

IIT Bombay MS by Research CMINDS Dept Written Test+Interview

Date May 2, 2022, Time 2 pm to 4pm 2 hours test

Each question 2 marks

28 questions MCQ MSQ NAT

total 56 marks paper

The qualifying mark to be considered for an interview is 30% of the total marks of the online test. only the top 90 candidates based on the online test scores will be shortlisted for the interview stage.

Syllabus:

Calculus Differentiation, Integration, Partial derivatives, Nested integration, Polar coordinates, etc.

Linear algebra Vectors, Linear equations, Vector spaces and subspaces, Orthogonality, Determinants, Eigenvalues and eigenvectors.

Probability Basic probability, Random variables, Sampling, Parameter estimation, Regression.

Algorithms Asymptotic notation, Divide and conquer, Sorting, Searching.

Questions

1) Given three linear eqn find unique solution exist or not ?

2) time required to sort 100000 using merge sort? ($n \log n$)

3) $T(n) = 2T(n/2) + n$ what is complexity?

4) limit $\lim_{z \rightarrow 0} \frac{\sin(2z) + 4z^2 - 2z}{(z^2)(z+1)^2}$

5) $f(x) = 1$ if ($x > 0$)

0 if ($x = 0$)

-1 if ($x < 0$) find limit of $f(x)$ at $x=0, 1, -1, +\infty, -\infty$?

6) direct formula-based language's mean value theorem calculus

7) asymptotic ordering of f_1, f_2, f_3, f_4 .

$f_1 = 1/x$ $f_2 = (x^2)/(e^x)$ $f_3 = (x^4)/(e^{x^2})$ $f_4 = 1/\log x$

8) matrix given find maximum eigen value?

9) two coins are there with p of head of coin 1 is 0.7 and p of head of coin 2 is 0.2. p of choosing coin1 is 0.3 and coin2 is 0.7 then probability of getting head provided the coin used is coin 1?

10) binary search tree is there to find element 363 which can be search path possible options given.

2-3 que on normal distribution and probability.

2 questions on basic differentiation.

Result declared on 4 May 6pm **(Selected for Interview)**

Interview

Interview Date 10 May 10, 2022 10.15 pm 25 minutes

1) a fair coin tossed 333 times what is probability that no. of heads more than no. of tails?

2) two arrays given. Each array individually has unique elements. find Intersection/common elements of these two?

I gave two approaches first one with unordered map time $O(n)$ space $O(n)$

Another sort two arrays and use two pointer (similar to merging in merge sort) time $O(n \log n)$ space $O(1)$

Similar que with some addons for practice

<https://leetcode.com/problems/intersection-of-two-arrays/>

<https://leetcode.com/problems/intersection-of-two-arrays-ii/>

3) Random variable definition $E(x)$ formula PDF etc

Verdict: (Did not get selected but may be because I got the MS by Research in CSE Dept which was having higher preference than this and any IIT offers only one offer of one Dept at a time (even if I get selected in multiple depts of same IIT) and that too of highest preference only)