ScAI Sample Question Paper of Aptitude Test

Maths

1. For all square matrices A and B, is it true that det(A+B) = det(A) + det(B)
A. True
B. False
C. Cannot be determined
2. Suppose that the characteristic polynomial of some matrix A is found to be p(λ) = (λ−1)(λ−3)^2(λ−4)^4. What is the size of A?
A) 5 × 5
B) 6 × 6
C) 5 × 6
D) 6 × 5

AI/ML

1 You observe the following while fitting a linear regression to the data: As you increase the amount of training data, the test error decreases and the training error increases. The train error is quite low (almost what you expect it to), while the test error is much higher than the train error.
What do you think is the main reason behind this behavior? Choose the most probable option.
(A) High variance
(B) High model bias
(C) High estimation bias
(D) None of the above

2) Gradient of a continuous and differentiable function
(A) is zero at a minimum
(B) is non-zero at a maximum
(C) is zero at a saddle point
(D) decreases as you get closer to the minimum

Data Structure

1. Select the correct asymptotic complexity of an algorithm with runtime T (n, n) where
T(x,c) = Θ(x)
T (x, y) = Θ(x) + S(x, y/2)
S(c, y) = Θ(y)
S(x, y) = Θ(y) + T (x/2, y)
A. Θ(logn)
B. Θ(n)
C. Θ(nlogn)
D. Θ(nlog$_2$n)

3. Given an array arr = {45,77,89,90,94,99,100} and key = 99; what are the mid values(corresponding array elements) in the first and second levels of recursion of binary search?

1. 90 and 99
2. 90 and 94
3. 89 and 99
4. 89 and 94

Aptitude

1. How many 3-digit numbers are there for which the product of their digits is more than 2 and less than or equal to 4?
   A. 8
   B. 9
   C. 7
   D. 10

2. In Arun's opinion, his weight is greater than 65 kg but less than 72 kg. His brother doesn't agree with Arun and he thinks that Arun's weight is greater than 60 kg but less than 70 kg. His mother's view is that his weight cannot be greater than 68 kg. If all of them are correct in their estimation, what is the average of different probable weights of Arun?

A. 67 kg
B. 68 kg
C. 69 kg
D. Data inadequate

Programming

Flipping Game Iahub got bored, so he invented a game to be played on paper.

He writes n integers $a_1, a_2, \ldots, a_n$. Each of those integers can be either 0 or 1. He's allowed to do exactly one move: he chooses two indices i and j ($1 \le i \le j \le n$) and flips all values a_k for which their positions are in range $[i, j]$ (that is $i \le k \le j$). Flip the value of x means to apply operation $x = 1 - x$.

The goal of the game is that after exactly one move to obtain the maximum number of ones. Write a program to solve the little game of Iahub.