Assignment 26

AI24BTECH11008- Sarvajith

27. Let the minimum, maximum, mean and standard deviation values for the attribute income of data scientists be 46000, 170000, 96000, and 21000, respectively. The z-score normalized income value of 106000 is closest to which ONE of the following options?(in Indian rupees)

(A) 0.217
(B) 0.476
(C) 0.623
(D) 2.304

28. Consider the following tree traversals on a full binary tree:

(i) Preorder
(ii) Inorder
(iii) Postorder

Which of the following traversal options is/are sufficient to uniquely reconstruct the full binary tree?

(A) i and ii
(B) ii and iii
(C) i and iii
(D) ii only

29. Let x and y be two propositions. Which of the following statements is a tautology /are tautologies?

(A) $(\neg x \wedge y) \implies (y \implies x)$
(B) $x \wedge \neg y \implies (\neg x \implies y)$
(C) $\neg x \wedge y \implies (\neg x \implies y)$
(D) $x \wedge \neg y \implies (y \implies x)$

30. Consider sorting the followin array of integers in ascending order using an in-place Quicksort algorithm that uses the last element as the pivot The minimum number of swaps performed during this Quicksort is .....

31. Consider the following two tables named Raider and Team in a relational database maintained by a Kabaddi league. The attribute ID in table team references the primary key of the Raider table, ID. The SQL query described below is execuuted on this database:
SELECT *
FROM Raider, Team
WHERE Raider.ID = Team.ID AND City = ”Jaipur” AND
RaidPoints ¿ 200; The number of rows returned by this query is .....

60	70	80	90	100

Raider			
ID	**Name**	**Raids**	**RaidPoints**
1	Arjun	200	250
2	Ankush	190	219
3	Sunil	150	200
4	Reza	150	190
5	Pratham	175	220
6	Gopal	193	215

Team		
City	**ID**	**BidPoints**
Jaipur	2	200
Patna	3	195
Hyderabad	5	175
Jaipur	1	250
Patna	4	200
Jaipur	6	200

32. The fundamental operations in a double-ended queue D are:
insertFirst(e) - Insert a new element e at the beginning of D.
insertLast(e) - Insert a new element e at the end of D.
removeFirst() - Remove and return the first element of D.
removeLast() - Remove and return the last element of D.
In an empty double-ended queue, the following operations are performed:
insertFirst(10)
insertLast(32)
a âremoveFirst()
insertLast(28)
insertLast(17)
a âremoveFirst()
a â removeLast()
The value of a is .....
33. Let $f : R \to R$ be the function $f(x) = \frac{1}{1+e^{-x}}$. The value of the derivative of f at x where $f(x) = 0.4$ is .....(rounded off to 2 decimal places).
34. The sample average of 50 data points is 40. The updated sample average after including a new data point taking the value of 142 is.....
35. Consider the 3×3 matrix $M = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 1 & 3 \\ 4 & 3 & 6 \end{bmatrix}$
The determinant of $\left(M^2 + 12M\right)$is .....
36. A fair six-sided die (with faces numbered 1, 2, 3, 4, 5, 6) is repeatedly thrown independently.

What is the expected number of times the die is thrown until two consecutive throws of even numbers are seen?

(A) 2
(B) 4
(C) 6
(D) 8

37. Let $f : R \to R$ be a function

$$f(x) = \begin{cases} -x, & x < -2 \\ ax^2 + bx + c, & x \in [-2, 2] \\ x, & x > 2 \end{cases}$$

Which ONE of the following choices gives the values of a, b, c that make the function f continuous and differentiable?

(A) $a = \frac{1}{4}, b = 0, c = 1$
(B) $a = \frac{1}{2}, b = 0, c = 0$
(C) $a = 0, b = 0, c = 0$
(D) $a = 1, b = 1, c = -4$

38. Consider the following Python code:

```
def count(child_dict, i):
if i not in child_dict.keys():
return 1
ans = 1
for j in child_dict[i]:
ans += count(child_dict, j)
return ans
child_dict = dict()
child_dict[0] = [1,2]
child_dict[1] = [3,4,5]
child_dict[2] = [6,7,8]
print(count(child_dict,0))
```

Which ONE of the following is the output of this code?

(A) 6
(B) 1
(C) 8
(D) 9

39. Consider the function computeS(X) whose pseudocode is given below: computeS(X)

```
S[1] ← 1
for i ←2 to length(X)
S[i] ← 1
if X[i − 1] ≤ X[i]
S[i] ← S[i] + S[i - 1]
end if
end for
```

return S

Which ONE of the following values is returned by the function computeS(X) for X = [6, 3, 5, 4, 10]?

1,1,2,3,4
1,1,2,3,3
1,1,2,1,2
1,1,2,1,5