

ISI Interview Questions

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Interview Questions - 2015

Q 01 A 'success' is defined as picking an 'A' such that the polynomial $x^2 - Ax + 1$ has at least one real root. Mr. X is picking A from uniform distribution over $[0, 5]$. Mr. Y is picking $A \in [0, 5]$ with the probability distribution function $f_A(a)$ given by : $f_A(a) = \frac{2a}{25} \forall a \in [0, 5]$. Which person has a higher probability of success?

Q 02 *Reference: MWG Chapter 2*

The table below shows the consumption pattern of a consumer over a period of two years. It is known that the consumer spends all his income in both years.

	Year-1		Year-2	
	Goods	Price	Goods	Price
Good 1	100	100	120	100
Good 2	100	100	x	80

- (a) If Year-2 bundle is preferred over Year-1 bundle, what can you say about consumption of second good in Year-2?
- (b) If Year-1 bundle is preferred over Year-2 then what can you say about consumption of second good in Year-2?
- (c) When will the Weak Axiom of Revealed Preference be violated?
- (d) It is given that consumer prefers Year-1 bundle. Is there any inferior good in this case?

Q 03 Suppose a monopolist faces constant returns to scale. Answer the following parts:

- (a) Why he never produces on the inelastic side of the demand curve?
- (b) Why does total revenue increase on the inelastic side as price increases?

Q 04 There are two cities C_1 & C_2 . Every citizen in both cities have concave increasing utility function.

- (a) Initially a social planner is supposed to allocate an endowment among all the citizens. How does he/she allocate it? Explain.
- (b) Suppose entire endowment is C_1 but with social planner. Again the task is to distribute endowment in C_1 and C_2 . But, now the transfer of 1 unit of endowment to C_2 results in loss of v fraction. How does he/she allocate? Explain.

- (c) In the above case, which of the region gets more part of endowment. Explain with the proof.
- (d) What happens if the utilities are convex?

Q 05 (a) Define concavity.

- (b) Given a strictly concave utility function $v(x, y) = U(x) + y$. Find the optimal consumption bundle.

Q 06 A professor has 20 hours to allocate between two PhD students. Let x_1 and x_2 be the time allocated to the two students. The utility of each student is as follows:

$$U_1 = -|x_1 - 2| \text{ and } U_2 = -|x_2 - 8|$$

- (a) Find the set of Pareto efficient allocations.
- (b) What will be the optimal time allocation if the professor maximizes a social function given by : $\min\{U_1, U_2\}$

Q 07 Evaluate:

$$\lim_{n \rightarrow \infty} \left(1 - \frac{1}{2^2}\right) \left(1 - \frac{1}{3^2}\right) \left(1 - \frac{1}{4^2}\right) \cdots \left(1 - \frac{1}{n^2}\right)$$

ISI Interview Pattern

- Interview is for 10-15 mins with a panel of 3-4 professors
- You've to solve one question out of 2 questions (one from maths or stats and one from microeconomics).

Tips from ISI Students

1. Do GOOD in the written exam. It has more weightage. Your chance of getting selected will be higher.
2. They are there to test your understanding. Only way to develop understanding is to solve problems, lots of different kind of problems.
3. Be clear in your approach even if you can't solve the problem. Your approach will matter a lot. They will give you hints.
4. Remember two things:
 - (a) You have cleared the written exam, so you can clear the interview too. You need one thing and that is confidence. It will come through problem solving. So just solve as much as you can.
 - (b) They are there to select you and not to reject you. So, don't get scared and give your best.

Other Questions asked in the interviews before 2015

Q 01 A consumer has a utility function $u(x, y, z) = \min(x, y) + z$. Find the optimal consumption bundle.

Q 02 Let X be a Normally distributed random variable with mean 0 and variance 1. Let $\Phi(\cdot)$ be the cumulative distribution function of the variable X . Find the distribution of $\Phi(X)$.

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