर्यावरणीय अभ्यासामध्ये विविध शाखा कशा प्रकारे योगदान देतात? **[6]**
ब) भारत नैसर्गिक संसाधनांनी समृद्ध का आहे? **[4]**

प्र.3) खालील प्रश्नाचे उत्तरे द्या.

अ) जलविज्ञान चक्राचे तपशीलवार वर्णन करा. **[6]**
ब) जैवविविधतेवर कोणते घटक परिणाम करतात? **[4]**

प्र.4) खालील प्रश्नाचे उत्तरे द्या.

अ) भूस्थल परिसंस्था स्पष्ट करा. **[6]**
ब) स्थर रचना म्हणजे काय? **[4]**

प्र.5) थोडक्यात टिपा लिहा. (कोणत्याही चार) **[10]**

अ) वातावरण
ब) अपारंपारिक ऊर्जास्त्रोत
क) अतिचराईचा परिणाम
ड) पारंपारिक शेती
इ) पूर
फ) कोळसा

Total No. of Questions : 5]

SEAT No. : ____

PC-1572

[Total No. of Pages : 2

[6328]-41
S.Y. B.Sc.
Computer Science
CS-241: DATA STRUCTURES AND ALGORITHMS-II
(Revised 2019 Pattern) (Semester - IV) (CBCS) (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) What is complete binary tree?

b) Define degree of the tree.

c) What is expression tree?

d) Define Balance factor.

e) What do you understand by splay tree?

f) Write about inverse adjacency list.

g) Give any two uses of graph in social network.

h) Define topological sort.

i) What is a Bucket?

j) List any two collision resolution techniques.

P.T.O.

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

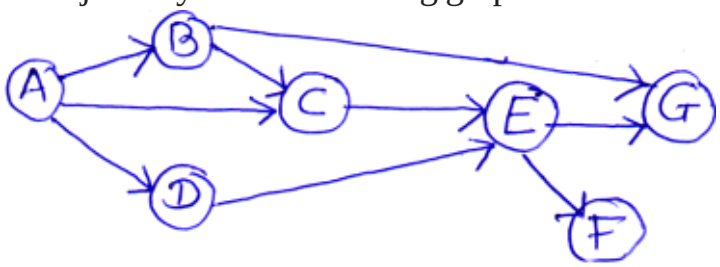
a) What do you mean by Huffman Encoding?

b) Write a short note on B-tree.

c) Define:

i) Height of tree ii) Siblings

d) Draw adjacency list of following graph.



e) What do you understand by collision in hashing?

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

a) Write a C program to calculate indegree, outdegree of each node and total degree of graph.

b) Write a 'C' function for deleting a node from Binary search tree.

c) Write a 'C' function 'Search' - that will searches an element in a hash table.

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

a) Differentiate between BFS and DFS.

b) Construct AVL tree for following data.

RUS, BRA, GER, IND, PAK, BAN, USA, AFR

c) Describe coalesced chaining with an example.

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

a) Write the conditions and rules that red black tree must be satisfied.

b) Define the following terms.

i) Spanning Tree

ii) Acyclic Graph

iii) Weighted Graph

Total No. of Questions : 5]

SEAT No. : ____

PC-1573

[Total No. of Pages : 2

[6328]-42
S.Y. B.Sc.
COMPUTER SCIENCE
CS-242: Computer Networks - I
(24122) (Revised 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 wherever necessary.***

Q1) **Attempt any <u>Eight</u> of the following: (out of ten)** **[8 × 1 = 8]**

a) State the important functions of data link layer.

b) List Random-Access protocols.

c) Find the network address for IP address 192.168.10.5.

d) Define subnetting.

e) What is the address space for 'n' bit address?

f) What is agent Solicitation?

g) What is the window size of TCP segment?

h) List the TCP flags.

i) What is the half-close in TCP?

j) Which are the windows used in TCP?

P.T.O.

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

a) IF the bandwidth of a channel is 5 kbps, how long does it take to transmit a data frame of 100000 bits?

b) What are the types of standards?

c) Write Shannon's formula for noisy channel.

d) Find out class, netid and hostid of following IP address-126.26.22.2

e) "UDP is faster than TCP", Comment.

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

a) Explain the services provided by the network layer.

b) What are the applications of TCP?

c) Define following terms:

i) Propagation time

ii) Transmission time

iii) Queuing time

iv) Processing time

Q4) **Attempt any <u>Two</u> of the following: (out of three)** **[2 × 4 = 8]**

a) Write difference between distance vector routing and link state routing.

b) Explain the frame format of IEEE 802.3

c) Explain encapsulation and decapsulation in the transport layer.

Q5) **Attempt any <u>One</u> of the following: (out of two)** **[1 × 3 =3]**

a) What are the design issues for the layer?

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

i) Address mask

ii) First address of the block

Total No. of Questions : 3]

SEAT No. :

PC-1574

[Total No. of Pages : 3

[6328]-43

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

MATHEMATICS

MTC-241 : Computational Geometry

(Revised 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.***
3) ***Non-programmable, scientific calculator is allowed.***

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

a) Write the transformation matrix for translation in x and y direction by - 4 and 5 units respectively.

b) Find the principal foreshorting factor f_x if the transformation matrix for axonometric projection is give by

$$\begin{bmatrix} \frac{\sqrt{3}}{2} & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & \frac{1}{\sqrt{2}} & 0 & 0 \\ \frac{1}{2} & \frac{-\sqrt{6}}{4} & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

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

d) Find an angle $\delta\theta$ to generate uniformly spaced 7 points on the circumference of a circle in 2^{nd} and 3^{rd} quadrant.

P.T.O.

e) Write the matrix of perspective projection on X = 0 plane from centre of projection at (–7, 0, 0).

f) Obtain area of transformed triangle if area of original triangle is 5, where

$$[T] = \begin{bmatrix} 3 & -1 \\ 5 & 0 \end{bmatrix}.$$

g) Write the transformation matrix for the rotation about x-axis through an angle 60°.

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

a) Find the cabinet projection of the object represented by the following position vector matrix [X] with horizontal inclination $\alpha = 30°$

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

b) Find the combined transformation matrix and apply it on the triangle with vertices A(1 2], B[3 –1], C[2 1]. The sequence of transformation is given below :

i) Uniform scaling by factor 5

ii) Rotation about origin through angle $\theta = 60°$

c) Consider the line with direction ratios 2, 3, 3 and passing through origin (0, 0, 0). Determine the angles through which the line should be rotated about x-axis and then about y-axis, so that it coincides with z-axis.

d) Obtain three uniformly spaced points in the first quadrant on the circle $x^2 + y^2 = 1$.

e) Find the concatenated matrix for the following transformations in order. First translate in x, y, z directions by –2, –2, –2 units respectively, followed by a rotation about x-axis by an angle 45°.

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

a) Find the parametric equation of a Be'zier curve determined by control points B_0[1 0], B_1[2 3] and B_2[4 1]. Also find position vector of the points on the curve corresponding to parametric valve $t = 0.1, 0.2$.

b) Find the combined transformation matrix for reflection through the line $y = -4$. Apply it to the position vector [–1 2].

c) obtain isometric projection of the line segment of the points A[1 –2 1] and B[3 1 –6] for $\theta > 0$ and $\phi > 0$.

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Total No. of Questions : 3]

SEAT No. : ____

PC-1575

[Total No. of Pages : 4

[6328]-44

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

MATHEMATICS

MTC-242 : Operation Research

(Revised 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 indicate full marks.***

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

a) State any two applications of operation research.

b) Write the following linear programming problem in standard form

Min Z = 2x + 3y + 5z

Subject to

$2x - 3y + z \leq 1$

$x, y, z \geq 0$

c) Find any one initial basic feasible solution of the following linear programming problem.

Max Z = x + 3y + 3z

Subject to

$x + 2y + 3z = 4$

$2x + 3y + 5z = 7$

$x, y, z \geq 0$

d) Write the dual of the following linear programming problem.

Min Z = $x - 2y + 3z$

Subject to

$x + y + z = 2$

$x, y, z \geq 0$

P.T.O.

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

Destination / Origin	D_1	D_2	D_3	Supply
O_1	1	2	3	1
O_2	4	5	6	2
O_3	7	8	9	3
Demand	3	2	1	

f) Define the degeneracy in transportation problem.

g) Solve the following Assignment problem for minimization

	I	II	III
A	-	2	3
B	3	-	1
C	2	1	-

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

a) Solve the following linear programming problem by graphical method.

Max Z = $4x + 10y$

Subject to

$2x + y \leq 10$

$2x + 5y \leq 20$

$2x + 3y \leq 18$

$x, y \geq 0$

b) Obtain initial basic feasible solution by least cost method for following.

	D_1	D_2	D_3	D_4	Supply
A	5	2	4	3	22
B	4	8	1	6	15
C	4	6	7	5	8
Demand	7	12	17	9	

c) Obtain initial basic feasible solution by vogels approximation method for following.

Destination / Origin	D_1	D_2	D_3	D_4	Supply
O_1	2	3	11	7	6
O_2	1	0	6	1	1
O_3	5	8	15	9	10
Demand	7	5	3	2	

d) Solve the following Assignment problem for minimization.

	I	II	III	IV
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

e) Solve the following Assignment problem for maximization.

	A	B	C	D
I	2	3	4	5
II	4	5	6	7
III	7	8	9	8
IV	3	5	8	4

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

a) Solve the following linear programming problem by simplex method.

Min Z = $2y_1 + 3y_2$

Subject to

$y_1 + y_2 \geq 5$

$y_1 + 2y_2 \geq 6$

$y_1, y_2 \geq 0$

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

6	3	5	4
(12)		(1)	(9)
5	9	2	7
		(15)	
5	7	8	6
(7)		(1)	

⌘⌘⌘

Total No. of Questions : 5]

SEAT No. : ____

PC-1576

[Total No. of Pages : 2

[6328] - 45
S.Y.B.Sc. (Computer Science)
ELECTRONICS SCIENCE
ELC-241: Embedded System Design
(Revised 2019 Pattern) (Semester - IV) (Paper - I) (24321)

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

Instructions to the candidates:

1) ***Q.No. 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 whenever necessary.***
5) ***Use of calculotor is allowed.***

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

a) Write full form of SBC?

b) State use of UART in communication?

c) Which port is used to connect monitor in Raspberry Pi?

d) List any two types of SOC'S?

e) Which operating system is popularly used in Raspberry pi?

f) Differentiate between list and tupple?

P.T.O.

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

a) Explain any five I/O functions used in python programming to interface hardware?

b) Draw and explain block diagram of embedded system?

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

a) With proper circuit diagram explain LCD interfacing to raspberry Pi? **[5]**

b) i) Write difference between microcontroller and SBC? (any - 3) **[3]**

ii) State parameters of ARM11J6HZF-S? **[2]**

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

a) i) Write a python program to find perimeter of reactangle **[3]**

ii) Draw a circuit diagram of switch interfacing with Raspberry Pi? **[2]**

b) Explain basic architecture of SOC? **[5]**

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

a) Logical operators in Python.

b) Steps for installation of Raspberry Pi operating system.

c) Finger print sensor.

d) Difference between Soc and processor on chip (any - 3)

e) Teachnical specifications of Beogle Bone Black

f) Wi - Fi

Total No. of Questions : 5]

SEAT No. : ____

PC-1577

[Total No. of Pages : 2

[6328] - 46
S.Y. B.Sc. (Computer Sciences)
ELECTRONICS
ELC-242: Wireless Communication and Internet of Things
(Revised 2019 Pattern) (Semester - IV) (Paper - II) (24322)

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

Instructions to the candidates:

1) ***Q.No. 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) What is cluster in cellular telephony?

b) What are different frequencies used in ZigBee Communication?

c) What do you mean by M2M?

d) State the meaning of mobile station in GSM.

e) Mention any one application of IoT.

f) How many satelite required in GPS system.

P.T.O.

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

a) State any five difference between wired and wireless communication.

b) Explain piconet and scatternet interms of Bluetooth.

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

a) State the advantages of cloud in IoT.

b) Explain the working of RFID System.

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

a) Give the function of following blocks of GSM:

AUC, HLR, VLR

b) With the help of suitable diagram explain architecture of smart home system.

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

a) Z-wave architecture.

b) NB - IoT

c) Frequency reuse concept in cellular telephony

d) Sigfox.

e) ZigBee devices

f) Blocks of Mobile handset.

Total No. of Questions : 5]

SEAT No. :

PC1578

[Total No. of Pages : 4

[6328]-47

S.Y. B.C.A./B.Sc. (Computer Science)/(Biotech.)/(Animation)/ (Hospitality Studies)/(Cyber and Digital Science)

AECC-I : ENVIRONMENTAL AWARENESS - II

(Revised 2019 Pattern) (Semester - IV) (24921)

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.

a) Define Air pollution **[1]**

b) What is CBD? **[1]**

c) What is Disaster? **[1]**

d) What is Acid Rain? **[1]**

e) In which year environment act was passed? **[1]**

f) Define Noise pollution. **[1]**

Q2) Answer the following.

a) Write note on water pollution. **[6]**

b) What is Global warnming? Explain indetail. **[4]**

Q3) Answer the following.

a) What are the salient features of water act 1974? **[6]**

b) Write note on Flood. **[4]**

P.T.O.

Q4) Answer the following.

a) Describe Chipko movement. **[6]**

b) Explain ozone layer depletion. **[4]**

Q5) Write a short note on Any four of the following.

a) Soil pollution **[2½]**

b) Nuclear Hazards **[2½]**

c) Nature reserve **[2½]**

d) Earthquake **[2½]**

e) Bishnois of Rajasthan **[2½]**

f) Kyoto Protocol **[2½]**

Total No. of Questions : 5]

PC1578

[6328]-47

S.Y. B.C.A./B.Sc. (Computer Science)/(Biotech.)/(Animation)/ (Hospitality Studies)/(Cyber and Digital Science)

AECC-I : ENVIRONMENTAL AWARENESS - II

(Revised 2019 Pattern) (Semester - IV) (24921)

(मराठी रूपांतर)

वेळ : *2* तास] [एकूण गुण : *35*

सूचना :– *1)* प्रश्न क्र. 1 अनिवार्य आहे.

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

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

प्र.*1)* खालीलपैकी कोणतेही पाच प्रश्न सोडवा.

अ) वायू प्रदूषणाची व्याख्या करा. **[1]**

ब) सी.बी.डी. म्हणजे काय? **[1]**

क) आपत्ती म्हणजे काय? **[1]**

ड) आम्ल पाऊस म्हणजे काय? **[1]**

इ) पर्यावरण कायदा कोणत्या वर्षी मंजूर झाला? **[1]**

फ) ध्वनी प्रदूषणाची व्याख्या करा. **[1]**

प्र.*2)* खालील प्रश्नाचे उत्तरे द्या.

अ) जल प्रदूषणावर टीप लिहा. **[6]**

ब) जागतिक तापमान वाढ म्हणजे काय ते सविस्तर सांगा. **[4]**

प्र.*3)* खालील प्रश्नाचे उत्तरे द्या.

अ) पाणी कायदा, 1974 महत्त्वाचे वैशिष्ट्य काय आहे? **[6]**

ब) पुरावर टीप लिहा. **[4]**

प्र.*4)* खालील प्रश्नाचे उत्तरे द्या.

अ) चिपको चळवळीचे वर्णन करा. **[6]**

ब) ओझोन थर कमी होणे हे स्पष्ट करा. **[4]**

प्र.*5)* थोडक्यात टिपा लिहा. (कोणत्याही चार)

अ) माती प्रदूषण **[2½]**

ब) आण्विक धोके **[2½]**

क) नेचर रिझर्व **[2½]**

ड) भूकंप **[2½]**

इ) राजस्थानमधील बिष्णोई **[2½]**

फ) क्यूटो प्रोटोकॉल **[2½]**

Total No. of Questions : 5]

SEAT No. : ____

PC-1579

[Total No. of Pages : 2

[6328]-51

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 351 : Operating Systems - I

(Revised 2019) (Semester - V) (New CBCS) (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) ***Assume suitable data, if necessary.***

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

a) What is batch operating system?

b) List any two advantages of multithreaded programming.

c) Define dispatch latency.

d) "Counting Semaphore can be implemented by using binary semaphore". True/False. Justify.

e) Define logical address space.

f) Define spooling.

g) What is ready queue?

h) What will happen if all processes are I/O bound in system?

i) Define semaphore.

j) List various dynamic allocation memory management methods.

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

a) What is page table? What are its contents?

b) What is critical section problem?

c) What is pre - emptive and Non - preemptive scheduling?

d) Explain the functions performed by dispatcher.

e) Write the advantages of microkernel.

P.T.O.

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

a) Explain process control block with proper diagram.

b) Consider the following snapshot of a system.

Process	Arrival Time	CPU burst Time
p_1	0	7
p_2	1	2
p_3	2	5
p_4	3	4

Compute average trunaround time and average waiting time using RR with quantum 3.

c) Differentiate between internal fragmentation and external fragmentation.

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

a) Explain one - to - one and many - to - many multithreading models.

b) Explain dining philosopher problem.

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

i) FIFO

ii) LRU

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

a) What is system call? Explain the system call for process and job control.

b) Explain swapping in detail.

♦ ♦ ♦

Total No. of Questions : 5]

SEAT No. : ____

PC-1581

[Total No. of Pages : 2

[6328]-53
T.Y. B.Sc.
COMPUTER SCIENCE
CS-353 : Web Technologies - I
(Revised 2019) (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 difference between echo ( ) and print ( ) function?

b) What is DSN?

c) How to delete file in PHP?

d) What is use of Post Office Protocol 3?

e) Explain the use of <Style>

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

g) What is associative array?

h) Define Web Browser.

i) Which tag is used to set the text in superscript format?

j) Give the difference between single quoted string and double quoted string.

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

a) Write the output of the following PHP Script

```
<?php
$ age = array("Anna"=>"45", "Julie"=>"38", "Benne"=>"53");
usort($age);
print_r($age);
?>
```

P.T.O.

b) Find the Output of the following PHP Script

```
<?php
$file=fopen (“samp 1 e.txt”, “w”);
echo fwrite($file, “Hello! How are you Rahul?”);
fclose($file);
?>
```

c) Write any two functions of decompose string with suitable example.

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

e) How External CSS is used?

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

a) Explain any two control statements with syntax and example.

b) Explain prepare ( ) and execute ( ) command in database handling.

c) Explain anonymous function concept in PHP.

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

a) Write a PHP script to read a file abc.txt where file contains character, B, C, T, G and space. Count occurrences of each character and write it to the abccount.txt file.

b) Write PHP Script to accept associative array and sort in descending order. Display sorted array to user.

c) Consider a string $str=”PUNE UNIVERSITY”; write a PHP script to display above string in the format given below using built in functions:

i) Pune university

ii) PUNE UNIVERSITY

iii) Pune university

iv) Pune University

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

a) Explain here document with example.

b) What is use of pg_fetch_row( ) and pg_fetch assoc( )? Explain with example.

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Total No. of Questions : 5]

SEAT No. :

PC1582

[Total No. of Pages : 2

[6328]-54
T.Y.B.Sc.
COMPUTER SCIENCE
CS-354 : Foundations of Data Science
(Revised 2019 Pattern) (Semester-V)

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

Instructions to the candidates:

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

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

a) Define Data Science.

b) List any two Social media data sources.

c) What is Open Data Source?

d) What is outlier?

e) Define variance.

f) What is nominal attribute?

g) Define Data wrangling.

h) What is one hot encoding?

i) Define data visualization.

j) List any two data visualization tools.

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

a) What do you understand by structured and unstructured data?

b) Write any four applications of data science.

c) What is inferential statistics?

P.T.O.

d) Define data discretization.

e) What is visual encoding?

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

a) Explain any one outlier detection method.

b) Write and explain data visualization libraries in Python.

c) What is data cleaning? Explain any two data cleaning methods.

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

a) Explain 3 V's of data science with diagram.

b) Elaborate data cube aggregation in detail.

c) Describe Exploratory Data Analysis (EDA) in detail.

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

a) Find the mean and median for the following list of values.

23, 18, 14, 21, 16, 28

b) Write a short note on feature extraction.

Total No. of Questions : 5]

SEAT No. : ____

PC-1583

[Total No. of Pages : 2

[6328]-55

T.Y. B.Sc (Computer Science)

CS - 355 : OBJECT-ORIENTED PROGRAMMING USING JAVA - I

(Revised 2019) (Semester - V)

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

Instructions to the candidates :

1) ***Answer all Questions.***
2) ***Figures to the right indicate full marks.***

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

a) What is Bytecode?

b) Write any two characteristics of Inheritance

c) What is use of 'this' keyword.

d) "Is it possible to overload a constructor in a class" comment.

e) What is AWT?

f) What is use of Adapter class.

g) List the types of checked Exception.

h) Differentiate between scanner & Buffer reader class.

i) What is use of tostring ( ) method.

j) List any two event class.

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

a) Differentiate between object and reference variable.

b) Give any two methods of character wrapper class.

c) What is use of length property, Give its Syntax.

d) What is use of JFile chooser class. Give its Syntax.

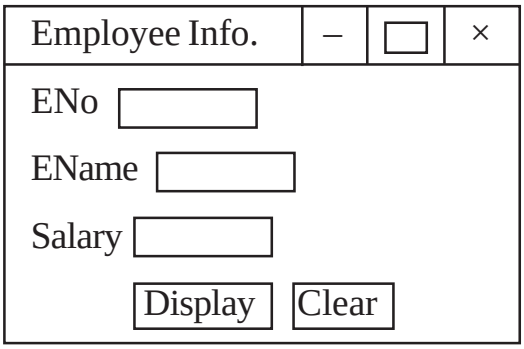
e) What is Polymorphism? How to implement it at runtime.

P.T.O.

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

a) Create an abstract class shape with abstract method area ( ). Inherit abstract class shape into circle class. Write a Java program to calculate area of circle and to display it. (Use Final Keyword)

b) Design the following screen by using Swing.



Write a Java program to accept details of employee and display it on console by clicking on Display button. Clear button should clear all the controls.

c) Define user-define exception Nameval. Write a Java program to accept Name from user if it is invalid then trow user define Exception "Name is Invalid" otherwise convert it into the uppercase and display it.

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

a) Explain the uses of 'Super' keyword with example.

b) Write a Java program to accept a string from user, reverse the case of all the Characters and replace all the digits by '*' in target string.

c) Write a Java program to accept n numbers from user and store only prime numbers into array and display that array.

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

a) Differentiate between static variable and Instance variable.

b) Write a Java program to display the contents of file in reverse order.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

PC-1584

[Total No. of Pages : 3

[6328]-56
T.Y. B.Sc.
COMPUTER SCIENCE
CS-356 : Theoretical Computer Science
(Revised 2019 Pattern) (CBCS) (Semester - V)

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

Instructions to the candidates:

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

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

a) Define the term ∈ - Closure.

b) State two differences between NFA and DFA.

c) Give the meaning of 'δ' function of NFA with ∈ moves.

d) Define Formal Languages.

e) State operations on Regular Languages.

f) Define tuples of Push Down Automata.

g) Define ambiguous grammar.

h) Define 'λ' function of Melay and Moore machine.

i) Name the type of language accepted by Pushdown Automata.

j) Define useless symbols.

P.T.O.

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

a) Differentiate between FA and PDA.

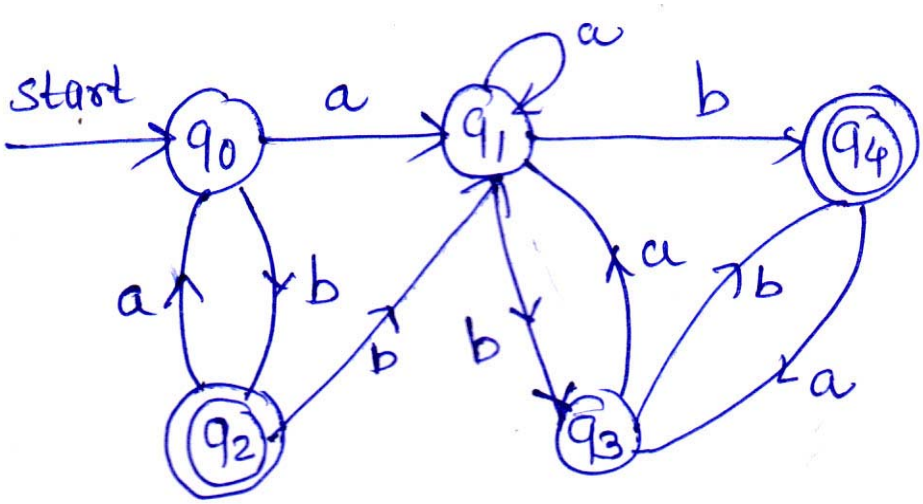
b) Construct FA for regular expression.

((a+b)* + abb)*

c) Construct CFG for language L which accepts set of all palindromes over $\Sigma = \{a,b\}*$.

d) Define Turing Machine.

e) Construct minimal DFA for the following.



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

a) Construct a DFA for a language containing strings starting with 'a' and ending with 'b' over alphabet {a,b} that is string generated from

L= {a (a + b)*b}

b) Construct the following grammar into GNF

S-> ABA |AB|BA|AA|A|B

A->aA | a

B->bB | b

c) Design TM for language, L= $\{a^m b^n c^m \mid m,n>=0\}$

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

a) Construct a PDA for the language L= $\{a^n b^n \mid n>=1\}$.

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

c) Explain Left linear grammar and Right linear grammar with example.

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

a) Construct a Mealy machine to convert each occurrence of substring 101 by 100 over alphabet {0,1}.

b) Show that L = $\{0^n 1^n \mid n> = 1\}$ is not regular.

Total No. of Questions : 5]

SEAT No. :

PC1585

[Total No. of Pages : 2

[6328]-57

T.Y.B.Sc. (C.S.)

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) ***Figures to the right indicate full marks.***

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

a) Explain features of python.

b) What is purpose of range ( ) function.

c) What is indentation.

d) Define anonymous function.

e) Compare List and dictionary.

f) Define text and binary files.

g) What is lamda function.

h) Explain Exception with syntax.

i) Compare for and while loop?

j) What is regular Expression.

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

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

b) Explain built in string methods with example.

c) Explain following Statements.

i) If ii) If else

iii) break iv) Continue

d) What is difference between call by value and call by reference.

e) Explain set union and intersection with example.

P.T.O.

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

a) Write a python program to find sum of natural numbers.

b) Write a python function to check whether a number is perfect or not.

c) Write a python program to convert a list to a tuple.

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

a) Write python program to accept the strings which contains all vowels.

b) Write a python program to computer the number of characters, words and lines in file.

c) Write a python program to check number is odd or even.

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

a)
```
def myfun(name, msg = "Good morning") :
    print("Hello", name + ',' + msg)
myfun("Amar")
myfun("Kiran", "How do you do")
```

b)
```
try :
    a = 5
    b = 0
    print(a|b)
except Type Error :
    Print('unsupported operation')
except zero division Error;
    print('Division by Zero not allowed')
    print('out of try except blocks')
```

■■■■

Total No. of Questions : 5]

SEAT No. :

PC1586

[Total No. of Pages : 2

[6328]-58
T.Y. B.Sc.
COMPUTER SCIENCE
CS-3511 : Blockchain Technology
(Revised 2019 Pattern) (CBCS) (Semester - V)

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

Instructions to the candidates:

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

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

a) Who is the inventor of Bitcoin?

b) What is gas?

c) Which command is used to find the target value?

d) What is used for a wallet security?

e) Define nonce.

f) In which network, each node is itself a client and server?

g) Name the institute that standardized AES algorithm.

h) What is IPO?

i) The blockchain is invented by bitcoin. State and explain true/false.

j) What is confidentiality?

P.T.O.

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

a) What is Ether? List any two denominations in wei?

b) What is consortium and private blockchain?

c) List and explain types of variables in solidity.

d) How nonce useful in hashing?

e) Define stream cipher and block cipher.

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

a) What is Wallet? Explain its types.

b) Explain tasks of miners.

c) List the applications of smart contract. Explain any three.

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

a) Describe the structure of EVM.

b) Explain digital signature with neat diagram.

c) Explain the layered architecture of blockchain.

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

a) State and explain Merkle tree.

b) What are the properties of SHA 256?

Total No. of Questions : 5]

SEAT No. :

PC-1587

[Total No. of Pages : 3

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T.Y. B.Sc.
COMPUTER SCIENCE
CS-361 : Operating Systems-II
(Rev. 2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

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

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

a) List any four file attributes.

b) Define starvation.

c) What do you mean by full stroke lime ?

d) Define Distributed systems.

e) List the limitations of single level directory.

f) What is mobile operating system ?

g) Kernel is core of any operating system. Justify True/False.

h) Define deadlock.

i) What do you mean by disk Bandwidth ?

j) What do you mean by Grid Computing ?

P.T.O.

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

a) Write features of mobile operating system.

b) List the different types of Distributed systems.

c) Explain any two Disk performance parameters.

d) Explain resource allocation Graph.

e) What do you mean by absolute path and relative path.

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

a) Explain Design goals of distributed systems.

b) Write short note on Disk Mangement.

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

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	4	2	0
P_1	1	1	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	1	0	1	4	1	6	5	6				

Answer the following questions using Banker's Algorithm.

i) What are the contents of need array.

ii) If the system is in safe state give the safe sequence.

iii) If the request from process P_1 arrived for (0, 4, 2, 0) can it be granted immediately.

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

a) Explain the necessary conditions for a Deadlock to occur.

b) Explain linked Allocation of file in detail.

c) Explain iphone Architecture in detail.

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

a) Write Advantages and Disadvantage of Distributed systems.

b) Assume there are total 200 tracks are presents on each surface of the disk. If request quecee is 30,140,20,170,60,190 and initial position of the head is 120. Apply following disk scheduling Algorithms & calculate total head movement.

i) FCFS

ii) SSTF

Total No. of Questions : 5]

SEAT No. : ____

PC-1588

[Total No. of Pages : 2

[6328]-62

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

CS - 362 : SOFTWARE TESTING

(Rev-2019) (Semester - VI)

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

Instructions to the candidates :

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

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

a) Define the term fault.

b) What is driver?

c) What is Graph Matrix?

d) Define the term Test plan?

e) List out the characteristics of test,

f) What is the purpose of web application?

g) Define the term Acceptance testing.

h) What is the purpose of accessibility testing.

i) List out the features of agile testing.

j) Define the term System Testing.

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

a) What is cyclomatic complexity? How it is computed?

b) Explain the dimensions of Quality.

c) Explain the types of performance testing.

d) List out Agile principles in details.

e) Differentiate between the alpha and beta testing.

P.T.O.

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

a) Describe test case template with the help of example.

b) Explain the process of load testing. Give the examples of load testing.

c) Differentiate between testing and debugging

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

a) Define the term navigation testing. How to test navigation syntax and semantics?

b) Differentiate between White box testing and Black Box Testing

c) Explain the V —model with the help of suitable diagram

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

a) Explain the Internationalization testing phases with suitable diagram.

b) What is unit testing? What are the advantages and disadvantages of unit testing?

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Total No. of Questions : 5]

SEAT No. :

PC-1589

[Total No. of Pages : 2

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

CS - 363 : WEB TECHNOLOGIES - II

(Rev. 2019 Pattern) (CBCS) (Semester - VI)

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

Instructions to the candidates:

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

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

a) What is the use of trigger_error()?

b) Define selectors in jQuery.

c) How to set cookie values and destroy the cookies?

d) What are the different values of readyState property of XMLHttpRequest?

e) What is XML?

f) Define Page Redirection.

g) Define Sticky Form.

h) List the features of JavaScript.

i) List applications of AJAX currently running in the market.

j) View and Model can be called by controller. True/False.

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

a) What is the difference between Cookies and Session?

b) Explain DOM Manipulation Methods used in jQuery with proper example.

c) Explain the Syntax Rules for XML.

d) Define events in JavaScript.

e) List advantage and disadvantage of AJAX.

P.T.O.

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

a) Explain working with Database in Codelgniter.

b) Explain Pop-up boxes in JavaScript.

c) How to get SERVER information? Explain with example.

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

a) Write php script to display the page visit count using Session.

b) Write an Ajax Program to display details of Students present in student.dat file. The student.dat file contains information as Roll No., Name, Class, Contact No.

c) Write php script to read Book.xml file which contains following details in it and display the Book Id attribute and Book Title.

```
<BookInfo>
        <Book id= "1">
            <Title> Programming in PHP </Title>
            <AuthorName> Mr. Patil </AuthorName>
            <Price> 550.50 </Price>
            <Publish_Year> 2000 </ Publish_Year>
    </Book>
    <Book id= "2">
            <Title> Programming in JAVA </Title>
            <AuthorName> Mr. Pawar </AuthorName>
            <Price> 862.50 </Price>
            <Publish_Year> 2015 </ Publish_Year>
    </Book>
</BookInfo>
```

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

a) List the features of Codelgniter.

b) Differentiate between XML and HTML.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

PC-1590

[Total No. of Pages : 2

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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.***

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

a) What is web scrapping?

b) What is Data Analytics?

c) What is F1 score?

d) Write any two applications of supervised machine learning.

e) Give the formula for support & confidence.

f) What is an outlier?

g) What is sentiment analysis?

h) What is purpose of n-gram?

i) Define classification.

j) What is Deep learning?

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

a) Explain the concept of under fitting & over fitting with example.

b) What is linear Regression? What type of machine learning applications can be solved with linear Regression?

c) List seven layers of social media Analytics.

d) What are advantages of the FP-Growth Algorithm?

e) What are dependant & independent variables?

P.T.O.

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

a) What are frequent item set & association rules? Describe with example.

b) What is natural language processing? Give its application.

c) Explain various types of Data Analytics.

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

a) What is Text summarization?

b) What is Logistic Regression? Explain it with example.

c) Consider the following & find out the frequent item set using Apriori Algorithm with minimum support threshold 3.

Tid	Item purchased
1	M, T, B
2	E, T, C
3	M, E, T, C
4	E, C
5	J

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

a) Define the terms :

i) Confusion matrix

ii) Accuracy

iii) Precision

b) What is machine learning? Explain its type.

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Total No. of Questions : 5]

SEAT No. : ____

PC-1591

[Total No. of Pages : 2

[6328]-65

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 365 : Object Oriented Programming Using Java - II

(Revised 2019) (Semester - VI)

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

Instructions to the candidates :

1) ***Answer all questions.***
2) ***Figures to the right indicate full marks.***

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

a) List any two collection interface.
b) What is multithreading?
c) What is metadata?
d) Write a syntax of comment in JSP.
e) What are the parameters of doPost ().
f) What is spring framework?
g) Define map interface.
h) State any two methods of inner thread communication.
i) Define Result set interface.
j) Define cookies.

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

a) How to create a thread in multithreading?
b) Differentiate between prepared statement & statement.
c) State any two methods for session tracking.
d) What are the advantages of servlet over CGI?
e) Write any two differences between Arraylist & linked list.

P.T.O.

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

a) Write a JSP program to accept student name, address & class & display it on next page in tabular format.

b) Write a java program to display the odd numbers between 1 to 100. Each number should display after 5 second. (Use sleep())

c) Write a java program to accept the details of student (Rno, Name, Percentage) from user & store it into the database using prepared statement interface.

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

a) Explain the life cycle of JSP.

b) Write a java program to accept 'n' Employee names through command line store them into the Arraylist collection and display them (use iterator interface).

c) Write a JSP program to display all the prime numbers between 1 to n in Red colour.

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

a) Explain JDBC Architecture.

b) Explain synchronization in detail.

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Total No. of Questions : 5]

SEAT No. : ____

PC-1592

[Total No. of Pages : 3

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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 indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data if necessary.***

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

a) Define the term Handle.

b) What is a cross - compiler?

c) Lex is a scanner provided by Linux operating system. Justify True/False.

d) List all phases of compiler in sequence.

e) What is a parser?

f) LALR is the best bottom-up parsing method state & Justify True / False.

g) Define Basic Block.

h) What is the use of Display?

i) List code optimization technique.

j) What is sentinel?

P.T.O.

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

a) Write short note on S-attributed grammar.

b) Find FIRST and FOLLOW of the following grammar.

$S \rightarrow AB$

$A \rightarrow BS|b|E$

$B \rightarrow bSB'|SB'|aB'$

$B' \rightarrow SSB'|E$

c) What is the basic and auxiliary tasks of a lexical analyzer?

d) Explain the value number method to construct DAG with an example.

e) Construct the local & non-local variable scope or accessibility table for the following blocks A, B, C, D

A

```
X, Y, Z : Integer
B   a : real
    C   H, Z : Integer
D   i, j : integer
```

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

a) Check whether the following grammar is SLR or not.

$S \rightarrow bAB|aA$

$A \rightarrow Ab|b$

$B \rightarrow aB|a$

b) Write a lex program to find the sum of N numbers.

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

$S \rightarrow aA|SbB$

$A \rightarrow aA|bB$

$B \rightarrow b$

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

a) Check whether the following grammar is LL(1) or not

$A \rightarrow aAa|Ab|AA|b$

b) Check whether the given grammar is LR(1) or not.

$E \rightarrow E + T|T$

$T \rightarrow T * F|F$

$F \rightarrow id$

c) Check whether the following grammar is operator precedence or not?

$E \rightarrow E + E \mid E * E \mid (E) \mid id.$

also construct operator precodence relation table.

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

a) Construct DAG for the following expression

i) 2 * (3 + 4) + (3 + 4) * 2

ii) b + (b + a) / (b – c) * (a – c)

b) Define SOD and SDT. State the task performed by SDT.

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Total No. of Questions : 5]

SEAT No. : ____

PC1593

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[6328]-67

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

CS-3610: SOFTWARE TESTING AND TOOLS

(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 indicate full marks.***

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

a) The purpose of test case is to determine whether a software application is working as per customer requirement or not? state true or false.

b) What is static testing?

c) Enlist any two features of backlog tool.

d) Define test planning by IEEE standard.

e) Write the formula for calculating branch coverage percentage.

f) Enlist the types of requirement defect.

g) Write any two objective of writing test cases.

h) Define static taste tool.

i) Define coding defect.

j) What is selenium?

P.T.O.

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

a) Define bug and explain different software bug.

b) Explain goal of loop coverage testing.

c) Explain exit criteria in test planning.

d) Define any two root causes of defect.

e) Define any two limitation of manual testing.

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

a) Enlist open source bug tracking tool and explain any one of them.

b) Explain decision coverage testing with its advantages.

c) Explain the different field of test plan template.

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

a) Define defect and explain any four attributes of defect.

b) Consider following code –

```
Input(intx, inty)
{
intsum=x+y;
If(sum>0)
Printf(“ Positive’’);
Else
Printf(“Negative”);
}
```

Testcase 1 :x =10, y=5, Testcase 2:x = –10, y= –5

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

c) Explain test automation framework with its different types.

Q5) Attempt any One of following. (Out of Two) **[1×3=3]**

a) Explain extra coding with example?

b) Explain test incident report.

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Total No. of Questions : 4]

SEAT No. :

PC5146

[Total No. of Pages : 2

[6328]-71

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

CS - 221 : Object Oriented Concepts Using C++

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

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

Instructions to the candidates:

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

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

a) What is object oriented programming?

b) Write a syntax of new operator.

c) A function can be declared as private. State True/False.

d) List the types of Template.

e) Define late binding.

f) What does catch (...) mean?

g) Write the syntax of overloading << operator.

h) List the file mode operations in C++.

i) What is pure virtual function?

j) List different types of inheritance in C++.

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

a) What is the need of a friend function in C++ ? Write syntax and features of friend function.

b) Define polymorphism. List and explain types of polymorphism.

c) Write a C++ program to overload binary operator '+' to add two complex numbers.

P.T.O.

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

a) Differentiate between C++ and C.

b) Explain the terms with example.

i) Pass by reference

ii) Return by reference

c) Write a C++ program to accept the eno, ename, esalary and ebonus for five employees.

Calculate total salary and display the output.

OR

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

a) i) Write a C++ program to accept information about an item (code, name, quantity, rate). Raise an exception if negative no. is entered for the quantity or rate. **[4]**

ii) Write short note on this pointer. **[3]**

iii) What is the use of seekg( ) and seekp ( ) **[3]**

b) i) Write an explain block structure of C++ program. **[4]**

ii) Explain class template with multiple parameters with example. **[3]**

iii) Trace the output of the following C++ code segment. Assume there are no syntax errors Justify : **[3]**

```
Class P
{
      public : void print ( ) {cout < < “Inside P”;}
};
Class Q : Public P
{
      public : void print ( ) {cout < < “Inside Q”;}
};
Class R : Public Q
{ };
int main ( )
{
R r;
r.print ( );
return 0;
}
```