MAHARAJA INSTITUTE OF TECHNOLOGY THANDAVAPURA

LIBRARY AND INFORMATION CENTRE

VTU Question Papers

Computer Science-III,V & VII Semester

Feb/Mar-2022

2018 Scheme

Maharaja Institute of Technology Thandavapura

Just of NH-766,Mysore-Ooty highway,Thandavapura(Vill & Post),Nanjangud Taluk,Mysore District-571302.

INDEX

USN | | | | | | | | | | |

18MAT31

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Transform Calculus, Fourier Series and Numerical Techniques

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Evaluate (i) $L\left\{\frac{\cos 2t - \cos 3t}{t}\right\}$ (ii) $L(t^2 e^{-3t} \sin 2t)$ **(06 Marks)**

b. If $f(t) = \begin{cases} t, & 0 \le t \le a \\ 2a - t, & a \le t \le 2a \end{cases}$, $f(t + 2a) = f(t)$ then show that $L(f(t)) = \frac{1}{s^2}\tanh\left(\frac{as}{2}\right)$ **(07 Marks)**

c. Solve by using Laplace Transforms
$\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 4y = e^{-t}$, $y(0) = 0$, $y'(0) = 0$ **(07 Marks)**

OR

2 a. Evaluate $L^{-1}\left(\frac{4s+5}{(s+1)^2(s+2)}\right)$ **(06 Marks)**

b. Find $L^{-1}\left(\frac{s}{(s^2+a^2)^2}\right)$ by using convolution theorem. **(07 Marks)**

c. Express $f(t) = \begin{cases} \sin t, & 0 \le t < \pi \\ \sin 2t, & \pi \le t < 2\pi \\ \sin 3t, & t \ge 2\pi \end{cases}$
in terms of unit step function and hence find its Laplace Transform. **(07 Marks)**

Module-2

3 a. Obtain fourier series for the function $f(x) = |x|$ in $(-\pi, \pi)$ **(06 Marks)**

b. Expand $f(x) = \frac{(\pi - x)^2}{4}$ as a Fourier series in the interval $(0, 2\pi)$ and hence deduce that
$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots\dots\dots$ **(07 Marks)**

c. Express y as a Fourier series upto the second harmonic given :

x:	0	60	120	180	240	300
y:	4	3	2	4	5	6

(07 Marks)

OR

4 a. Find the Half-Range sine series of $\pi x - x^2$ in the interval $(0, \pi)$ **(06 Marks)**

b. Obtain fourier expansion of the function $f(x) = 2x - x^2$ in the interval (0, 3). **(07 Marks)**

c. Obtain the Fourier expansion of y upto the first harmonic given :

x	0	1	2	3	4	5
y	9	18	24	28	26	20

(07 Marks)

Module-3

5 a. If $f(x) = \begin{cases} 1, & |x| < a \\ 0, & |x| > a \end{cases}$, find the Fourier transform of f(x) and hence find the value of $\int_0^\infty \frac{\sin x}{x} dx$ **(06 Marks)**

b. Find the infinite Fourier cosine transform of $e^{-\alpha x}$. **(07 Marks)**

c. Solve using z-transform $y_{n+2} - 4y_n = 0$ given that $y_0 = 0$, $y_1 = 2$ **(07 Marks)**

OR

6 a. Find the fourier sine transform of $f(x) = e^{-|x|}$ and hence evaluate $\int_0^\infty \frac{x \sin mx}{1+x^2} dx$; $m > 0$. **(06 Marks)**

b. Obtain the z-transform of $\cos n\theta$ and $\sin n\theta$. **(07 Marks)**

c. Find the inverse z-transform of

$$\frac{4z^2 - 2z}{z^3 - 5z^2 + 8z - 4}$$

(07 Marks)

Module-4

7 a. Solve $\frac{dy}{dx} = x^3 + y$, $y(1) = 1$ using Taylor's series method considering up to fourth degree terms and find y(1.1). **(06 Marks)**

b. Given $\frac{dy}{dx} = 3x + \frac{y}{2}$, $y(0) = 1$ compute y(0.2) by taking h = 0.2 using Runge – Kutta method of fourth order. **(07 Marks)**

c. If $\frac{dy}{dx} = 2e^x - y$, y(0) = 2, y(0.1) = 2.010, y(0.2) = 2.040 and y(0.3) = 2.090, find y(0.4) correct to 4 decimal places using Adams-Bashforth method. **(07 Marks)**

OR

8 a. Use fourth order Runge-Kutta method, to find y(0.8) with h = 0.4, given $\frac{dy}{dx} = \sqrt{x+y}$, y(0.4) = 0.41 **(06 Marks)**

b. Use modified Euler's method to compute y(20.2) and y(20.4) given that $\frac{dy}{dx} = \log_{10}\left(\frac{x}{y}\right)$ with y(20) = 5 Taking h = 0.2. **(07 Marks)**

c. Apply Milne's predictor-corrector formulae to compute y(2.0) given $\frac{dy}{dx} = \frac{x+y}{2}$ with

x	0.0	0.5	1.0	1.5
y	2.000	2.6360	3.5950	4.9680

(07 Marks)

Module-5

9 a. Using Runge-Kutta method, solve $\frac{d^2y}{dx^2} = x\left(\frac{dy}{dx}\right)^2 - y^2$, for x = 0.2, correct to four decimal places, using initial conditions $y(0) = 1, y'(0) = 0$ **(07 Marks)**

b. Derive Euler's equation in the standard form viz, $\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right) = 0$ **(07 Marks)**

c. Find the extremal of the functional $\int_{x_1}^{x_2} (y^2 + y'^2 + 2ye^x)\,dx$ **(06 Marks)**

OR

10 a. Given the differential equation $2\frac{d^2y}{dx^2} = 4x + \frac{dy}{dx}$ and the following table of initial values:

x	1	1.1	1.2	1.3
y	2	2.2156	2.4649	2.7514
y′	2	2.3178	2.6725	2.0657

Compute y(1.4) by applying Milne's Predictor-corrector formula. **(07 Marks)**

b. Prove that geodesics of a plane surface are straight lines. **(07 Marks)**

c. On what curves can the functional $\int_0^1 (y'^2 + 12xy)dx$ with y(0) = 0, y(1) = 1 can be extremized? **(06 Marks)**

* * * * *

CBCS SCHEME

USN [| | | | | | | | |]

18MATDIP31

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Additional Mathematics – I

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Find the modulus and amplitude of the complex number : $\dfrac{(2-3i)(2+i)^2}{1+i}$. **(07 Marks)**

b. Prove that $\left(\dfrac{1+\cos\theta+i\sin\theta}{1+\cos\theta-i\sin\theta}\right)^n = \cos n\theta + i\sin n\theta$. **(06 Marks)**

c. Show that the vectors $\vec{a}-2\vec{b}+3\vec{c}$, $-2\vec{a}+3\vec{b}-4\vec{c}$, $-\vec{b}+2\vec{c}$ are coplanar. **(07 Marks)**

OR

2 a. Given $\vec{a} = 2\hat{i}+2\hat{j}-\hat{k}$, $\vec{b} = 6\hat{i}-3\hat{j}+2\hat{k}$. Find : i) $\vec{a}\cdot\vec{b}$ ii) $\vec{a}\times\vec{b}$ iii) $|\vec{a}\times\vec{b}|$. **(07 Marks)**

b. Determine the value of λ, so that $\vec{a} = 2\hat{i}+\lambda\hat{j}-\hat{k}$, and $\vec{b} = 4\hat{i}-2\hat{j}-2\hat{k}$, are perpendicular. **(06 Marks)**

c. Express $1-i\sqrt{3}$ in the polar form and hence find its modulus and amplitude. **(07 Marks)**

Module-2

3 a. Using Euler's theorem, prove that $xu_x + yu_y = -3\cot u$ where $u = \sin^{-1}\left(\dfrac{x^2y^2}{x+y}\right)$. **(07 Marks)**

b. Using Maclaurin's series, prove that $\sqrt{1+\sin 2x} = 1 + x - \dfrac{x^2}{2} - \dfrac{x^3}{3} + \dfrac{x^4}{24} + \ldots\ldots$. **(06 Marks)**

c. If $u = x + 3y^2$, $v = 4x^2yz$, $w = 2z^2 - xy$, evaluate $\dfrac{\partial(u,v,w)}{\partial(x,y,z)}$ at the point (1, –1, 0). **(07 Marks)**

OR

4 a. Obtain Maclaurin's series expansion for the function e^x upto x^4. **(07 Marks)**

b. If $u = \sin^{-1}\left[\dfrac{x^3+y^3}{x+y}\right]$ prove that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = 2\tan u$. **(06 Marks)**

c. If $u = f\left(\dfrac{x}{y}, \dfrac{y}{z}, \dfrac{z}{x}\right)$, prove that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} + z\dfrac{\partial u}{\partial z} = 0$. **(07 Marks)**

Module-3

5 a. A particle moves along the curve $x = (1 - t^3)$, $y = (1 + t^2)$, $z = (2t - 5)$ determine its velocity and acceleration at t = 1 sec. **(07 Marks)**

b. If $\vec{F} = 2x^2\hat{i} - 3yz\hat{j} + xz^2\hat{k}$, and $\phi = 2z - x^3y$, find $\vec{F}\cdot(\nabla\phi)$ and $\vec{F}\times(\nabla\phi)$ at (1, –1, 1). **(06 Marks)**

c. Find the constants a, b, c so that $\vec{f} = (x+2y+az)\hat{i} + (bx-3y-z)\hat{j} + (4x+cy+2z)\hat{k}$ is irrotational. **(07 Marks)**

OR

6 a. Find the directional derivate of $\phi = x^2yz + 4xz^2$ at (1,–2,–1) along $\vec{a} = 2\hat{i} - \hat{j} - 2\hat{k}$ **(07 Marks)**

b. Find curl $\vec{f}$ given that $\vec{f} = xyz^2\hat{i} + xy^2z\hat{j} + x^2yz\hat{k}$. **(06 Marks)**

c. If $\vec{f} = x^2 i + y^2 j + z^2 k$ and $\vec{g} = yzi + zxj + xyk$. Show that $\vec{f} \times \vec{g}$ is a solenoidal vector. **(07 Marks)**

Module-4

7 a. Obtain the reduction formula, $I_n = \int \cos^n x dx$, where n is a positive integer. **(07 Marks)**

b. Evaluate $\int_0^1 \int_x^{\sqrt{x}} xy dy dx$. **(06 Marks)**

c. Evaluate $\int_0^1 \int_0^1 \int_0^1 (x + y + z) dx dy dz$. **(07 Marks)**

OR

8 a. Evaluate : $\int_0^{\pi/6} \sin^6(3x) dx$. **(07 Marks)**

b. Evaluate : $\int_0^{\pi} x \sin^4 x \cos^6 x \, dx$. **(06 Marks)**

c. Evaluate $\int_0^1 \int_0^1 \int_0^y xyz \, dx dy dz$. **(07 Marks)**

Module-5

9 a. Solve : $(2x + y + 1) dx + (x + 2y + 1) dy = 0$. **(07 Marks)**

b. Solve : $(4xy + 3y^2 - x) dx + (x^2 + 2xy) dy = 0$. **(06 Marks)**

c. Solve : $y(2xy + e^x) dx - e^x dy = 0$. **(07 Marks)**

OR

10 a. Solve : $(5x^4 + 3x^2y^2 - 2xy^3)dx + (2x^3y - 3x^2y^2 - 5y^4)dy = 0$. **(07 Marks)**

b. Solve : $y(2xy + 1)dx - x dy = 0$. **(06 Marks)**

c. Solve : $\frac{dy}{dx} + y \cot x = \cos x$. **(07 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS32

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Data Structures and Applications

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define Data Structures. Explain the various operations on Data structures. **(06 Marks)**

b. Define Structures. Explain the types of structures with examples for each. **(07 Marks)**

c. List and explain the functions supported in C for Dynamic Memory Allocation. **(07 Marks)**

OR

2 a. Define Pattern Matching. Write the Knuth Morris Pratt Pattern matching algorithm and apply the same to search the pattern 'abcdabcy' in the text 'abcxabcdabxabcdabcy'. **(10 Marks)**

b. Write the Fast Transpose algorithm to transpose the given Sparse Matrix. Express the given Sparse Matrix as triplets and find its transpose.

$$A = \begin{bmatrix} 10 & 0 & 0 & 25 & 0 \\ 0 & 23 & 0 & 0 & 45 \\ 0 & 0 & 0 & 0 & 32 \\ 42 & 0 & 0 & 31 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 30 & 0 & 0 \end{bmatrix}.$$ **(10 Marks)**

Module-2

3 a. Define Stacks. List and explain the various operations on stacks using arrays with stack overflow and stack underflow conditions. **(10 Marks)**

b. Write an algorithm to convert an infix expression to postfix expression and also trace the same for the expression (a + b) * d + e/f + c. **(10 Marks)**

OR

4 a. Define Recursion. Explain the types of recursion. Write the recursive function for
i) Factorial of a number ii) Tower of Hanoi. **(10 Marks)**

b. Give the Ackermann function and apply the same to evaluate A(1, 2). **(04 Marks)**

c. Explain the various operations on Circular queues using arrays. **(06 Marks)**

Module-3

5 a. Give the node structure of create a single linked list of integers and write the functions to perform the following operations :
i) Create a list containing three nodes with data 10, 20, 30 using front insertion.
ii) Insert a node with data 40 at the end of list.
iii) Delete a node whose data is 30.
iv) Display the list contents. **(10 Marks)**

b. Write the functions for : i) Finding the length of the list ii) Concatenate two lists
iii) Reverse a list. **(10 Marks)**

OR

6 a. Write the node representation for the linked representation of a polynomial. Explain the algorithm to add two polynomials represented as linked list. **(08 Marks)**

b. For the given Sparse matrix, write the diagrammatic linked list representation.

$$A \begin{bmatrix} 3 & 0 & 0 & 0 \\ 5 & 0 & 0 & 6 \\ 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 8 \\ 0 & 0 & 9 & 0 \end{bmatrix}.$$ **(04 Marks)**

c. List out the differences between single linked list and double linked list. Write the functions to perform following operations on double linked list :
i) Insert a node at rear end of the list ii) Delete a note at rear end of the list
iii) Search a node with a given key value. **(08 Marks)**

Module-4

7 a. Define a Tree. With suitable example explain i) Binary tree ii) Complete binary tree iii) Strict binary tree iv) Skewed binary tree. **(10 Marks)**

b. Write the routines to traverse the given tree using
i) Pre – Order traversal ii) Post – Order traversal. **(06 Marks)**

c. Write the recursive search algorithm for a Binary Search tree. **(04 Marks)**

OR

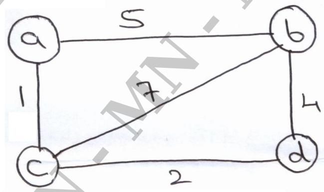
8 a. Draw a Binary tree for the following expression : ((6 + (3-2) *5) ^ 2+ 3.
Traverse the above generated tree using Pre – order and Post – order and also write their respective functions. **(10 Marks)**

b. Write the routines for :
i) Copying of binary trees ii) Testing equality of binary trees. **(10 Marks)**

Module-5

9 a. Define Graphs. Give the Adjacency matrix and Adjacency list representation for the following graph in Fig. Q9(a). **(08 Marks)**

Fig. Q9(a)



b. Write the algorithm for following Graph Traversal methods :
i) Breadth first search ii) Depth first search. **(08 Marks)**

c. Write an algorithm for insertion sort. **(04 Marks)**

OR

10 a. Define Hashing. Explain any three Hash functions. **(08 Marks)**

b. Explain Static and Dynamic hashing in detail. **(08 Marks)**

c. Define the term File Organization. Explain indexed sequential File Organization. **(04 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS33

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Analog and Digital Electronics

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is biasing? Mention different BJT biasing techniques. Explain voltage divider bias. **(08 Marks)**

b. Explain relaxation oscillator. **(06 Marks)**

c. Write a note on opto coupler. **(06 Marks)**

OR

2 a. Explain active filters. List advantages of active filters over passive filters. **(06 Marks)**

b. Explain with diagram, R-2R ladder type D to A converter. **(08 Marks)**

c. Define op-amp. Explain the performance parameters of op-amp. **(06 Marks)**

Module-2

3 a. Explain Don't Care condition with an example. **(04 Marks)**

b. Reduce the following functions using K-map technique:
$F(P, Q, R, S) = \Sigma m(0, 1, 4, 8, 9, 10) + d(2, 11)$ **(08 Marks)**

c. Using Quine McClusky method, simplify the expression:
$F(P, Q, R, S) = \Sigma m(0, 3, 5, 6, 7, 11, 14)$
Write the gate diagram for the same. **(08 Marks)**

OR

4 a. Explain entered variable map method. **(05 Marks)**

b. Apply Quine McClusky method to find the essential prime implicants for the Boolean expression $f(a, b, c, d) = \Sigma m(1, 3, 6, 7, 9, 10, 12, 13, 14, 15)$ **(07 Marks)**

c. For the below expression, draw the logic diagram using AOI logic for minimal sum. Obtain minimal sum using K-map.
$F(a, b, c, d) = \Sigma m(1, 2, 3, 5, 6, 7, 11, 12, 13, ,14, 15)$ **(08 Marks)**

Module-3

5 a. What is hazard? List the types of hazards. Explain static 0 and static 1 hazard. **(06 Marks)**

b. Differentiate between combinational and sequential circuit. **(06 Marks)**

c. Implement the following using PLA:
$A(x, y, z) = \Sigma m (1, 2, 4, 6)$
$B(x, y, z) = \Sigma m (0, 1, 6, 7)$
$C(x, y, z) = \Sigma m (2, 6)$ **(08 Marks)**

OR

6 a. Implement the following function using 8:1 multiplexer:
$f(a, b, c, d) = \Sigma m (0, 1, 5, 6, 8, 10, 12, 15)$ **(07 Marks)**

b. What is programmable logic array? How does PLA differ from PAL? **(06 Marks)**

c. Realize the following using 3:8 decoder:
(i) $f(a, b, c) = \Sigma m (1, 2, 3, 4)$ (ii) $f(a, b, c) = \Sigma m (3, 5, 7)$ **(07 Marks)**

Module-4

7 a. What are the three different models for writing a module body in VHDL? Give example for any one model. **(06 Marks)**

b. Derive characteristic equation for JK, T, D and SR flip flop. **(08 Marks)**

c. Give VHDL code for 4:1 multiplexer using conditional assign statement. **(06 Marks)**

OR

8 a. Using structural model, write VHDL code for Half Adder. **(06 Marks)**

b. Derive the excitation table for JK and SR flip flop. How SR flip flop is converted to T flip flop? **(08 Marks)**

c. With logic diagram, explain JK flip flop. **(06 Marks)**

Module-5

9 a. Define counter. Design synchronous counter for the sequence 0, 4, 1, 2, 6, 0, 4 using JK flip-flop. **(08 Marks)**

b. What is shift register? With a neat diagram, explain 4 bit parallel in serial out shift register. **(08 Marks)**

c. Write a note on sequential parity checker. **(04 Marks)**

OR

10 a. With a neat diagram, explain ring counter. **(06 Marks)**

b. Design and implement MOD 5 synchronous counter using JK flip-flop. Explain with timing diagram. **(08 Marks)**

c. Write a note on parallel adder with accumulator. **(06 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS34

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Computer Organization

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. With a neat diagram, explain the different processor registers. **(08 Marks)**
b. Explain the overall SPEC rating for the computer in a program suite. **(04 Marks)**
c. Explain one address , two address and three address instruction with examples. Also, use any of these instructions to carry out C ← [A] + [B]. **(08 Marks)**

OR

2 a. What is an addressing mode? Explain the different addressing modes. With an example for each. **(10 Marks)**
b. Explain shift and rotate operations, with example. **(10 Marks)**

Module-2

3 a. What is direct memory access, when it is used? Explain it with block diagram. **(08 Marks)**
b. Define the terms 'cycle stealing' and 'burst mode with respect to DMA. **(04 Marks)**
c. Define bus arbitration. Explain in detail centralizaed bus arbitration. **(08 Marks)**

OR

4 a. With a block diagram, explain how the keyboard is connected to processor. **(08 Marks)**
b. Explain the use of a PCI bus in a computer system with a neat sketch. **(08 Marks)**
c. What are the design objectives of USB? **(04 Marks)**

Module-3

5 a. Draw a neat block diagram of memory hierarchy in a computer system. Discuss the variation of size, speed and cost per bit in the hierarchy. **(08 Marks)**
b. Explain the working of a single transistor dynamic memory cell and internal organization of a 16 megabit DRAM chip configured as $2M \times 8$ cells. **(12 Marks)**

OR

6 a. Explain the different mapping functions used in cache memory. **(12 Marks)**
b. What is replacement policy? Explain LRU replacement algorithm. **(04 Marks)**
c. Explain memory interleaving with necessary diagram. **(04 Marks)**

Module-4

7 a. Perform the following operations on the 5-bit signed numbers using 2's complement representation system:
i) (-10) + (-13)
ii) (-10) – (+4)
iii) (-3) + (-8)
iv) (-10) – (+7) **(10 Marks)**
b. In a carry look ahead addition, explain the generate G_i and propagate P_i functions for stage i. Using this design explain 4 bit carry look ahead adder. **(10 Marks)**

OR

8 a. Perform the signed multiplication of numbers +13 and -6 using booth multiplication and bit pair recording method. List the tables used. **(10 Marks)**

b. Perform division of number 9 by 3(9 ÷ 3) using the restoring division algorithm. Write the steps of algorithm used. **(10 Marks)**

Module-5

9 a. Draw and explain multiple bus organization. Explain its advantages. **(10 Marks)**

b. Write and explain the control sequence for execution of an unconditional branch instruction. **(10 Marks)**

OR

10 a. Draw the block diagram of the control unit organization and describe. **(10 Marks)**

b. Explain basic idea of instruction pipelining. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS35

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Software Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define software engineering. What are the different types of software products? **(06 Marks)**
b. Explain briefly the Software Engineering Ethics. **(06 Marks)**
c. List and explain the different types of Application Softwares. **(08 Marks)**

OR

2 a. What are the fundamental software process activities? With neat diagram, explain requirement engineering process. **(08 Marks)**
b. With neat diagram, explain Bohem's Spiral model. **(08 Marks)**
c. Explain Re-use oriented Software Engineering. **(04 Marks)**

Module-2

3 a. What is object orientation? Explain the characteristics of object oriented approach. **(10 Marks)**
b. Define model. Explain the three different models of object orientation. **(10 Marks)**

OR

4 a. Explain the following with suitable diagrams:
(i) Links and Associations
(ii) Generalization **(10 Marks)**
b. With neat diagram, explain the class model of a Windowing System. **(10 Marks)**

Module-3

5 a. With neat diagram, explain the context model for MHC-PMS system. **(10 Marks)**
b. Explain the state diagram of microwave oven. **(10 Marks)**

OR

6 a. Explain the Rational Unified Process. **(06 Marks)**
b. Explain Design Pattern with UML model of the observer model. **(08 Marks)**
c. What are the different implementation issues of Software Engineering? **(06 Marks)**

Module-4

7 a. What are the two distinct goals of Software Testing? **(05 Marks)**
b. Explain the three different types of testing carried out during software development. **(05 Marks)**
c. What are the different types of user testing? With neat diagram, explain the six stages of acceptance testing process. **(10 Marks)**

OR

8 a. Write the Lemman's law of program dynamic evolution. **(06 Marks)**
b. With neat diagram, explain the software reengineering process activities. **(08 Marks)**
c. What are the four strategic options for Legacy Systems? **(06 Marks)**

Module-5

9	a.	What are the factors affecting the pricing of software product?	**(04 Marks)**
	b.	With neat diagram, explain the project planning process.	**(06 Marks)**
	c.	With neat diagram, explain the COCOMO – II estimation model.	**(10 Marks)**

OR

10	a.	Explain the product standards and process standards in software quality management.	**(06 Marks)**
	b.	Explain three phases of software review process.	**(08 Marks)**
	c.	Explain the various inspection checks in the program inspection.	**(06 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS36

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Discrete Mathematical Structures

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Prove that for any propositions p, q, r the compound proposition $[(p \to q) \wedge (q \to r)] \to (p \to r)$ is a Tautology. **(08 Marks)**

b. Prove the logical equivalence without using truth table: $p \to (q \to r) \Leftrightarrow (p \wedge q) \to r$ **(05 Marks)**

c. Find whether the following argument is valid. No engineering student of first or second semester studies logic.
Anil is an Engineering student who studies logic
$\therefore$ Anil is not in second semester **(07 Marks)**

OR

2 a. Give a direct proof and an indirect proof for the given statement. "If 'n' is an odd integer, then n + 9 is an even integer". **(06 Marks)**

b. Prove the given logical equivalence problem using laws of logic.
$(p \to q) \wedge [\neg q \wedge (r \vee \neg q) \Leftrightarrow \neg (q \vee p)$. **(07 Marks)**

c. Verify the given argument is valid or not?
$p \to (q \to r)$
$p \vee \neg s$
q
$\therefore s \to r$ **(07 Marks)**

Module-2

3 a. Prove that for each $n \in z^+$
$1^2 + 2^2 + 3^2 + \ldots\ldots + n^2 = 1/6\, n(n + 1)(2n + 1)$ **(07 Marks)**

b. Find the number of permutation of the letter of the word "MASSASAUGA". In how many of there all four 'A's are together? How many of them begin with 'S'? **(06 Marks)**

c. Find how many distinct four digit integers one can make from the digit 1, 3, 3, 7, 7, 8. **(07 Marks)**

OR

4 a. Determine the co-efficient of xyz^2 in the expansion of $(2x - y - z)^4$. **(06 Marks)**

b. In how many ways can 10 identical pencils be distributed among 5 children in following cases:
i) There are no restrictions.
ii) Each child gets atleast one pencil.
iii) The youngest child gets at least two pencils. **(07 Marks)**

c. Find the number of arrangements of all the letters in "TALLAHASSEE"? How many of these arrangement have no adjacent 'A's? **(07 Marks)**

Module-3

5 a. Let $f : R \to R$ be defined by

$$f(x) = \begin{cases} 3x - 5 & \text{for } x > 0 \\ -3x + 1 & \text{for } x \le 0 \end{cases}$$

find $f^{-1}(0)$, $f^{-1}(1)$, $f^{-1}(3)$, $f^{-1}(-3)$, $f^{-1}(-6)$, $f^{-1}([-5, 5])$. **(07 Marks)**

b. On the set Z^{-1} a relation 'R' is defined by aRb if and only if "a divides b (exactly)" verify that 'R' is equivalence relation. **(06 Marks)**

c. Draw the Hasse diagram representing the positive divisor of 36. **(07 Marks)**

OR

6 a. Let A = {1, 2, 3, 4, 5} define relation 'R' on A×A by (X_1Y_1) R (X_2Y_2) if and only if $X_1 + Y_1 = X_2 + Y_2$.

i) Verify 'R' is a equivalence relation on A×A

ii) Determine the partition of A×A induced by R. **(07 Marks)**

b. Let A = {1, 2, 3, 4, 6} and 'R' be a relation on 'A' defined by aRb if and only if "a is multiple of b" represent the relation 'R' as a matrix, draw its diagraph and relation R. **(06 Marks)**

c. Let f, g, h be a function from R to R defined by f(x) = x + 2, g(x) = x – 2, h(x) = 3x for $\forall x \in R$ find gof, fog, fof, gog, foh, fohog. **(07 Marks)**

Module-4

7 a. How many integers between 1 and 300 (inclusive) are

i) Divisible by atleast one of 5, 6, 8

ii) Divisible by none of 5, 6, 8. **(07 Marks)**

b. Find the rook polynomial for the 3 × 3 board by using the expansion formula. **(07 Marks)**

c. Solve the recurrence relation

$a_n - 3a_{n-1} = 5 \times 3^n$ for $n \ge 1$ given that $a_0 = 2$. **(06 Marks)**

OR

8 a. The number of virus affected files in a system is 1000 (to start with) and this increases 250% every two hours. Use a recurrence relation to determine the number of virus affected files in the system after one day. **(06 Marks)**

b. Solve the recurrence relation

$a_n = 2(a_{n-1} - a_{n-2})$ for $n \ge 2$ given that $a_0 = 1$ and $a_1 = 2$. **(07 Marks)**

c. Compute derangement of d_4, d_5, d_6, d_7. **(07 Marks)**

Module-5

9 a. Define Isomorphism. Verify the given two graphs are Isomorphic (Fig.Q.9(a)). **(07 Marks)**

Fig.Q.9(a)

b. "A tree with 'n' vertices has n – 1 edges". Prove this. Define a tree. **(06 Marks)**

c. Construct an optimal prefix code for the given set of frequencies, 20, 28, 4, 17, 12, 7. **(07 Marks)**

OR

10 a. Explain complete graph, Bipartite graph, subgraph, regular graph, spanning subgraph, minimally connected graph, with example for each. **(07 Marks)**

b. Apply merge sort to the given list -1, 7, 4, 11, 5, -8, 15, -3, -2, 6, 10, 3. **(06 Marks)**

c. Obtain an optimal prefix code for the message "LETTER RECEIVED" indicate the code. **(07 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | **18CS51**

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
Management and Entrepreneurship for IT Industry

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What is Management according to George. R. Terry? Mention and explain the Functional areas of Management. **(10 Marks)**
b. Explain the features of System's approach in Management. **(06 Marks)**
c. Explain the different levels of Management. **(04 Marks)**

OR

2 a. What is Planning? Explain the importance of Planning. **(05 Marks)**
b. Mention and explain the features , benefits and drawbacks of matrix organizational structure. **(08 Marks)**
c. Explain the steps involved in the Selection process. **(07 Marks)**

Module-2

3 a. Define Leadership. Give the differences between Autocratic , Participative and Free rein Leadership styles. **(07 Marks)**
b. What is Motivation? Give the importance of Motivation. Explain Herzberg's two factor theory. **(08 Marks)**
c. What is Communication? Give the differences between Formal and informal communication. **(05 Marks)**

OR

4 a. What is Co-ordination? Explain the requisites of effective co-ordination. **(06 Marks)**
b. Define Controlling. Explain the steps involved in the Controlling Process. **(10 Marks)**
c. Explain the benefits of Controlling. **(04 Marks)**

Module-3

5 a. Define Entrepreneurship. Explain the role of Entrepreneurs in Economic development. Explain the barriers to Entrepreneurship. **(10 Marks)**
b. Explain the different ways of Identifying business opportunities. **(10 Marks)**

OR

6 a. Mention the importance of Entrepreneurship. **(05 Marks)**
b. Explain the features of following types of Entrepreneurs : i) Drone Entrepreneur ii) Business Entrepreneur iii) Non – Technical Entrepreneur iv) Intrapreneur. **(08 Marks)**
c. Mention and explain the stages in Entrepreneurial process. **(07 Marks)**

Module-4

7 a. What is Project? Explain the different ways of Project Identification and Project selection. **(10 Marks)**
b. What is Project Report? What are the significances of Project report? Explain the planning commission guidelines for preparing a project report. **(10 Marks)**

OR

8	a.	What is Enterprise Resource Planning? Give the advantages of ERP.	**(06 Marks)**
	b.	Give the features of the following ERP Software's : i) Human Resource Management System ii) Financial Management System.	**(08 Marks)**
	c.	Explain briefly steps involved in Report writing.	**(06 Marks)**

Module-5

9	a.	Define MSME. List the characteristics and advantages of MSME.	**(08 Marks)**
	b.	Explain Indian Industrial Policy 2007 on MSME.	**(07 Marks)**
	c.	Write a case study of Captain G.R. Gopenath.	**(05 Marks)**

OR

10	a.	Give the facilities provided to Entrepreneurs by the following Institutions : i) KIADB ii) KSFC iii) DIC.	**(12 Marks)**
	b.	What are Intellectual Property Right? Briefly explain the main forms of Intellectual Property Rights.	**(08 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS52

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
Computer Networks and Security

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Differentiate between :
(i) HTTP and FTP (ii) SMTP and HTTP (iii) UDP and TCP **(10 Marks)**
b. Explain Cookies and Web Caching with diagram. **(10 Marks)**

OR

2 a. Describe in detail the services offered by DNS and explain DNS message format. **(08 Marks)**
b. Compare HTTP and SMTP. **(04 Marks)**
c. Define Socket. Demonstrate the working of TCP-Socket. **(08 Marks)**

Module-2

3 a. With the help of FSM, describe the two states of the sender side and one state of the receiver side of rdt2.0 **(10 Marks)**
b. With a neat diagram, demonstrate the working of Go-BACK-N protocol. **(10 Marks)**

OR

4 a. Describe TCP connection management with help of diagram. **(10 Marks)**
b. Interpret the FSM to TCP congestion control. **(10 Marks)**

Module-3

5 a. Explain the Implementation of virtual circuit services in Computer Network. **(07 Marks)**
b. Explain the three Switching Techniques. **(06 Marks)**
c. Explain Distance vector algorithm using three nodes network. **(07 Marks)**

OR

6 a. Explain Dijkstra's algorithm with example. **(10 Marks)**
b. Explain various broadcast routing algorithms. **(10 Marks)**

Module-4

7 a. Explain Feistel structure of DES Algorithm. **(10 Marks)**
b. Explain RSA Algorithm with an example. **(10 Marks)**

OR

8 a. In the Diffie - Hellman key exchange protocol prove that the two keys k_1 and k_2 are equal. **(10 Marks)**
b. Discuss the following :
(i) Secure Hash Algorithm (ii) Firewalls. **(10 Marks)**

Module-5

9 a. Explain briefly how DNS redirects a users request to a CDN server. **(10 Marks)**
b. With neat diagram explain the naïve-architecture for audio/video streaming. **(10 Marks)**

OR

10 a. Write a short notes on :
(i) Netflix video streaming platform (ii) VOIP with Skype. **(10 Marks)**
b. With neat diagram explain the RTP header fields. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS53

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
Database Management System

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. List and discuss advantages of Database Management System over File Processing System. **(06 Marks)**

b. Explain three Schema Architecture and reason for need of mapping among schema level. **(08 Marks)**

c. Explain different types of attributes that occur in an E – R diagram model with example. **(06 Marks)**

OR

2 a. Explain characteristics of the Database approach. **(06 Marks)**

b. Discuss the different types of User friendly interfaces. **(06 Marks)**

c. Draw an ER diagram for an AIRLINES database schema with atleast five entities. Also specify primary key and structural constraints. **(08 Marks)**

Module-2

3 a. What are the basic operations that can change the states of relations in the database? Explain how the basic operations deal with constraints violations. **(06 Marks)**

b. Explain the terms Super key , Candidate key and Primary key. **(04 Marks)**

c. Given the following schema :
emp (fname, Lname , SSN , Bdate, address, gender , salary , superSSN , Dno)
dept (Dname , Dnumber , MgrSSN , mgrstartdate)
dept_loc (Dnumber , Dloc)
project (Pname, Pnumber, Ploc, Dnum)
works_on (ESSN, Pno , hours)
Dependent (ESSN , dependent_ name, gender , bdate , relationship)
Give the relation algebra expression for the following :
i) Retrieve the name of the manager of each department.
ii) For each project retrieve the project number , project name and number of employee who worked on that project.
iii) Retrieve the names of employees who work on all the project controlled by department 5.
iv) Retrieve the name of employees who have no dependents.
v) Retrieve number of Male and Female employee working in the Company. **(10 Marks)**

OR

4 a. Describe the steps of an algorithm for ER to Rational mapping with example. **(06 Marks)**

b. Write command that is used for table creation. Explain how constraints are specified in SQL during table creation, with suitable example. **(04 Marks)**

c. Given the following schema
Emp (Fname, Lname , SSN , bdate , address, gender, salary , superSSN , dno)
dept (dname , dnumber, mgrSSN , mgrstartdate)
dept_loc (dnumber, dloc)
project (Pname, Pnumber, Ploc , dnum)
works_on (ESSN, Pno, hours)
dependent (ESSN , dependent_name, gender, bdate, relationship)
Give the relation algebra expression for the following :
i) Retrieve the name and address of all employees who work for 'sports' department.
ii) Retrieve each department number, number of employers and their average salary.
iii) List the project number, controlling department number and department manager's last name , address and birthdate.
iv) Retrieve the name of employees with 2 or more dependents.
v) List female employees from dno = 20 earning more than 50000. **(10 Marks)**

Module-3

5 a. Define Database stored procedure. Explain creating and calling stored procedure with example. **(06 Marks)**

b. What is SQLJ and how is it different from JDBC? **(06 Marks)**

c. Consider the following schema :
Sailors (Sid , Sname , rating , age)
Boats (bid, bname, color)
Reservers (Sid , bid , day)
Write queries in SQL
i) Find the ages of sailors whose name begins and ends with A and has atleast three characters.
ii) Find the age of the youngest sailor who is eligible to vote (i.e. is atleast 18 years old) for each rating level with atleast two such sailors.
iii) Find the names of sailors who have not reserved a red boat. (use nested query).
iv) Compute increments for the rating of persons who have sailed two different boats on the same day. **(08 Marks)**

OR

6 a. What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI script? **(06 Marks)**

b. What is Dynamic SQL and how is it different from embedded SQL? Explain. **(06 Marks)**

c. Consider the following schema :
Sailors (Sid, Sname, rating , age)
Boats (bid, bname, color)
Reserves (Sid, bid, day).
Write queries in SQL.
i) Find the names of sailors who have reserved at least one boat.
ii) Find sailors whose rating is better than some sailors called 'Jennifer'. (Use nested query)
iii) Find the average age of sailor for each rating level that at least two sailors.
iv) Find the name and age of the oldest sailor. **(08 Marks)**

Module-4

7 a. Which normal form is based on 6 transitive functional dependencies and full functional dependency? Explain the same with example. **(08 Marks)**

b. A relation R satisfies the following : FDS : $A \rightarrow C$, $AC \rightarrow D$, $E \rightarrow AD$, $E \rightarrow H$. Find the cover for this set of FDS. **(06 Marks)**

c. Consider the universal relation : R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies. F = {$AB \rightarrow C$, $A \rightarrow DE$, $B \rightarrow F$, $F \rightarrow GH$, $D \rightarrow IJ$}.
Determine whether each decomposition has the loss less join property with respect to F.
$D_1 = \{R_1, R_2, R_3\}$; R_1 = {A, B, C, D, E} ; R_2 = {B, F, G, H} ; R_3 = {D, I, J}. **(06 Marks)**

OR

8 a. Write an algorithm to check whether decomposed relations are in 3NF with dependency preservation and non – additive join property. Consider universal relation R = (U, C, L, A) and the set of functional dependencies. F = {$P \rightarrow LCA$, $LC \rightarrow AP$, $A \rightarrow C$}. Decompose the relation R into 3NF with dependency preservation and non – additive join property. **(06 Marks)**

b. Define Normal Form. Explain 1NF, 2NF and 3NF with suitable examples for each. **(08 Marks)**

c. Consider two set of functional dependencies F = {$A \rightarrow C$, $AC \rightarrow D$, $E \rightarrow AD$, $E \rightarrow H$} and G = {$A \rightarrow CD$, $E \rightarrow AH$}. Are they equivalent? **(06 Marks)**

Module-5

9 a. What are the anomalies occur due to interleave execution? Explain them with example. **(08 Marks)**

b. Explain different types of locks used in concurrency control. **(06 Marks)**

c. Explain how shadow paging helps to recover from transaction failure. **(06 Marks)**

OR

10 a. Explain ACID property of transaction and system log. **(06 Marks)**

b. When deadlock and starvation problem occurs? Explain how these problems can be resolved. **(06 Marks)**

c. Explain ARIES recovery algorithm with example. **(08 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS54

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
Automata Theory and Computability

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Define the following terms with examples :
i) Alphabet ii) String iii) Language iv) Concatenation at Languages
v) Power of an Alphabet. **(10 Marks)**

b. Define DFSM. Design DFSM
i) To accept strings having Even number of a's and even number b's
ii) To accept binary numbers divisible by 5. **(10 Marks)**

OR

2 a. Convert the following NDFSM of DFSM. [Refer Fig Q2(a)].

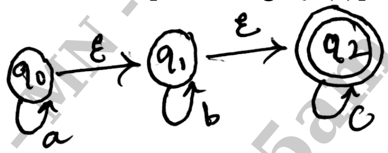


Fig Q2(a) **(08 Marks)**

b. Minimize the following DFSM by indentifying Distinguishable and Non-distinguishable states.

δ	0	1
→A	B	F
B	G	C
*C	A	C
D	C	G
E	H	F
F	C	G
G	G	F
H	G	C

(12 Marks)

Module-2

3 a. Define Regular Expression. Write RE for the following Languages. **(10 Marks)**
i) Strings of 0's and 1's ending with three consecutive zeroes.
ii) Strings of a's and b's having substring aa.

b. Write DFSM to accept intersection of Languages $L_1 = (a + b)^*a$ and $L_2 = (a + b)^*b$ **(10 Marks)**

OR

4 a. Using Kleen's theorem, prove that for any Regular Expression R, their exits a finite automata $M = (Q, \Sigma, \delta, q_0, F)$ which accepts L(R). **(10 Marks)**

b. State and prove pumping Lemma for Regular Languages. Show that the Language $L = \{ww^r : w \in (0, 1)^*\}$ is not regular. **(10 Marks)**

Module-3

5 a. Define Context Free Grammar. Design CFG for the following Languages.

i) $L_1 = \{w : |w| \text{ Mod } 3 = 0\}$ over $\Sigma = \{a\}$

ii) $L_2 = \{a^n b^m c^k : m = n + k\}$ over $\Sigma = \{a, b, c\}$ **(10 Marks)**

b. Define Ambiguity. Consider the grammar

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

Find Leftmost and Rightmost derivations and parse tree for the string id + id * id, show that the grammar is ambiguous. **(10 Marks)**

OR

6 a. What is Chomsky Normal Form of CFG? Convert the following grammar to CNF.

$S \rightarrow ABC \mid BaB$

$A \rightarrow aA \mid BaC \mid aaa$

$B \rightarrow bBb \mid a \mid D$

$C \rightarrow CA \mid AC$

$D \rightarrow \varepsilon$

Eliminate ε - productions, Unit productions and useless symbols if any before conversion. **(10 Marks)**

b. What is NPDA? Design NPDA for Language $L = \{a^n b^n \mid n \geq 1\}$. Draw transition diagram. Write sequence of moves made by NPDA to accept the string aaabbb. **(10 Marks)**

Module-4

7 a. Design TM for WCW^R over $\Sigma = \{0, 1\}$. Write transition diagram, and ID for w = 101C101 **(14 Marks)**

b. Explain : i) Multitape ii) Non-deterministic TM **(06 Marks)**

OR

8 a. Define Turning Machine. Explain the working of Turning Machine. **(06 Marks)**

b. Design Turning machine to accept the Language $L = \{0^n 1^n 2^n \mid n >= 0\}$. Draw the transition diagram. Write sequence of moves made by TM for string 001122. **(14 Marks)**

Module-5

9 a. Explain Halting problem in Turning machine. **(07 Marks)**

b. Write applications of Turning Machine. **(06 Marks)**

c. Explain Recursively Enumerable Languages. **(07 Marks)**

OR

10 a. Explain Quantum Computers. **(07 Marks)**

b. Explain P and NP classes. **(07 Marks)**

c. Explain Church Turning Thesis. **(06 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS55

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
Application Development using Python

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Write a Python program to calculate the area and circumference of a circle Input the value of radius and print the results. **(06 Marks)**

b. Explain with example code snippets, different syntax of range( ) function in Python. **(06 Marks)**

c. Discuss local and global scope of variables in Python. Illustrate different scenarios, with an example. **(08 Marks)**

OR

2 a. Demonstrate the use of break and continue keywords using a code snippet. **(06 Marks)**

b. List and define the use of comparison operators in Python. Write the output for the following expression in Python:
i) 2 * * 3 ii) 20% 6 iii) 20//6 **(06 Marks)**

c. What is user defined function? Write a function to check if a given number is a prime or not. **(08 Marks)**

Module-2

3 a. What is a List? Explain the methods that are used to delete items from the list. **(08 Marks)**

b. Write a program to take a sentence as input and display the longest word in the given sentence. **(06 Marks)**

c. How is the dictionary different from list? Assume a dictionary containing city and population as key and value respectively. Write a program to traverse the dictionary and display most populous city. **(06 Marks)**

OR

4 a. Explain the following string methods with example:
i) join( ) ii) islower( ) iii) strip( ) iv) center( ). **(08 Marks)**

b. Write a program to create a list of number and display the count of even and odd numbers in the list. **(06 Marks)**

c. If S = 'Hello World', explain and write the output of the following statements:
i) S[1:5] ii) S[:5] iii) S[3: - 1] iv) S[:] **(06 Marks)**

Module-3

5 a. What is a regular expression? Explain the process of finding patterns of text with regular expressions and associated methods in Python with an example. **(08 Marks)**

b. Explain the following patterns matching capabilities in python with suitable program snippets:
i) Grouping with parentheses
ii) Matching multiple groups
iii) Matching one or more. **(06 Marks)**

c. Explain the following file operations in Python with suitable examples:
i) Copying files and folders
ii) Moving files and folders
iii) Permanently deleting files and folders. **(06 Marks)**

OR

6 a. Explain with a suitable Python program how findall( ) is different from search( ) method. State the purpose of any four short hand character classes with examples. **(08 Marks)**

b. What is the difference between OS and OS.path modules? Discuss the following four methods of OS module:
i) chdir( ) ii) walk( ) iii) listdir( ) iv) getcwd( ) **(06 Marks)**

c. With code snippets, explain reading, extracting and creating ZIP files in Python. **(06 Marks)**

Module-4

7 a. What is class? How do we define class? How to instantiate the class and members are accessed? **(08 Marks)**

b. Write a Python program to add and multiply two complex number objects using operator overloading concepts. **(06 Marks)**

c. Discuss type-based dispatch in a Python. **(06 Marks)**

OR

8 a. Explain _ _init_ _ and _ _str_ _ methods, with an example. **(08 Marks)**

b. What is pure function? Illustrate the same with an example. **(06 Marks)**

c. Explain concept of polymorphism with suitable example. **(06 Marks)**

Module-5

9 a. What is Web Scraping? Explain the process of downloading the file from web and saving downloaded files. **(08 Marks)**

b. Explain the process of reading cells from EXCEL sheets. **(06 Marks)**

c. With a code snippet, discuss how to change the text style of .doc file using paragraph and run objects. **(06 Marks)**

OR

10 a. How do we extract, decrypt, copy and encrypt PDF files in Python. **(08 Marks)**

b. Discuss the process of creating a beautiful soup object and finding an element from HTML. **(06 Marks)**

c. With an example, illustrate the use of JASON module in Python. **(06 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS56

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
UNIX Programming

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain the architecture of UNIX Operating System. **(10 Marks)**

b. Explain the following commands :
i) printf ii) passwd iii) date iv) who. **(10 Marks)**

OR

2 a. Explain features of UNIX. **(10 Marks)**

b. Explain basic file types in UNIX. What is relative and absolute pathname? **(10 Marks)**

Module-2

3 a. Interpret the significance of ℓs -ℓ command redirection. **(10 Marks)**

b. Explain 3 standard redirection files with respect to UNIX OS. **(10 Marks)**

OR

4 a. Explain changing file permissions in absolute and relative manner. **(10 Marks)**

b. Define Shell Script. Write menu driven shell script which displays :
i) Currents users of system ii) List of files iii) Today's date
iv) Process status v) Contents of a file. **(10 Marks)**

Module-3

5 a. What is the advantage of locking files? Explain mandatory and advisory locks. Why advisory lock is considered safe? What are the drawbacks of advisory lock? Explain. **(12 Marks)**

b. Explain exec functions with program. **(08 Marks)**

OR

6 a. Discuss how a C program is started and terminated in various ways along with suitable diagram. **(10 Marks)**

b. Write a C/C++ program using setjmp and longjmp to show their effect on various variables. **(10 Marks)**

Module-4

7 a. What is Stream Pipe? Explain it with program. How Stream pipe is better than pipe? **(10 Marks)**

b. Explain the implementation of system with its prototype. **(10 Marks)**

OR

8 a. Define Message queue. Discuss how it is useful in IPC. **(10 Marks)**

b. What are Pipes? What are its limitations? Write a program to send data from parent to child over a pipe. **(10 Marks)**

Module-5

9 a. Discuss how error logging is done by daemon process with suitable diagram. **(10 Marks)**

b. Discuss the working of sigprocmask API. Explain all parameters of API with program. **(10 Marks)**

OR

10 a. What is Daemon process? Explain coding rules and error logging. **(10 Marks)**

b. Explain the prototypes of following APIs :
i) Signal ii) Kill iii) alarm iv) sigaction. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS71

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Artificial Intelligence and Machine Learning

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. List all task domains of Artificial Intelligence. **(06 Marks)**

b. Explain Minimax procedure of tic – tac – toe. **(07 Marks)**

c. List all production rules for the water jug problem. **(07 Marks)**

OR

2 a. Illustrate Slot – and – filler structure method in Question and Answering system. **(06 Marks)**

b. Explain Hill climbing issues which terminates algorithm without finding a goal state or getting to a state from which no better state can be generated. **(04 Marks)**

c. Apply AO* algorithm for the following graph and find final path. **(10 Marks)**

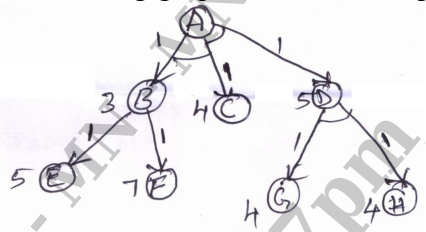


Fig. Q2(c)

Module-2

3 a. Convert the following statement into its Equivalent Predicate Logic from

i) Marcus was a man ii) Marcus was a Pompeian

iii) All Pompeians were Romans iv) Caesar was a Ruler

v) All Romans were either loyal to Caesar of hated him.

vi) Everyone is loyal to someone

vii) People only try to assassinate rulers they are not loyal to.

viii) Marcus tried to assassinate Caesar. **(08 Marks)**

b. List the issues on Knowledge representation. **(05 Marks)**

c. Construct maximally specific hypothesis for the following training examples. **(07 Marks)**

Example	Sky	Air Temp	Humidity	Wind	Water	Forecast	Enjoy Sport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

OR

4 a. Apply Candidate Elimination algorithm for the dataset given above (Question 3(c)). How do you classify following new instance from the set of hypothesis obtained by Candidate Elimination algorithm? **(12 Marks)**

Instance	Sky	Air Temp	Humidity	Wind	Water	Forecast	Enjoy Sport
A	Sunny	Warm	Normal	Strong	Cool	Change	?
B	Rainy	Cold	Normal	High	Warm	Same	?

b. What are Horn Clauses? Write a declarative and a procedural representation. List syntactic difference between Logic and PROLOG. **(08 Marks)**

Module-3

5 a. Construct decision tree using ID3 algorithm for the following data : **(12 Marks)**

Day	Outlook	Temp	Humidity	Wind	Decision
1	Sunny	Hot	High	Weak	Yes
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	No
5	Rain	Cool	Normal	Weak	Yes

b. Derive Gradient descent rule. **(08 Marks)**

OR

6 a. Give decision tree to represent the following Boolean functions :

i) $A \wedge \neg B$ ii) $A \vee [B \wedge C]$ iii) A XOR B iv) $[A \wedge B] \vee [C \wedge D]$. **(08 Marks)**

b. Explain Perceptron with appropriate diagram Represent AND Boolean function using Perceptron. **(04 Marks)**

c. Write Back propagation algorithm. **(08 Marks)**

Module-4

7 a. A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present and a correct negative result in only 97% of the cases in which the disease is not present. Further, 0.008 of the entire population have the Cancer. Does a patient have Cancer or not? **(10 Marks)**

b. Derive Brute force MAP learning and also mention assumption made in this process. **(10 Marks)**

OR

8 a. Explain Minimum Description Length Principle (MDL). **(06 Marks)**

b. Explain Naïve Bayes classifier and Bayesian belief Networks. **(08 Marks)**

c. Write EM algorithm. **(06 Marks)**

Module-5

9 a. Explain K – NN algorithm. **(06 Marks)**

b. Explain steps of Locally Weighted Linear regression. **(07 Marks)**

c. Describe Radial basis function with appropriate diagram. **(07 Marks)**

OR

10 a. Illustrate the basic concept of Q – learning using Simple Deterministic World. **(10 Marks)**

b. Explain Q – Learning algorithm. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS72

Seventh Semester B.E. Degree Examination, Feb./Mar.2022
Big Data Analytics

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Discuss the Evolution of Big Data. **(06 Marks)**
b. Explain the characteristics of Big Data. **(04 Marks)**
c. With a neat block diagram, explain Data Architecture Design. **(10 Marks)**

OR

2 a. Write notes on Analytics Scalability to Big Data and Massive Parallel Processing Platforms. **(12 Marks)**
b. Highlight Big Data Analytics applications with one case study. **(08 Marks)**

Module-2

3 a. What are the core components of Hadoop? Explain in brief its each of its components. **(10 Marks)**
b. Explain Hadoop Distributed File System. **(10 Marks)**

OR

4 a. Define MapReduce Frame work and its functions. **(06 Marks)**
b. Write down the steps on the request to MapReduce and the types of process in MapReduce. **(10 Marks)**
c. Write short notes on Flume Hadoop Tool. **(04 Marks)**

Module-3

5 a. Discuss the characteristics of NoSQL data store along with the features in NoSQL transactions. **(08 Marks)**
b. With neat diagrams, explain the following for shared-Nothing Architecture for Big Data Tasks,
(i) Single Server model
(ii) Sharding very large databases
(iii) Master Slave distribution model.
(iv) Peer-to-Peer distribution model. **(12 Marks)**

OR

6 a. Define key-value store with example. What are the advantages of key-value store? **(10 Marks)**
b. Write down the steps to provide client to read and write values using key-value store. What are the typical uses of key value store? **(10 Marks)**

Module-4

7 a. With a neat diagram, explain the process in MapReduce when client submitting a Job. **(10 Marks)**
b. Explain Hive Integration and work flow steps involved with a diagram. **(10 Marks)**

OR

8 a. Using HiveQL for the following:
(i) Create a table with partition.
(ii) Add, rename and drop a partition to a table. **(10 Marks)**

b. What is PIG in Big Data? Explain the features of PIG. **(10 Marks)**

Module-5

9 a. In Machine Learning explain linear and non-linear relationship with essential graphs. **(10 Marks)**

b. Write the block diagram of text mining process and explain its phases. **(10 Marks)**

OR

10 a. Define multiple regressions. Write down the examples involved in forecasting and optimization in regression. **(10 Marks)**

b. Explain the parameters in social graph network topological analysis using centralities and PageRank. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS731

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Software Architecture and Design Patterns

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define design pattern. Explain essential elements of design patterns. **(08 Marks)**
b. Explain Delegation with an example. **(04 Marks)**
c. Explain how to select and use a design pattern. **(08 Marks)**

OR

2 a. Explain the types of UML diagrams with example. **(10 Marks)**
b. Explain usecase analysis and hence write the usecase for registering new member. **(10 Marks)**

Module-2

3 a. Define structural patterns. Explain applicability, structure and participants of adapter design pattern. **(10 Marks)**
b. Explain motivation, applicability and structure of composite design pattern. **(10 Marks)**

OR

4 a. Explain motivation, applicability, structure and participants of façade design pattern. **(10 Marks)**
b. Explain the issues to be considered when implementing the composite design pattern. **(06 Marks)**
c. Mention few common situations in which proxy pattern is applicable. **(04 Marks)**

Module-3

5 a. Define behavioural patterns. Explain motivation, applicability and structure of chain of responsibility. **(10 Marks)**
b. Explain motivation, applicability and implementation of interpreter design pattern. **(10 Marks)**

OR

6 a. Explain when to use memento, observer, state, command and mediator design pattern. **(10 Marks)**
b. Explain Motivation, structure and implementation of iterator design pattern. **(10 Marks)**

Module-4

7 a. With a neat diagrams, explain MVC architecture and alternative view of the MVC architecture. **(08 Marks)**
b. Draw and explain sequence diagram for adding line. **(05 Marks)**
c. Define controller. Explain the steps involved in defining the controller. **(07 Marks)**

OR

8	a.	Explain use case for drawing a line.	**(05 Marks)**
	b.	Explain the characteristics of architectural patterns.	**(05 Marks)**
	c.	Explain implementing the undo operation.	**(10 Marks)**

Module-5

9	a.	With a neat diagram, explain the basic architecture of client/server systems.	**(10 Marks)**
	b.	List and explain the steps to setup remote object system.	**(10 Marks)**

OR

10	a.	Draw state transition diagram for logging into the system, adding book and issuing book and hence explain it.	**(10 Marks)**
	b.	Draw and explain directory structure for servlet.	**(05 Marks)**
	c.	Explain GET and POST methods.	**(05 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS734

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
User Interface Design

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define User Interface? Explain the important benefits of a good design. **(08 Marks)**
b. Explain the concept of Direct and indirect manipulation. **(08 Marks)**
c. Write any four advantages and graphical system? **(04 Marks)**

OR

2 a. List and explain the characteristics of Graphical User Interface (GUI). **(08 Marks)**
b. Compare the characteristic of Graphical User Interface Versus Web User Interface. **(08 Marks)**
c. Discuss the general principles of User Interface Design [any 4]. **(04 Marks)**

Module-2

3 a. What are the common pitfalls identified in the design process? Explain the five commandments to eliminate the pitfalls in designing the Interface? **(08 Marks)**
b. Define the term Usability. List any 8 usability problems as defined by Model in graphical system. **(08 Marks)**
c. Explain briefly about human Interaction speeds. **(04 Marks)**

OR

4 a. Explain the techniques for determining the user requirements using Direct Methods. **(08 Marks)**
b. Explain the guidelines for designing the conceptual model. **(08 Marks)**
c. List the various design standards or guideline to be followed in user design to achieve consistency. **(04 Marks)**

Module-3

5 a. List out the major functions of menus. Explain the structure of menus with illustration. **(08 Marks)**
b. Explain the guidelines to be followed for formatting the menus. **(08 Marks)**
c. What are the elements of menu contents? Explain. **(04 Marks)**

OR

6 a. Describe the various guidelines to be followed in phrasing of menus during the development of system menus? **(08 Marks)**
b. Describe the components of Web navigation system with illustration. **(08 Marks)**
c. What are disadvantages of popup menus? **(04 Marks)**

Module-4

7 a. Explain the major components of windows. **(08 Marks)**

b. Discuss in brief, the different types of windows with an example. **(08 Marks)**

c. What are the different windows management schemes? Discuss any two schemes in detail. **(04 Marks)**

OR

8 a. List the characteristics of device based controls. Identify various device based control. **(08 Marks)**

b. Write a short note on :
   i) Trackball
   ii) Joystick **(08 Marks)**

c. Explain the general guidelines followed in designing of windows operations. **(04 Marks)**

Module-5

9 a. What are Operable Controls? Explain usage of buttons along with their advantages and disadvantages. **(10 Marks)**

b. Explain the following controls with an example
   i) Radio Buttons
   ii) Check Boxes
   iii) Tool Tips
   iv) Progress Indicators **(10 Marks)**

OR

10 a. Explain Slider and Tree view operable controls with advantage and disadvantages. **(10 Marks)**

b. Explain cognitive Walkthrough, Thick aloud Evaluation and Usability tests conducted in the User Interface Design. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS741

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Digital Image Processing

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. With a neat diagram, explain the fundamental steps in Digital Image Processing. **(10 Marks)**

b. Consider the image segment shown in Fig Q1(b). i) Let V = {0, 1} and compute the length of the shortest 4, 8 and m-path between p and q ii) Repeat for V = {1, 2}

	3	1	2	1 (q)
	2	2	0	2
	1	2	1	1
(p)	1	0	1	2

Fig Q1(b) **(10 Marks)**

OR

2 a. Explain the concept of sampling and quantization with necessary diagrams. **(10 Marks)**

b. Explain the different distance measures between the pixels in an Image. **(05 Marks)**

c. List any five example fields that use digital image processing. **(05 Marks)**

Module-2

3 a. Explain the following gray level transformations with a neat graph i) Log Transformation ii) Power Law Transformations. **(10 Marks)**

b. Describe how the first order derivatives are used for Image Sharpening. **(10 Marks)**

OR

4 a. Explain the different spatial filters used for Image Smoothing. **(10 Marks)**

b. What is image histogram? Discuss histogram equalization for Image enhancement. **(10 Marks)**

Module-3

5 a. Obtain the equation for one dimensional Discrete Fourier Transform and its inverse from the continuous transform of sampled function of one variable. **(10 Marks)**

b. Explain the steps involved in Image filtering in frequency domain. **(10 Marks)**

OR

6 a. Explain any five properties of two dimensional DFT. **(10 Marks)**

b. Discuss about two dimensional DFT and its inverse. **(10 Marks)**

Module-4

7 a. Discuss the procedure of obtaining the segmented regions using split and merge strategy with example. **(10 Marks)**

b. Explain the technique for detecting three basic types of gray level discontinuities in a digital Image. **(10 Marks)**

OR

8 a. Describe the procedure of detecting lines using Hough Transform. **(10 Marks)**

b. Discuss Image segmentation using Thresholding in detail. **(10 Marks)**

Module-5

9 a. What is Image compression? Describe the general Image compression models with a neat block diagram. **(10 Marks)**

b. Explain the Huffman compression technique obtain the Huffman code for the following data given in Table Q9(b). Also compute the average length of the code.

Symbol	a_1	a_2	a_3	a_4	a_5	a_6
Probability	0.1	0.4	0.06	0.1	0.04	0.3

Table Q9(b) **(10 Marks)**

OR

10 a. Explain Arithmetic coding technique. Calculate arithmetic code for the message $a_1\ a_2\ a_3\ a_3\ a_4$. Probability and subinterval of each source symbol in given below in Table Q10(a).

Source symbol	Probability	Initial subinterval
a_1	0.2	[0.0, 0.2]
a_2	0.2	[0.2, 0.4]
a_3	0.4	[0.4, 0.8]
a_4	0.2	[0.8, 0.1]

Table Q10(a) **(10 Marks)**

b. Explain coding Redundancy by taking suitable example. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS743

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Natural Language Processing

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define NLP. What makes NLP difficult. **(10 Marks)**

b. Explain Karaka theory of Paninian grammar. Identify different Karaka's in the following sentence in Hindi language. "Maan bachchi ko aangan mein haath se rotii khilaatii hei". **(10 Marks)**

OR

2 a. Explain transformational grammar with example. **(10 Marks)**

b. Write the C-structure and F-structure for the following sentence "she saw stars". Consider the CFG rule.

$S \rightarrow NPVP$

$VP \rightarrow V \{NP\} \{NP\} PP^{*} \{S'\}$

$PP \rightarrow P\ NP$

$NP \rightarrow Det\ N \{PP\}$

$S' \rightarrow comp\ S$ **(10 Marks)**

Module-2

3 a. What is morphological passing? Explain 2-level morphological model with an example. **(10 Marks)**

b. Write and explain an algorithm for minimum edit distance spelling correction. Apply the same to find the minimum edit distance between words 'PEACEFUL' and 'PAECFLU'. **(10 Marks)**

OR

4 a. Explain Levensthein minimum edit distance algorithm. **(10 Marks)**

b. Write a note on different phrase level constructs with suitable example for each phrase. **(10 Marks)**

Module-3

5 a. With neat diagram, explain the infact framework architecture over view. **(10 Marks)**

b. Write a neat diagram, explain the architecture used in the task of learning to annotale cases with knowledge roles. **(10 Marks)**

OR

6 a. Explain the strategies used in active learning approach for acquiring labels using committee based classification scheme. **(10 Marks)**

b. Write a short note on:

i) The shortest path hypothesis

ii) Learning with dependency path. **(10 Marks)**

Module-4

7 a. Explain SVM (Support Vector Machine) learning method in sequence model estimation. **(10 Marks)**

b. Explain in detail the high-level representation approaches in text mining. **(10 Marks)**

OR

8 a. Explain the functioning of word matching feedback system used in ISTART. **(10 Marks)**

b. Write a note on various approaches to analyzing texts. **(10 Marks)**

Module-5

9 a. Explain design feature of IR with a neat diagram. **(10 Marks)**

b. Explain classical information retrieval models. **(10 Marks)**

OR

10 a. With a suitable example explain cluster based Information Retrieval (IR) modeling. **(10 Marks)**

b. Write short note on: i) Word Net ii) Frame Net. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18CS752

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Python Application Programming

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1	a.	List the features of Python Programming Language.	**(04 Marks)**
	b.	How Python handles exceptions? Explain with programming example.	**(08 Marks)**
	c.	Write a Python program to find the largest of three numbers.	**(08 Marks)**

OR

2	a.	Explain the Chained and Nested conditional execution statement along with syntax and flow chart.	**(08 Marks)**
	b.	Explain with example, Fruitful and Non – fruitful functions in Python.	**(06 Marks)**
	c.	Demonstrate the use of break and continue keyword using a Snippet of code.	**(06 Marks)**

Module-2

3	a.	Explain Definite and Indefinite loops in Python with example.	**(06 Marks)**
	b.	What are String Slices? Explain the Slicing Operator in Python with example.	**(06 Marks)**
	c.	Write a Python program to count the frequency of occurrence of character within another string.	**(08 Marks)**

OR

4	a.	List and explain four built – in string manipulation functions supported by Python.	**(08 Marks)**
	b.	Explain with examples read ( ) and write ( ) methods in file.	**(06 Marks)**
	c.	Write a Python program to generate and print prime numbers in a given range.	**(06 Marks)**

Module-3

5	a.	What are Lists? Explain any four. List methods with examples.	**(06 Marks)**
	b.	How tuples are created in Python? Explain different ways of creating and accessing them.	**(06 Marks)**
	c.	Write a Python program to count the frequency of each of the word in a given file.	**(08 Marks)**

OR

6	a.	Explain Dictionaries in Python with examples.	**(08 Marks)**
	b.	Explain the need of regular expressions in Python with example.	**(06 Marks)**
	c.	Implement a Python program using Lists to store and display the average of 'N' integers accepted from the user.	**(06 Marks)**

Module-4

7	a.	What is a Class? Explain how class and object are created in Python.	**(06 Marks)**
	b.	With example, explain Shallow copy and Deep copy methods in class.	**(06 Marks)**
	c.	Write a program to add two point objects by overloading + operator. Overload_ _ str_ _ ( ) to display point as a ordered pair.	**(08 Marks)**

OR

8 a. Explain _ _ init _ _ ( ) method with example. **(08 Marks)**
b. Explain Pure functions and Modifiers with example. **(08 Marks)**
c. Explain type based dispatch with an example. **(04 Marks)**

Module-5

9 a. What is Socket? Explain how Socket connection can be established over TCP/IP connection and retrieve the data from a web page. **(08 Marks)**
b. Explain the significance of XML over the web development. Illustrate with an example. **(06 Marks)**
c. Write a program to retrieve data from a webpage using urllib and to count the number of words in it. **(06 Marks)**

OR

10 a. What is JSON? Illustrate the concept of parsing JSON Python code. **(06 Marks)**
b. Define Cursor. Explain connect , execute and close commands of databases with a suitable example. **(08 Marks)**
c. Write a program to extract various parts of anchor tag using BeautifulSoup. **(06 Marks)**

* * * * *