COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)

End Semester Examination

Programme: B.Tech.   **Semester:** II

Course Code: CT-20008   **Course Name:** Principles of Programming Languages

Branch: Computer Engineering   **Academic Year:** 2022-23

Duration: 3 Hour   **Max Marks:** 60

Student PRN No.	1	4	2	2	0	3	0	1	3	

Instructions:

1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of stationery, calculator etc. not allowed.
5. Write your PRN Number on Question Paper.
6. Assume suitable data where necessary.

Q 1 **A** There are various types of pens. The purpose of pen is to write on the given surface. The Plastic Ballpoint pen is a type of pen which consists of main parts oil-based ink, oil ink refill, plastic body and cap. The Gel Pen is a type of pen which consists of Gel based ink, Gel ink refill, plastic body and cap. There is also a Steel Ballpoint pen with same properties as that mentioned for Ballpoint pen apart from plastic parts. Its body is Steel body. It has two variety namely with cap and without cap. The Steel Ballpoint pen without cap consists of a spring assembly which can be used to open the nuzzle of pen through which the refill point will come out after pressing the button on the top of the pen. Fountain Pen is a type of pen which uses water based ink which is delivered through nib. The body of Fountain pen is typically plastic. The fountain pens may either consist of a permanent built-in refill or disposable refill. Ballpens are used by local people in society, school & college students, teachers and government officials. Gel pens are used by typically students and academicians. Fountain pens are used typically by few government officials, school students, architects and writers.   **[5]**   CO – 2, 5   PO - 1, 2,3 ,4 ,5 ,6, 8

Draw class diagram for the given scenario. Show and explain relation between them. Also write down which will be interfaces for each of the class?

B Explain design issues in exception handling   **[5]**   CO – 3, 4   PO - 1, 2,3 ,4 ,5 ,6, 8

OR

What is difference between a function and an exception.

Q 2 **A** Software is to be developed for air traffic control. Which programming paradigm/s and Language/s will be preferred at front-end and back-end of the software?   **[5]**   CO – 2, 5   PO - 1, 2,3 ,4 ,5 ,6, 8

	B	State and explain in detail "simplicity, readability and correctness" attribute of a programming language.	[5]	CO - 2, 3	PO - 1, 2,3 ,4 ,5 ,6, 8
Q 3	A	Write the statements which create spaghetti code. Explain for each statement, how spaghetti is created.	[5]	CO - 2, 3	PO - 1, 2,3 ,4 ,5 ,6, 8
	B	Write note on coercion, narrowing and widening.	[5]	CO 1,2, 3	PO - 1, 2,3 ,4 ,5 ,6, 7, 8
Q 4	A	For the given statement, enlist the lexemes and tokens : fact = fact*i;	[5]	CO 1,2, 3	PO - 1, 2,3 ,4 ,5 ,6, 7, 8
	B	For a integer array of 10 numbers in C, draw and explain dope vector. What will be l-value of 10th element in the array?	[5]	CO 1,2, 3	PO - 1, 2,3 ,4 ,5 ,6, 7, 8
Q 5	A	For the statement : int *p = &a; Comment on storage and binding of the tokens in the above statement. Also mention the binding times.	[5]	CO 1,2, 3	PO - 1, 2,3 ,4 ,5 ,6, 7, 8
	B	Following are the statements in LISP. Explain how the memory is allocated for these statements if executed in sequence. Assume upper limit of memory space as 5 units. 1. `(A B `(C) D E) 2. (* 10 (+ 3 4))	[5]	CO 3	PO - 1, 2,3 ,4 ,5 ,6, 8
Q 6	A	Can event driven programming used to check errors and validate data in software? Support your answer with a suitable example.	[5]	CO 1,2, 3	PO - 1, 2,3 ,4 ,5 ,6, 7, 8
	B	Prof ABC teach PPL. Prof PQR teach DC while Prof LMN teach DSA. Students Sachin, Mahendra and Ravi have registered all courses while Rahul, Mahima and Shreya have registered only PPL and DC. Write down the facts, relations and query in Prolog to get answers for following : 1. Who teach PPL course? 2. Name of students enrolled for all courses 3. Name of students enrolled for DSA	[5]	CO 2,3, 5	PO - 1, 2,3 ,4 ,5 ,6, 7, 8

Test 2 Examination

Programme: B.Tech.

Semester: II

Course Code: CT-20008

Course Name: Principles of Programming Languages

Branch: Computer Engineering

Academic Year: 2022-23

Duration: 1 Hour

Max Marks: 20

Student PRN No.										

Instructions:

1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of stationery, calculator etc. not allowed.
5. Write your PRN Number on Question Paper.
6. Assume suitable data where necessary.

Q 1 A software system is build to introduce various pet animals to kids. Enlist 5 [5] animals with their attributes and behaviour in order to perform abstraction and encapsulation of the animals.

Q 2 For given grammar,

[5]

<program> -> <stmts>

<stmts> -> <stmt> | <stmt> ; <stmts>

<stmt> -> <var> = <expr>

<var> -> a | b | c | d

<expr> -> <term> + <term> | <term> - <term>

<term> -> <var> | const

Derive the program with statement : a = b + const

Draw parse tree for the same.

Q 3 Syntax rule: <expr> -> <var>[1] + <var>[2]   [5]

Semantic rules:

<expr>.actual_type -> <var>[1].actual_type

Predicate:

<var>[1].actual_type == <var>[2].actual_type

<expr>.expected_type == <expr>.actual_type

Syntax rule: <var> -> id

Semantic rule:

<var>.actual_type -> lookup (<var>.string)

With the above rules, explain with appropriate diagram, type checking for statement : a = "Hello" + 1

Q 4 Draw and explain activation record for the following program. Assume   [5]
initial values of rsp = 100d and rbp = 0d.

```
int add(inta ,int b ) {

int c = a + b;

return c;

}

int main () {

int i,j,k;

i = 1;

j = 2;

k = add(i,j);

return 0;

}
```