AI Mid Exam – All Sets with Answers (Prolog Solutions)

SET-1 Questions

1. Write any 2 Prolog Programmes
2. Write a program in Prolog to find square and cube of a number
3. Find maximum number out of three numbers
4. Display addition of numbers from 1 to N

SET-1 Answers (Prolog)

```
% Square and Cube
square_cube(N, S, C) :- S is N*N, C is N*N*N.

% Max of 3 numbers
max3(A,B,C,Max) :- Max is max(A, max(B,C)).

% Sum 1 to N
sum_n(1,1).
sum_n(N,Sum) :- N > 1, N1 is N-1, sum_n(N1,Sum1), Sum is Sum1 + N.
```

SET-2 Questions

1. Write any 2 Prolog Programmes
2. Write a program in Prolog to find area and perimeter of a circle
3. Check whether entered no is divisible of 4
4. Display addition of numbers from N1 to N2

SET-2 Answers (Prolog)

```
% Circle area & perimeter
circle(R, Area, Perimeter) :- Area is 3.14*R*R, Perimeter is 2*3.14*R.

% Divisible by 4
divisible_by_4(N) :- 0 is N mod 4.

% Sum between N1 and N2
sum_range(N1,N1,N1).
sum_range(N1,N2,Sum) :- N1 < N2, N3 is N2-1, sum_range(N1,N3,Sum1), Sum is Sum1 + N2.
```

SET-3 Questions

1. Write any 2 Prolog Programmes

2. Write a program to convert year into minutes
3. Check whether entered no is odd or even
4. Write a series from 1 to N

SET-3 Answers (Prolog)

```
% Year to Minutes
year_to_minutes(Y, M) :- M is Y * 365 * 24 * 60.

% Odd or Even
is_even(N) :- 0 is N mod 2.
is_odd(N) :- 1 is N mod 2.

% Series from 1 to N
series(N) :- series_helper(1,N).
series_helper(I,N) :- I =< N, write(I), nl, I1 is I+1, series_helper(I1,N).
series_helper(I,N) :- I > N.
```

SET-4 Questions

1. Write any 2 Prolog Programmes
2. Write a program in Prolog to find area and perimeter of a circle
3. Check the student is pass or fail for entered percentage
4. Write a series from N to 1

SET-4 Answers (Prolog)

```
% Circle (same as Set-2)
circle(R, Area, Perimeter) :- Area is 3.14*R*R, Perimeter is 2*3.14*R.

% Pass or Fail
result(Per,'Pass') :- Per >= 40.
result(Per,'Fail') :- Per < 40.

% Series from N to 1
series(N) :- N > 0, write(N), nl, N1 is N-1, series(N1).
series(0).
```

Family Tree Question 1 (Bob, Pam, Tom, Liz)

```
% Facts
male(tom). male(bob). male(peter). male(jim).
female(pam). female(liz). female(ann). female(pat).

parent(pam, bob). parent(tom, bob).
parent(bob, ann). parent(bob, peter). parent(bob, pat).
```

parent(liz, ann). parent(liz, peter). parent(liz, pat).
parent(peter, jim).

married(tom, pam). married(pam, tom).
married(bob, liz). married(liz, bob).

% Rules for father, mother, grandparent, sibling, uncle, aunt, etc.

Sample Answers:
1. Parents of Bob -> Pam, Tom
2. Is Pat Jim's parent? -> No
3. Father of Ann -> Bob
4. Mother of Bob -> Pam
5. Bob's kids -> Ann, Peter, Pat
6. Jim's uncle -> None
7. Jim's aunt -> Ann, Pat
... up to Q16

Family Tree Question 2 (Karan, Jack, David, Amy)

% Facts
male(karan). male(jack). male(david). male(ray). male(john). male(peter).
female(amy). female(susan). female(liza). female(mary).

parent(karan, ray). parent(karan, susan). parent(jack, susan).
parent(david, john). parent(david, liza). parent(amy, john). parent(amy, liza).
parent(susan, peter). parent(susan, mary). parent(john, peter). parent(john, mary).

married(karan, jack). married(jack, karan).
married(david, amy). married(amy, david).
married(susan, john). married(john, susan).

% Rules similar to Family Tree 1

Sample Answers:
1. Susan's parents -> Karan, Jack
2. Liza's parents -> David, Amy
3. Peter's parents -> Susan, John
4. Susan's children -> Peter, Mary
5. Peter's dadi -> Jack's wife (assumed)
6. Mary's nani -> Amy
7. Peter's grandfather -> Karan, David
8. Mary's grandmother -> Amy
... up to Q18