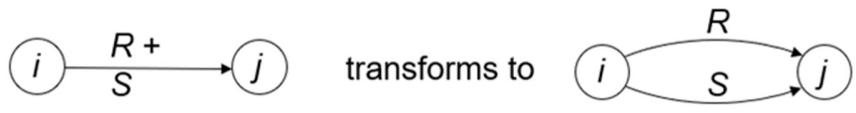
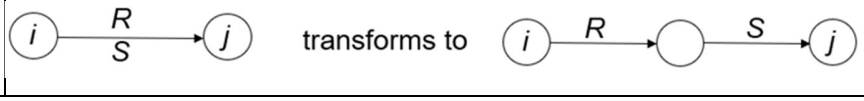
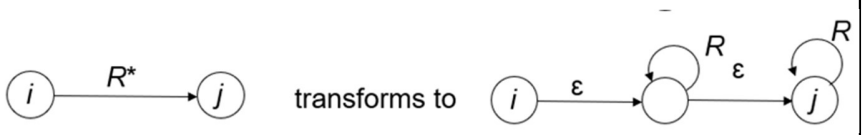
UNITV			
Symbolic Programming Paradigm, Symbolic Maths, algebraic manipulations, limits, differentiation, integration, series SymPy usage for symbolic maths, Equation Solving, Matrices Other languages: Aurora, LISP, Wolfram, Demo: Symbolic Programming in Python Automata Based Programming Paradigm, Finite State Machine, deterministic finite automation (dfa). NFA State transitions using python-automaton, Initial state, destination state, event (transition) Other languages: Forth, Ragel, SCXML, Demo: Automata Based Programming in Python GUI Programming Paradigm, Graphical User Interface (GUI) Tkinter, WxPython, JPython, WxWidgets, PyQT5 Other languages: GTK, java-gnome, Demo: GUI Programming in Python			
PART-A (Multiple Choice Questions)			
Q. No	**Questions**	**Course Outcome**	**Competence BT Level**
1	Which of the following is false about sympy? a. Sympy is a python library for symbolic mathematics b. It requires external libraries for execution c. It is an alternative to the systems like mathematica or maple Ans: B	CO5	BT1
2	Limit the Sympy Expression using the syntax a. limit (var,func,point) b. limit(func,var,point) c. limit(func,var) d. limit(var,point) Ans: B	CO5	BT1
3	Finite state machines are used for____ a. Pseudo random test patterns b. Deterministic test patterns c. Random test patterns d. Algorithmic test patterns Ans:D	CO5	BT1
4	_____ is a class attribute defined by its source state and destination state. a. LGPL b. Scipy c. Transition d. State Ans : C	CO5	BT1

5	What kind of abstract machine can recognize strings in a regular set? a. DFA b. NFA c. PDA d. DFA,NFA Ans: A	CO5	BT1
6	Identify the latest version of wxPython that supports both Python 2 and Python 3 a. wxPython b. Phoenix c. wxJython d. Sphinx Ans: A	CO5	BT1
7	In regular expressions, the operator '*' stands for------ a. Concatenation b. Addition c. Selection d. Iteration Ans: D	CO5	BT1
8	_____ is used for grouping and organizing the widgets a. Menu b. Window c. Frame d. ListBox Ans: C	CO5	BT1
9	Essential thing to create a window screen using tkinter python? a. Call tk() function b. Create a button c. To define a geometry d. Create a Window Ans: A	CO5	BT1
10	Differentiate the Sympy Expression using the syntax a. diff (var,func) b. diff(func,var) c. diff(expr,var) d. diff(var,point) Ans: B	CO5	BT1

11	Choose the correct output for the following code? Import sympy as sym a= sym.Rational(4,6) print a a. 6/4 b. 0.66 c. 4/6 d. 1.5 Ans: C	CO5	BT2
12	Choose the output for the following code? Limit (sin(x), x,0) a. 0 b. 1 c. Infinite d. Error Ans: B	CO5	BT2
13	evalf() function evaluates a given numerical expression upto a given floating point precision upto _____ digits. a. 1 b. 10 c. 100 d. 1000 Ans: C	CO5	BT2
14	Which of the following is the correct output for the below given code? x,y=sym.symbols('x,y') A=sym.Matrix([[1,x],[y,1]]) print A a. Matrix ([[1,x], [y,1]]) b. Matrix ([[x,1],[1,y]]) c. Matrix ([[0,x], [y,0]]) d. Matrix ([[x,0],[0,y]]) Ans: A	CO5	BT2
15	Which of the following is correct among the following expressions? i.  ii. 	CO5	BT2

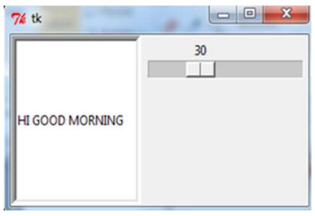
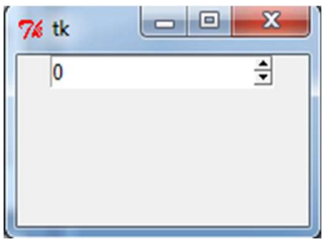
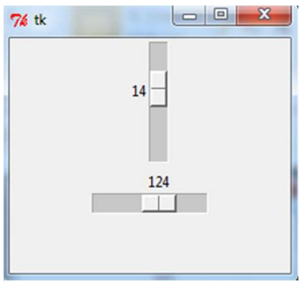
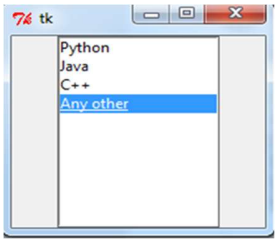
	iii.  a. i,ii b. ii,iii c. i,iii d. i,ii,iiii Ans: A		
16	wxPython API contains wx.Slider class. a. Yes b. No c. Can be yes or no d. Can not say Ans: A		

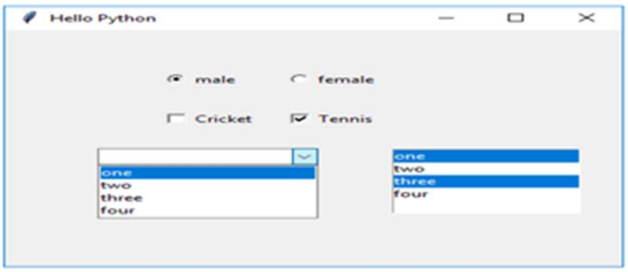
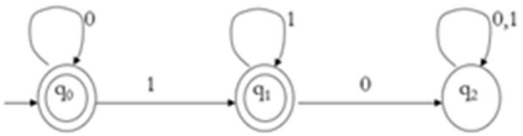
17	Which of the following statements is correct in jpython code?
	class Name:
	def __init__(javatpoint):
	javajavatpoint = java
	name1=Name("ABC")
	name2=name1
	a. It will throw the error as multiple references to the same object is not possible
	b. id(name1) and id(name2) will have same value
	c. Both name1 and name2 will have reference to two different objects of class Name
	d. id(name1) and id(name2) will have different value
	Ans: B
		CO5	BT2

18	(a+b)* is equivalent to------- a. b*a* b. (a*b*)* c. a*b* d. (a*b*) Ans: B	CO5	BT2
19	Choose the following correct output from sympy import sqrt, pprint, mul x=sqrt(2) y=sqrt(2) pprint(mul(x,y,evaluate=false)) print('equals to') print (x*y) a. 4	CO5	BT2

	b. 2 c. Sqrt(2) d. Error Ans: B		
20	How does the grid function put the widget on the screen? a. According to x,y coordinate b. According to row and column wise c. According to left, right d. According to up, down Ans: B	CO5	BT2
21	According to the given transitions, which among the following are the epsilon closures of q1 for the given NFA? Δ (q1, ε) = {q2, q3, q4} Δ (q4, 1) =q1 Δ (q1, ε) =q1 a. q4 b. q2 c. q1 d. q1, q2, q3, q4 Ans: D	CO5	BT3
22	Choose the right steps for creating the GUI a. Import the module Tkinter, Add the widgets, Build a GUI application (as a window), Enter the main event's loop for taking action when the user triggered the event b. Import the module Tkinter, Build a GUI application (as a window), Add the widgets, Enter the main event's loop for taking action when the user triggered the event c. Add the widgets, Build a GUI application (as a window), Enter the main event's loop for taking action when the user triggered the event d. Build a GUI application (as a window), Add the widgets, Enter the main event's loop for taking action when the user triggered the event Ans: B	CO5	BT3
23	Choose the correct output for the following code? from sympy import * mat = Matrix([[1, 2], [2, 1]]) new_mat = mat.col_insert(1, Matrix([[3], [4]])) print(new_mat) a. [1,2,3], [2,3,4] b. [1,3,2],[2,4,3]	CO5	BT3

	c. [1,2,3],[2,4,1] d. [1,3,2],[2,4,1] Ans: D		

24	Choose the correct output for the following code. from tkinter import * m1 = PanedWindow() m1.pack(fill = BOTH, expand = 1) left = Entry(m1, bd = 5) m1.add(left) m2 = PanedWindow(m1, orient = VERTICAL) m1.add(m2) top = Scale(m2, orient = HORIZONTAL) m2.add(top) mainloop() a.  b.  c.  d.  Ans: A	CO5	BT3

25	What is the output of the following Python code for the given statements? import sympy as sym x = Symbol('x') y = Symbol('y') ans1 = expand((x + y) ** 3) print("expand: ", ans1) ans2=simplify((x + x * y) / x) print("simplify:",ans2) 1. If the expression is sin(x)/cos(x), what will be the output using simplify method a. Sin (x) b. Cos (x) c. Tan (x) d. Cos $^{-1}$(x) Ans: C 2. What is the output of (x+y)**2? a. x**2+2*x*y+y**2 b. x**2-2*x*y+y**2 c. x**2+2*x*y-y**2 d. x**2-2*x*y-y**2 Ans: A	CO5	BT3
PART B (4 Marks)			
1	Write a program to factorize the following expression x**3 + 3*x**2*y + 3*x*y**2 + y**3	CO5	BT3
2	Write a Program to Create the following Layout using Python: 	CO5	BT2
3	Let Σ = {0, 1}. Give DFAs for {}, {ε}, Σ*, and Σ+ 	CO5	BT3
4	Find an NFA to recognize the language $(a + ba)^*bb(a + ab$	CO5	BT2
5	Design and implement a GUI program that consist of "Subject" , " Faculty" List box and "SUBMIT" button .Subject and faculty for the corresponding subject should be selected by the student and it should be submitted with the help of submit button	CO5	BT3
6	Write the commands to perform the operations on substitutions and expressions	CO5	BT1

7	Write a DFA automata code for L(M)={$(ab)^n$ | n Î N}	CO5	BT2
8	Write a DFA automata code for L(M) ={ w | w has an even number of 1s}	CO5	BT2
PART C (12 Marks)			
1	Consider the following series: X+(X2/2) + (X3/3) + (X4/4) +……+(Xn/N) Write a python program that will ask a user to input a number, n, and print this series for that number. In the series, x is a symbol and n are an integer input by the program's user. The nth term in this series is given as (Xn/N).	CO5	BT3
2	Design a student information system which consists of name, register number, email-id, department, five subject names and marks for each subject and calculate Average marks. Requirements: (i) Add check button to select subjects and department and add entry buttons for getting name, registration number, email-id from the user. (ii)Make use of Grid to arrange all the widgets and display Average marks in label box.	CO5	BT2
3	a. Write NFA automata code for the Language that accepts all end with 01 b. Write a automata code for L(M)= $a + aa^*b + a^*b$. c Write a automata code for Let Σ = {0, 1}. Given NFAs for {}, {ε}, {$(ab)^n$ | n Î N}, which has regular expression $(ab)^*$	CO5	BT3
4	Design an alarm tool that should allow users to create, edit, and delete alarms. It should also have an interface that lists all the alarms, provided they have not being deleted by the user	CO5	BT3
5	Find an DFA for each of the following languages over the alphabet {a, b} (a) {(ab)n | n Î N}, which has regular expression (ab)*. b) Find a DFA for the language of a + aa*b.	CO5	BT3

Note:

1. **BT Level –** Blooms Taxonomy Level
2. **CO – Course Outcomes**

BT1 –RememberBT2 – Understand BT3 – Apply BT4 – Analyze BT5 – Evaluate BT6 – Create