

Interview

Special

Cases for Practice

Case I:

Infinite Calculations :

Mr. Mishra was going through the Annual Report of his company. He felt that his worst fears were coming true. He was the Chairman and Managing Director of Infinite Calculations Pvt. Ltd., a company he had started almost a decade back. He was an Electronics graduate from a reputed engineering college of the country and started the company immediately after passing out. Being the only child of their parents, he was supported by his parents both emotionally and financially in his new venture.

They started by making Scientific Calculators and Measuring Devices. Soon he found that this market was dominated by large international players. It was difficult to find even a foothold in the market as making good quality products needed huge investments. He thus shifted to the lower end of the market, by making simple hand held calculators. This market was largely dominated by local players and he found that cost is the main differentiator.

He thus pushed his volumes hard to bring down the prices. In about five years time, they were the largest local player in the market and cash flow was good. They went on making the same models with almost no modifications and kept consolidating their position. About two years back, sales dipped slightly and he found that this was true for the whole market. Upon doing some research he found that calculators are an integral part of almost all electronic gadgets now and the young generation prefers them as they look good. He did not give this much importance and thought that this was a temporary phenomena. However, this report proved it all wrong. He immediately called a meeting of all his top officials to deal with the problem.

What advice would you give to Mr. Mishra?

What in your view, is the reason for the situation that the company is in?

How can such situations be avoided in future?

Case II:

The Nizam's Worries

Ashok Saxena was puzzled. His 2 years at the Mediocre Institute of Management had not prepared him to handle this situation. Ram Singh, a security guard at his restaurant was standing in front of him with a worried look on his face. When asked why he was there, Ram Singh mumbled something at first and then launched into a long diatribe about how things were not all fine at the restaurant and how many people were abusing the trust that Ashok had placed in them. Shortly after completing his management education, Ashok had plunged into the restaurant business that he so badly wanted to enter. His dream of a chain of Biryani outlets serving authentic Hyderabadi Biryani crystallised into The Nizam, a restaurant located in prime locality in Kolkata. He had put in a lot of effort into identifying the right person for each role including bringing in erstwhile cooks at the Nizam's kitchen in Hyderabad.

Shortly after its launch, The Nizam became very popular on account of the quality of the food it served, the ambience and the quality of service rendered. While it was nearly full every evening, weekends saw long queues lining up for dinner. Ashok had priced the dishes at the higher end but that did not prove to be a deterrent to the Biryani loving public of Kolkata. This problem that Ram Singh brought took him by surprise for, according to Ram Singh, many employees including the senior cooks were regularly ferreting out food, provisions and other ingredients from the stock room. This was shocking to Ashok because he particularly prided himself on the security measures he had installed. He had hired security guards from a reputed private security firm and put in place a stringent screening process every time an employee entered or left the premises. No employee was allowed to take even a plastic cover out of the premises without opening it and revealing its contents to the security guard.

He also claimed that he had caught the head chef red-handed with his bag stuffed with enough chicken biryani to feed a family of 4. He also said that the head chef had first offered to share the loot with him if he were to be accommodative and, when Ram Singh refused, even threatened him with dire consequences. The head chef was a particularly good cook whom Ashok had located with great difficulty and attracted at a very good pay for a chef whose chief skill was cooking authentic Hyderabad Biryani.

Many customers frequented the restaurant just to have the chef's special, which was specially prepared by the head chef and was always one or other interesting variation of Chicken Biryani. Ashok asked Ram Singh to leave and was wondering what to do next when the head chef stormed in to complain about Ram Singh's high-handed behaviour not just with him but with many other employees as well. He also said that one member of the housekeeping staff who was fired a month ago had been falsely implicated in a case of minor theft by Ram Singh, resulting in the former's dismissal. He demanded that Ram Singh be replaced and advised Ashok to insist that the security firm send people who know what politeness and professionalism are. Ashok was now completely confused as to what he should do.

CASE III:

Relatively Troubled

It was not a situation anyone would want to be in and Dr. Venkatesh was no exception. Dr. Venkatesh was one of the best geriatricians in the city of Hyderabad and was highly sought after by elderly patients seeking good medical advice. He was very popular also because he was one of the few geriatricians in the city who were ready to undertake house visits for very elderly patients who were too enfeebled to walk a lot or travel in vehicles. In addition, he was also known to be a very good general practitioner and had many clients in the 30 to 50 year age group.

After 30 years of practice which included practising in an established clinic for 3 hours every morning and being a consultant geriatrician in 2 of the city's most reputed hospitals, Dr. Venkatesh, upon the encouragement of some patients of his, decided to start Hyderabad Geriatric Centre as an independent set up seeking to provide high quality geriatric care at an affordable cost. In keeping with his long-standing principle of minimising the cost of treatment, Dr. Venkatesh also decided to tie up with NMIR, a reputed lab with many branches in Hyderabad, to operate a mini-lab for blood testing, ECG, ultra-sound and other basic tests that the elderly would normally need to go through fairly often. NMIR offered the machines and lab technicians to HGC at a monthly fee but Dr. Venkatesh was confident that with the traffic he expected to get, he could easily recover the costs and have a little profit on that as well.

3 months after the launch of HGC, Dr. Venkatesh was faced with a rather peculiar problem. He had a fairly large extended family on his own and his wife's side with whom he had fairly good relations. He also had a wide social circle thanks to his wife. He noticed that a good number (~10 to 12%) of the patients he was getting on a daily basis at HGC happened to be members of his extended family. While some of them were sensible and voluntarily offered to pay him for his advice, many would just walk in under some other pretext and seek his advice almost as an aside. In all such cases, Dr. Venkatesh was finding it very difficult to broach the issue of his fee, which was in the range of Rs. 200 to 300 per visit. To make matters worse, these people were brazen enough to walk away without bothering to ask Dr. Venkatesh about the fee. Most of them were fairly well-off and could easily afford the fee he would have charged.

What made it especially difficult was that many of them used his lab to take tests that he never prescribed and walk away without paying. In most cases, these tests were prescribed by other doctors and the patients were using Dr. Venkatesh's facility rather than other private diagnostic centres to avoid paying for the tests. The average cost of these tests was around Rs. 800 per patient. Taking up the issue of payment with these relatives was likely to sour relations, but not taking it up meant that he was taking on a huge financial burden that was fast depleting his capital. To make matters worse, visits by these relatives were usually unscheduled and were disrupting his schedule of appointments for his regular patients. Dr. Venkatesh was wondering how to solve this vexed problem.

Interview Questions**Maths & Stats**

- What is Integration?
- What is the opposite of Integration?
- What do you think is generally the problem with Integration?
- Can we make use of Integration in some principle of Physics?
- What is Differentiation?
- How do you find the maximum of a function $f(x)$?
- Draw a graph where the second order differential is zero.
- What is a point of inflection?
- Draw a graph which has a point of inflection.
- What is Hungarian Algorithm?
- What is Ant Colony Algorithm?
- What is the time complexity of an algorithm?
- Do you know about partial derivatives?
- What is the probability that on tossing a coin we get both heads? Are the two events independent?
- Describe Random Numbers. Why are Random Numbers generated in programming languages called pseudo-random?
- Describe an algorithm to generate numbers.
- What is probability? What is the probability that when you are married, your first child will be a boy? What is the probability that the first 3 children you have will be boys?
- What is a Prime Number?
- What is Descartes' rule in algebra?
- State Fermat's Last Theorem.
- What are Mersenne Primes?
- What is the value of zero raised to power zero?
- What do we mean by indeterminate form? List out the various indeterminate forms.
- Is $0.9999999\dots = 1$? Can you prove it?
- Why is $0! = 1$?
- Why there is Nobel in mathematics? Do you think it is justified?
- What do you know about Fields Medal or Abel Prize?
- Can you explain the Monty Hall Problem?
- What is the difference between a Theorem and an Axiom?
- Among the sets N , Z and Q identify the one which is a Monoid, an Integral Domain and a Field.
- What is the difference between a Field and a Ring?
- What do we mean by Six Sigma? Explain
- What do we mean by a random variable?
- Random variable X is distributed as $N(a, b)$, and random variable Y is distributed as $N(c, d)$. What is the distribution of (1) $X+Y$, (2) $X-Y$, (3) $X*Y$, (4) X/Y ?
- What's the expectation of a uniform (a, b) distribution? What's its variance?
- In your bedroom you have a drawer with 2 red, 4 yellow, 6 purple, 8 brown, 10 white, 12 green, 14 black, 16 blue, 18 gray, and 20 orange socks. It is dark, so you cannot distinguish between the colours of the socks. How many socks do you need to take out of the drawer to be sure that you have at least three pairs of socks of the same colour?
- You have a rectangular chocolate bar, m by n tiles. You start breaking the chocolate bar, always along the lines, until you end up with mn pieces (i.e. all the tiles have been separated). You want to minimise the number of breaks. What's the best strategy?
- A student calls out an answer to a multiple choice question at random, A, B, C or D, until he is correct (say the correct answer is A). On average, how many times will he have to do this?
- Differentiate between stratified and cluster sampling?
- What do we mean by continuous and discrete distributions? Give examples for each.
- Give situations where Poisson distribution is applicable.

- Give situations where Exponential distribution applicable.
- Differentiate between descriptive statistics and inferential statistics
- What are the different types of measurements scales used in statistics?
- Differentiate between Type I and Type II errors.
- State the Central Limit Theorem.
- 3 persons attend an interview at a company where each person can be either selected or rejected. What is the number of ways of announcing the result?
- What types of relations are called functions? Give examples of relations which are not functions.
- At what points is an algebraic function discontinuous?
- At what points is the greatest integer function discontinuous?
- Write the algebraic expression for a transfer function.
- Explain why sine of an angle cannot take a value of more than 1?
- Is every continuous function differentiable? Explain
- If an event A is independent of itself then what is the probability of event A to take place?
- If correlation coefficient of variables x and y is equal, then what can we say about the the two lines of regression?
- At what point do two lines of regression intersect?
- If $f(x)$ and $g(x)$ are both continuous at $x=a$, then what is the condition for $f(x)/g(x)$ to be continuous at $x=a$?
- Is it true to say that the continuity of fg implies continuity of f and g ?
- Can a null relation be classified as transitive? Justify.
- Give examples of a one to one function and many to one function?
- What is Mean? Central Tendency? Mode?
- What are the types of Mean?
- Give one example each for the practical application of Arithmetic Mean, Geometric Mean and Harmonic Mean.
- What do you understand by Standard Deviation? Also write the formula.
- What term would come if you square the Standard Deviation?
- What is the difference between Bayesian and 'regular' statistics?
- State Cayley-Hamilton Theorem.
- How many zeros are there at the end of $100!$ in base 6?
- Why is 'e' so important in mathematics? What uses does it have in the real world?
- What is the difference between correlation and regression?
- What are Transcendental Numbers? Give some examples
- What is the difference between Euclidean and Non-Euclidean Geometry?
- What is the difference between a bar graph and a histogram? What are the similarities?
- What do we mean by contrapositive, converse and inverse of a given statement?
- There is a rectangle. Which way should it rolled to give greater volume?
- If the perimeter of a rectangle is 20 cm, what is the distribution among length and breadth to maximize the volume?
- Draw the graph $y = x(x-5)$.
- What is Reynolds number? What does it signify?
- What is binomial and normal distribution?
- What is the inverse of a matrix?

Computer Science and Engineering

- What are the differences of Win 7 over Win XP?
- Explain polymorphism and inheritance. Give real life example.
- What is gate way used for?
- How is linked list implemented?
- What is semaphore?
- In binary search tree which traversal is used for getting ascending order values?
- What are Device drivers used for?
- Explain fork as applied in Unix?
- In Unix, what does profile contain?

- In Unix, what is echo used for?
- In Unix, where does ls store contents?
- How is relocatable code generated in an assembler?
- What does calloc do? How is it different from malloc?
- What is the scope of a global variable that is declared as static?
- How many flip-flops do you require for modulo 19 counter?
- A ring counters initial state is 01000. After how many clock cycles will it return to the initial state?
- Explain virtual functions in C++?
- What is the number of address lines required for 1-MB memory?
- What is the minimum number of IP addresses required for a router?
- What are disadvantage of pcm?
- Explain the Shannon Hartley theorem?
- What is microwave propagation along the curvature of earth called?
- What is used for knowing its own IP address?
- Write a program to swap two variables without using a temporary variable.
- Write a program for reversing the given string.
- Write a C program to find whether a stack is progressing in forward or reverse direction.
- Write a C program that reverses the linked list.
- Define function. Explain function arguments.
- C passes by value or by reference?
- Difference between my-stropy and stropy?
- What does a compiler do?
- How much information can be stored in 1 byte of an IBM pc compatible?
- What is the language used for Artificial Intelligence?
- What is piggy backing?
- Explain the difference between micro kernel, and macro kernel.
- Give an example of micro kernel.
- What is a real-time system?
- What is the difference between Hard and Soft real-time systems?
- What is mission critical system?
- What is the important aspect of a real-time system?
- What is software life cycle?
- What are the differences between Pascal and C?
- Which are the different computer architectures?
- What is the requirement in MIMD?
- What is the difference between RISC and CISC processors?
- What is the difference between loosely coupled and tightly coupled systems?
- What is an open system?
- Which are the different phases in software life cycle?
- How much time is spent usually in each phase and why?
- Why is analysis and testing phases very important?
- What is testing?
- Which are the different types of testing?
- What is unit testing, integration testing etc?
- Have you worked in Windows? What is the difference you have seen from a DOS environment?
- How does Win Main look like?
- How are the messages processed in Windows?
- Have you done any network programming?
- Why networks are layered? What is the advantage of that?
- How many layers are there in OSI?
- Are you familiar with network topologies?
- Which are the different network topologies?

- Give an example of bus type network.
- What is the band width of Ethernet?
- Explain the advantage and disadvantage of Ethernet.
- Which is the protocol used in Ethernet?
- Can all recursive programs be written iteratively?
- What should you do to ensure that one program doesnt corrupt another program in a multi-program environment?
- What is SQL?
- Whats the advantage of SRAM over DRAM?
- What is method used for disk searching?
- Which feature does C++ have that C does not have?
- What is the difference between synchronous and asynchronous transmission?
- What does quality factor indicate?
- What is difference in IRET and RET statements of 8086?
- What is the difference between C and C++?
- What is the purpose of hashing?
- Define avalanche diode multiplication?
- What is coupling?
- What does CONNECT BY mean?
- What is DHCP used for?
- Explain Codd's rule related to database?
- What is RSA?
- What is the use of global static variable in C?
- Define functional dependency.
- What is the command to initiate the Windows?
- In Unix, how does inter process communication take place?
- Which was the first super computer built in India?
- Whose product is Power PC 89? What is meant by QUEUE?
- What is meant by STACK?
- What is the difference between 80286 and 80287?
- What is meant by recursion?
- What is the difference between Macro and ordinary definition?
- What is the difference between Class and Structure?
- Describe VRTX in a few words.
- How does the scheduler know the time when it should be scheduled?
- What is deadlock? How do you avoid it?
- What is runtime locatable code?
- What is volatile register definition in C?
- How is semaphore variable different from variable?
- What is Dynamic allocation?
- Give the difference between monolithic and microlithic kernel.
- In Unix what is the difference between select and poll?
- What is a finite Automata?
- What is Turing machine?
- What is binary search, traversal, hashing etc?
- What is waterfall model, prototype model etc?
- What is indexing in databases?
- What is atomicity?
- Write recursive programs to calculate factorial in C++.
- What is the best data structure to store the process information in a real time operating system?
- What is a semaphore?
- What is a critical section problem?
- What is the dining philosophers problem?

- What are the various hashing techniques?
- Layers of an OS?
- How do you quick sort using double link list?
- What is a router?
- What are system calls?
- Describe a JK flip flop.
- Various methods of inter process communications.
- What is a virtual function used for?
- What is pipelining?
- What is boundaryfill, flood fill and scan fill?
- Explain DAD, ALE, BHE, DEN, HLDA.
- What is the difference between little Endian and big Endian data format?
- Describe the modes of operation of 80386?
- Explain the superscalar architect of Pentium?
- What is the difference between # include and # include stdio.h?
- Mention any two CPU scheduling algorithms?
- What is a Moore machine?
- Describe the functions of a red black tree.
- Explain the travelling sales person problem?
- What are the functions done during the 1st pass of an assembler?
- Explain RTOS?
- How is code optimisation done using DAG?
- What is a universal turning machine?
- What is 8087 used for?
- Give the features of CDMA technology?
- Explain the principle behind the functioning of a search engine.

Electrical Engineering

- What is the difference between neutral and earth?
- Why is alternating current used for transmission?
- What is corona?
- What is skin effect?
- Why is the voltage stepped up before transmission?
- What are the standard transmission and distribution voltages?
- Explain transmission and distribution systems?
- What are lightning arrestors?
- What is the difference between an insulator and a dielectric?
- Explain the principle of operation of relay and a circuit breaker?
- What is 3-phase supply?
- What is a busbar?
- What are the disadvantages of low power factor?
- What is arc formation?
- Why do we require protection against lightening?
- What is substation?
- What is grading of a cable?
- What are transmission cables made of?
- What is the purpose of a fuse?
- Explain the power rating of this bulb, say 60W, what if the voltage changes?
- Why is the earth pin in a 3-pin plug the longest and the thickest?
- Which is the motor used in fan?

- Explain the basic operation of dc motor / generator, induction motor, synchronous motor, stepper motor, and repulsion motor.
- What is hysteresis loss?
- Why do we use a starter for a dc Motor?
- What are back emf, commutation, armature reaction, stray losses; and breakdown torque?
- Why is an induction motor called a rotating transformer?
- What is slip?
- What is the purpose of compensating winding?
- What will happen if you supply a fan with dc?
- What is cogging and crawling?
- Why shouldn't you start a shunt motor on a heavy load?
- What are dummy coils?
- What are CT and PT?
- What is voltage build up of a generator?
- What is a universal motor?
- Why is transformer rating in KVA?
- What is voltage regulation?
- Why is transformer flux constant?
- Why is an induction motor used for most domestic applications?
- What is regenerative braking?
- Give an example where a transformer is used in a dc application.
- What is the problem with a fan that does not rotate unless rotated manually to start?
- What are brushless alternators?
- What are equalizer rings used for?
- What are interpoles used for?
- What is eddy current loss?
- What is plugging of an induction motor?
- What is the principle of operation in a tube light?
- What are the advantages and disadvantages of compact fluorescent lamps?
- Which is more dangerous - shock due to ac or dc?
- What is an UPS?
- What is the approximate power production capacity of India / Kerala?
- Explain the principle of dc motor.
- Explain the uses of servomotor.
- How do you specify the rating of transformer?
- How is speed control of ac motors achieved?
- Differentiate MC and MI instruments.
- What are integrating instruments? Give examples?
- Explain PLL circuits.
- How do you convert fixed ac to variable dc?
- What is the purpose of testing thyristors in speed control of drives?
- What are the uses of Schmidt trigger circuits?
- How can you eliminate noise in digital circuits?
- Explain low pass filter?
- How is the alternator synchronized to the main busbar?
- What is a Scott connected transformer?
- What is commutation in dc machines?
- What are damper windings?
- What are cooling methods used to cool a transformer?
- Can you start a series motor without load? If no, why?
- Draw the equivalent circuit of a transformer.
- What is R model of a circuit?

- What is specified in synchronous watts?
- How are lines affected due to switching operations?
- Is there any difference between the circuit breakers and the isolators?
- What do we prefer, overhead cables or underground cables?
- Is corona more in dc lines or ac lines?
- Are single induction motors self-starting?
- In a delta connected circuit are 3rd harmonics present?
- What is a shunt?
- What is phase swinging?
- What is phase margin?
- What type of motor is needed in hoists?
- What is IDMT?
- What is current chopping?
- Which circuit breaker uses current chopping circuit?
- Can an inverter be used as a converter? How?
- What are the types of faults that can occur in a 3-phase line?
- What is a ground line?
- What is form factor?
- What is an oscillator?
- Does an oscillator have input? If so, draw it?
- What is modulation?
- How do you start an induction motor?
- Which type of luminance has greater visibility - GLS or FL?
- How would you conserve electricity at home, being an electrical engineer?
- What is the generating voltage in India?
- Which generating station in Kerala has the largest capacity?
- Which is the oldest generating station in Kerala?
- What is SEADA?
- Why do we use a wave trap, draw the circuit?
- What is power line communication?
- What is the difference between an overcurrent relay and a fuse?
- How can you control the output voltage in an inverter and converter?
- How can you decrease the harmonics in a wave form?
- What are travelling waves?
- What is the general industrial power factor in India?
- What is diversity factor?
- Why is the wave form sinusoidal?
- Give some practical applications of variable resistance.
- Explain the working of a ceiling fan?
- What are the equipment in a substation?
- What are instrument transformers?
- Name the thyristor that can be turned off by applying signals to its gate terminal.
- What is the significance of having 11KV as the generation voltage?
- Explain the effect of a free wheeling diode.
- What is a page hit?
- What is cache memory?
- What do the three pins of a socket represent?
- Explain basic circuitry of voltage stabilizer.
- How do you drive a motor using 8085 microprocessor?
- How does a tester work?
- How is magnetic field intensity calculated in the vicinity of a current carrying wire?

Electronics and Communication Engineering

- What are Flip flops and explain their working?
- Differentiate between flip-flops and latches.
- What is totem pole?
- What is the mode of transmission of TV signals?
- Draw the internal circuit of 8085 microprocessor.
- What is a bit? What is CMOS?
- What is the bandwidth of FM?
- As an electronics engineer, how would you distinguish between paper money and digital money?
- What is modem? Draw its internal diagram.
- Obtain a square wave from a sine wave form Zener diodes.
- What is difference between oscillator and multivibrator?
- What is blue tooth and WAP?
- What are trappatt arid impatt diodes?
- What is emitter follower?
- Give the electromagnetic equations in the order of discovery.
- Find the transfer function of a given RLC circuit.
- What happens when you type user-name and password while logging on to a Unix system?
- Draw the circuit for an adder using NAND gates.
- Explain internal organization of memory chips.
- What are the different types of control systems?
- Explain open loop with block diagram examples.
- What are the advantages of closed loop?
- How can you design a stable system?
- Explain different stability criteria.
- Explain Ruthz-Hervitz rule in one sentence.
- What are poles and their significance?
- Is there any control system in this room (interview hall)?
- What is Karnaugh map?
- What are the 4 methods to reduce a Boolean expression?
- Draw 8086 internal architecture.
- What are the different types of buses?
- What are the different registers in CPU?
- What is the use of segment register?
- Which is the 1st 32-bit microprocessor?
- What are the different UPS?
- Compare 8086 and 80286.
- Explain the internal architecture of 8086.
- What do you know about antennas?
- Define control system. Why are control systems so important?
- Draw the block diagram of a control system and write its transfer function.
- What is ROC?
- Transformation between S and Z plane.
- What is wave studio?
- What is bit rate?
- What is the difference between mp3 and wave formats?
- What is sampling?
- How do you damp noises and jerks in recording?
- What is Winamp?
- What are plugins?
- Explain the functioning of an OP-AMP.

- What is the difference between input and output plugins?
- What do you know about CD writing?
- How do you mix BGM? What is its procedure?
- What is bus?
- What do you mean by 20-bit address bus?
- What is the ideal gain of an opamp?
- What is a database?
- What is the database software that is proprietary of IBM?
- What is the difference between half adder and full adder?
- Implement a half adder and a full adder.
- What is packet switching and circuit switching?
- What is VOIP (Voice over Internet Protocol)?
- What types of communications do you know?
- Explain various types of digital communication.
- Explain the structure of MOSFET - where and why they are preferred.
- How is amplification possible in a transistor?
- Classify power amplifiers (A, B, AB).
- What is doping?
- Describe DMA controllers.
- What is the protocol used in telephone network?
- Explain different types of switching.
- How many pins are there in 8086?
- What is the most important advantage of blue tooth?
- Which is the universal flip-flop?
- What are interrupts? How will you set an interrupt?
- What is Dynamic Memory Access?
- What is SRAM, DRAM? Compare the two, relative cost of the two.
- What will happen in case of a power failure for the above?
- What is modulation? What are the different modulation techniques?
- What is FM, PM and AM? Compare the three and what happens in them?
- Which waves will travel longer distance - FM or AM?
- What is a thyristor? Differentiate between thyristor and diode.
- Explain the switching action of SCR and triggering.
- Draw the diagram of thyristor.
- Advantage of CMOS and TTL.
- What technology is used in cmos logic?
- What are VLSI and ULSI? What is the number of components in both?
- How many components are there in the Pentium processor that we use?
- Which is the latest Pentium processor? What is its speed?
- Explain the technology used in the manufacture of Pentium processor.
- Design a decade counter.
- Explain asynchronous and synchronous counter.
- Minimize function using Quine McCluskey: $f = xy + xy + yz + x y z$.
- What is a prime implicant?
- How does a diode look (internally)? Explain working using internal diagram.
- Explain processes taking place in the depletion junction of a forward biased diode.
- What is an op amp?
- What is a buffer? what is the gain of a buffer?
- What is an oscillator?
- How do you forward bias a transistor?
- What are the practical applications of transistors?
- What is reverse recovery time and how does it affect a diode?

- What is a compiler?
- How can you test a compiler with certain boundary conditions?
- What is VHDL?
- What is FSF? What do you know about it? Any current relevance?
- Differentiate between open loop and closed loop control systems?
- Draw and explain the working of a monostable vibrator using op-amp.
- State Thevenins theorem and Nortons theorem. What is their application?
- What is the mathematics used in DSP and from which domain to which domain is signal converted?
- Difference between intrinsic and extrinsic semiconductor.
- Draw an internal block diagram of a normal voltage stabilizer.
- What is a reference variable?
- Volume control in TV is logarithmic. Why?
- Does MATLAB have an interpreter or a compiler?
- What do you know about segmentation of memory in 8086?
- What is virtual memory?
- Differentiate between macros and functions in C.
- Explain the significance of electromagnetic interference in PCBs and computer boards.
- What are the various pin connections to peripherals, memory and interrupts?
- Draw a rough diagram of a mother board using 8086 with relevant connections.
- What is the tri-state or high impedance state?
- What are the differences between open collector output and totem pole output?
- Find the highest clocking frequency of a digital circuit given the rise time, fall time and propagation delay?
- Implement Boolean expression using MUX (2 to 4, 3 to 8 etc).
- Draw the state graphs of a given problem like sequence generator, flip flops etc.
- Why is the accumulator called so?
- How can we implement a stack?
- Construct a D flip flop from a T flip flop.
- What is virtual ground in an opamp?
- Why is uplinking frequency higher than down linking frequency?
- Explain the booting procedure of a computer?
- What is metastable state in flip-flops?
- What is round robin technique of interrupt arbitration?
- What is avalanche breakdown? When does it occur?
- Explain the operation of a zener diode.

Economics

- What is demand?
- What is the shape of the demand curve?
- What is supply?
- What is the shape of the supply curve?
- What are Giffen Goods?
- What are the determinants of individual demand?
- What are the determinants of supply?
- How are prices determined?
- What is the Law of Diminishing Marginal Utility?
- What is Opportunity Cost?
- What is a Veblen Good?
- What is price elasticity of demand?
- What is income elasticity of demand?
- What do you mean by cross elasticity of demand?
- What are complementary goods?

- What are substitute goods in economics?
- What are Indifference Curves?
- What are the properties of Indifference Curves?
- What is the shape of an Indifference Curve?
- What do you mean by a deadweight loss?
- What is demand forecasting?
- How is demand forecasting done?
- What are externalities?
- What do you mean by the 'free-rider' problem?
- What are positive externalities?
- Give two examples of positive externalities?
- What are negative externalities?
- What is the negative externality associated with a nuclear power plant?
- What is a Pigovian tax?
- Is carbon tax an example of a Pigovian tax?
- What is predatory pricing?
- Explain the concept of absolute advantage.
- What is income effect?
- What do you mean by substitution effect?
- What is monopoly?
- Define oligopoly.
- What is monopsony?
- Give examples of monopoly, oligopoly, and monopsony.
- How is a monopoly different from a cartel?
- What is a Lemon Market?
- What is asymmetric information?
- What does the Hecksher-Ohlin Theorem state?
- What is a tariff? Why are they imposed?
- What is GDP? How is it measured?
- What is GNP?
- What is the difference between GDP and GNP?
- Between GDP and GNP, which is a better estimate?
- Define nominal GDP.
- What is real GDP?
- What is the multiplier effect?
- Define inflation.
- What are the causes of inflation?
- Explain demand-pull inflation? Does India experience it?
- What is cost-push inflation? Does India experience it?
- What is the Fisher Hypothesis?
- What is BoP?
- What are isoquants?
- Explain the Cobb-Douglas Production Function.
- What is the IS schedule?
- What is the LM schedule?

Commerce

- What is the Personal Income Tax rate?
- What are Direct and Indirect Taxes? Give examples.
- Why does a Balance Sheet balance?
- Is loss an asset or a liability?

- What are LIFO & FIFO? What are they used for?
- What are Quick Assets?
- What is Amortisation?
- What is Depreciation? What are the different methods of Depreciation? Which method is better and why?
- Do you know what N.P.V. discounting is?
- What are Derivatives?
- What are Options and Futures?
- What is Operating Ratio?
- Does dividend reduce profits?
- What is Trial Balance?
- Why is Trial Balance used?
- If ledger postings are computerised, do you require a Trial Balance?
- What is the highest rate of Depreciation under Income Tax and for what items?
- Does depreciation reduce profit?
- What is Current Ratio?
- What is Working Capital?
- What is the ideal Current Ratio? Why?
- What is Negative Working Capital and explain its implications?
- What is Discretionary Expense?
- What is Capital and Revenue Expenditure?
- When can Revenue Expenditure be capitalised?
- Is there any ratio of the expense incurred and cost of asset to capitalise the expense?
- What are the advantages of Capitalisation?
- If you are an investor, what will you look for before you invest in a company?
- What would happen if a company pays a lower dividend?
- Can you draw up a Balance Sheet?
- What is Fiscal Deficit?
- What is Budget Deficit?
- What is Mean / Median?
- Where does Goodwill appear in a Balance Sheet? Why?
- Explain Going Concern concept.
- Explain various costs in cost sheet.
- What is Contra-entry?
- What is Country of Origin?
- Can the captain of the vessel dump the goods in the middle of the sea?
- What is Sight Draft?
- What is Capital Account Convertibility?
- What is Corporate Tax? Is it a direct or indirect tax?
- What is the elasticity of demand and supply in corporate taxation?
- What are the differences between companies falling under small and medium sector?
- What is the difference between Excise Duty and Customs Duty?
- Can depreciation be on fixed assets only?
- As depreciation is to fixed assets, what is the same analogous to debtors?
- How much depreciation would you charge on a building - 5% or 10%? Why?
- Why is it that one has a 30% depreciation on computers and less on buildings?
- What is Single Entry? Why is it considered inferior to Double Entry?
- What is Bank Reconciliation Statement? What are its advantages?
- What is Tariff?
- What is the difference between Tariff & Customs Duty?
- What is Ad Valorem Duty?
- What is a Surcharge?
- Explain the calculation of IRR or NPV.

- What are the various costs in Accounting?
- What is Direct Cost?
- Is it a Fixed Cost or a Variable Cost?
- What is an Indirect Cost?
- What is Marginal Cost?
- How is the Exchange Rate between two currencies determined?
- What do you understand of the term Option?
- Define Fischers Equation?
- What is the difference between Financial, Cost and Management Accounting?
- What does a Management Accountant do?
- What ratios did you learn?
- What is Current Ratio?
- What is the ideal Current Ratio?
- What is the history of Double Entry?
- If a company spends on training of personnel, how does it account for?
- What is an Asset?
- What is Social Accounting?
- Is HR an asset? If shown on balance sheet what can you think of as corresponding liability?
- What is Trading A/c? Manufacturing A/c? The profit from Trading A/c is transferred to?
- What is Goodwill? What are the methods by which it is calculated?
- What is Marginal Rate of Taxation?

Biotechnology

- What is biotechnology?
- Give examples of application of biotech for welfare of mankind.
- What is cloning?
- Is cloning ethical?
- Name some cloned animals.
- What is a stem cell?
- What are the applications of stem cell technology?
- Can you name an Indian corporate group that is into stem cell research?
- Why does a cell multiply?
- What are bacteria?
- What are fungi?
- What is the difference between fungi and bacteria?
- What is a virus?
- Why is virus non-living?
- What is the difference between bacteria and virus?
- What are the major biotech companies in India?
- What is the use of biotech in agriculture and dairy industries?
- What is a protein?
- Is nucleic acid a protein?
- What is a gene?
- Who coined the term 'gene'?
- What is gene amplification?
- What is gene bank?
- What is gene pool?
- What is DNA?
- What is DNA made of?
- What are the four nitrogenous bases in DNA?
- What is RNA?

- How does DNA duplicate itself?
- What is a DNA chip?
- What is terminator gene technology?
- What is a chromosome?
- What do you know about the Human Genome Project?
- What are the applications of Human Genome in pharmaceuticals?
- What is genetic engineering?
- What is hybridisation?
- What is the difference between genetic engineering and hybridisation?
- What are amino acids?
- What is the difference between physical chemistry and organic chemistry?
- Name some inheritance diseases.
- Is haemophilia an inheritance disease?
- What is the contribution of Watson and Crick?
- What is mitosis?
- What is meiosis?
- What is alcoholic fermentation?
- What is an enzyme?
- What is dextran?
- Name the different vitamins.
- What is a steroid?
- What is PNA (Peptide Nucleic Acid)?
- What is an interferon?
- What is humulin?
- What is a polysaccharide?
- What is Teflon?
- What are the properties of Teflon?
- Name some Chemical companies.
- What are the mainstream products of DuPont?
- What is Mass Transfer?
- What is a Horton sphere?
- How is NH₃ stored?
- Which is the most toxic gas?
- What are fluid machines?
- What are solid machines?
- What are the differences between fluid machine and solid machines?
- What is viscosity?
- What is surface tension?
- Why does a liquid flow freely?
- What are CFCs?
- What is Osmosis?
- What is Osmotic pressure?
- What is term diffusion?
- What is a chemical bomb?
- As a chemical engineer, state the difference between nuclear warfare and biological warfare?
- What is a polymer?
- What is a synthetic polymer?
- Name some synthetic fibres.
- What is electrolysis?
- What is PET?
- What is an elastomer?
- Name some specialty chemicals.

- What is heat transfer?
- What is thermodynamics?
- What do you know about food processing technology?
- What is nanotechnology?
- Who first spoke about nanotechnology?
- Who coined the term 'nanotechnology'?
- How is steel manufactured?

Int Qs on Acads : Mechanical Engineering

- What is Mechanical Engineering?
- What are Carnot Cycle, Otto Cycle, and Diesel Cycle?
- Explain simple vapour compression cycle in refrigerator.
- Which compressor is usually used in AC?
- Why don't CI engines need a spark plug?
- What are MPFI and TPFC systems?
- State the laws of Thermodynamics.
- Which is your favourite car and why?
- Which is your favourite two-wheeler and why?
- When we start a vehicle, exhaust smoke appears white. Why?
- What are the various thermodynamic systems? What are the basic definitions?
- What is triple point of water?
- What is an indicator diagram? What are the features and advantages? How is it different from p-v diagram?
- What is a differential and how does it work?
- Explain 4-stroke and 2-stroke engines.
- What are the differences between SI and CI engines?
- What is the difference between turbo charging and supercharging?
- What are knocking detonation and pre-ignition? What are the preventive measures adopted?
- What is meant by Jet Propulsion? Ramjet, Scramjet, Turbojet, Turboprop, and Turbo fan?
- Explain common automobile specifications.
- Explain refrigerator system.
- What are the refrigerants used in refrigerators, AC, water coolers, walk-in coolers, and freezers?
- How are AC systems like window AC, split AC, and central AC different from each other?
- What are Heat Exchangers?
- What are Conduction, Convection and Radiation?
- Explain the concept of a black body.
- Explain Stephan-Boltzmann Laws, Kirchoffs Law, Plancks Law and Wiens Displacement Law.
- Explain lubrication system in IC engines.
- What is SAE?
- How to identify two balls having same external radius and weight, one hollow and the other solid, of different materials?
- Explain the principle of Watts Governor.
- Differentiate between governor and fly wheel.
- What is ASHRAE?
- What are the different types of turbines and compressors?
- What are the new trends in IC engine? What do you know about CDI, ball piston, camless engines like GDI, VTEC?
- How does the number of valves per cylinder affect the cycle?
- How can you differentiate between the inlet and outlet ports?
- What is ABS, GPS, SBC, SOHC, and DOHC?
- Explain different types of gears and their applications.
- Certain vehicles can be started by keeping the gears engaged, while certain others cannot be - explain?
- Tell us about different types of manufacturing processes.

- How do you polish a ball bearing?
- Differentiate between lathe and a milling machine.
- How will you machine a square cross-section in lathe?
- What are the different processes carried out on a lathe?
- What are CNC and DNC machines? Compare.
- What is the mode of manufacture of common articles like chairs, toothpaste tubes, and pens?
- What are different cutting tool materials and composition?
- Tell about cooling fluids and their functions.
- Differentiate between shaper and planer.
- Explain heat treatment processes.
- What do you mean by bending moment diagram? Explain its significance.
- What is Hooks law?
- What is Poissons ratio? Between glass and rubber for which material it is more and why?
- Can Poissons ratio be negative?
- Explain bending moment equation and torque equation.
- Explain crippling load with equations.
- What are the principal stresses and strains?
- What is Eulers theory?
- What is actor of safety and its significance in design and manufacturing?
- What is Endurance limit?
- How is flow measurement in pipe channel done?
- What is water hammer?
- What is the function of surge tank?
- Explain boundary layer theory and separation.
- What is Magnus effect?
- Explain Mach number and its significance.
- What is draft tube and explain its application?
- How does a centrifugal pump work?
- What is cavitation? What is its use?
- Explain the working of reciprocating pumps.
- Explain slip in reciprocating pumps?
- What is an air vessel and explain its functions?
- Explain the working of hydraulic ram, accumulator, lift.
- What is the function of pen stock?
- Apply Bernoullis theorem to an aircraft.
- Compare the constructional details of a petrol and diesel engine.
- Which gear is used to obtain maximum speed ratio?
- Which law of thermodynamics is applicable when you inflate a tyre?
- Why isnt the earth expanding?
- Differentiate between absolute and kinematics viscosity?
- Is turbo charging possible in petrol engines?
- Explain mechatronics?
- Explain the various processes required to manufacture an air conditioner or a boiler.
- Draw the Fe-C equilibrium diagram.
- What are the different types of layouts?
- Which is the type of lighting best suited for Software Company?
- Tell about head and turbine for different types of hydroelectric stations.
- What electives have you taken and why?
- Where does the future of mechanical engineering lie?
- What is Six Sigma?

Tips for Essay Writing

WAT: Written Ability Test

Professors at top Bschoools have long lamented the fact that their students while great at math and technology are seriously lacking in English writing skills. Whether is business communication, technical writing or creating proposals, basic writing skills are critical for manager. Keeping this in mind, most top Bschoools starting from the IIMs have included WAT as part of their selection process. In some cases WAT has replaced GD and in some cases it is addition to the selection process. A typical WAT task involves writing an short essay on a given topic, within a time frame of 15-25 min.

Preparing for WAT

Read Read and read. Students should be well informed about happenings across India as well as key international events. WAT is normally evaluated more on the effectiveness of the argument but not style of language used or complexity of vocabulary. Focus on identifying the Facts, Interpretation, examples and opinions etc while studying arguments. Facts are used as evidence. Facts are necessarily objective and their truth is Independent of the author.

Examples are true statements but they are cited to support specific arguments. We should understand whether the examples are relevant to the argument. Also note that examples can support but never prove an argument. Interpretation of facts is done by an author to speculate upon the cause and effects or the facts and is not necessarily objective. Opinions and are subjective and indicate the author's beliefs, preferences on a particular issue. Write concise arguments for and against an issue. This makes for great practice.

How to write an Actual WAT (15 min)

Spend the first 2-3 minutes gathering ideas about the topic. A WAT is a logical argument. Decide the conclusion of your argument. The conclusion need not agree with the topic. In fact you can write a balanced conclusion which may partial agree with the topic. Write a simple introductory passage. This may include, Interpretation of the topic, its relevance and context. In other words it will decide the scope of your argument. For the main body, select not more than 3-4 ideas and explain them with examples. These ideas would be facts and premises, which support your argument. Write the conclusion. This is the key part of the essay and must be included. It should logically flow from your main body. Don't go beyond 300-400 words at max. In other words, 1 side of an A4 size paper is good enough size for a 15 min WAT.

Keep sentences short and vocabulary simple. If there is any doubt in your mind about the meaning of a word, use a substitute. Be careful about grammar. Using short sentences, primarily in active voice can help minimize errors. Don't hurry, avoid spelling mistakes and illegible handwriting.

Some sample topics for practise

National affairs:

- India has the largest pool of talented manpower but very few innovations and patented products
- India cannot become a developed nation without promoting manufacturing sector
- Allowing Foreign Universities in India is bad for India's education system
- India versus Bharat: a divided nation
- How should women empower themselves?
- More than one billion Indians: A gigantic problem or a sea of opportunities
- In India, mass mobilization can only be achieved through religion
- Activism is necessary for survival of democracy
- Indian polity has a better socio-economic model for growth than China
- Corruption is the cause for slow economic development.
- It is the society that bears the brunt of terrorism, while terrorist gets the publicity
- India needs smaller states for better governance
- Which form of democracy us better - Presidential or Parliamentary?
- Even Jan Lokpal Bill can't phase out corruption in India.
- Aadhar: Utility is less than the struggle in implementation.
- Is the AAP dream run over?

Political Issues:

- *Rahul ji ke nau hathiyar, door kareng bhrashtachar*
- With three anti-corruption laws - the Black Money Regulation Act, Lokpal and the Right to Information Act – does congress really want to remove corruption?
- Voting should be made compulsory
- Banning politicians with criminal records from contesting elections is a violation of their human rights
- Power tends to corrupt and absolute power corrupts absolutely.
- Women's Reservation Bill – Will it ever get passed
- Union Budget is useless and recession puts it off track
- Can we bear the burden of Food Security Bill?
- India is an example of misinterpreted democratic system. Is democracy crumbling?
- Elimination of subsidies will boost the government's image.
- Can populism make good economic sense?
- Will Narendra Modi be a good Prime Minister for India?

Economy/ Business Issues:

- Recession is the mother of innovation
- Discuss the role of Public Private Partnership in India's Economic Growth
- Foreign direct investment will revitalize the education system
- Businesses should concentrate on making profits and not address social and environmental Issues
- Is it possible to have no income tax in India?
- The recent financial crisis highlights the perils of Capitalism
- Essential services like water, electricity should not be privatized
- Is disinvestment in profit making PSU's advisable
- Do Corporates really have a social responsibility?
- FDI in retail a boon or bane for India
- Should business lobbying be made legal in India?
- Indian economy is not supported by coherent fiscal and monetary policies
- Effects of corruption; in today's world, business and ethics don't go hand in hand
- Family-managed business vs professionally-run organizations
- If governments live within their means, there will be no inflation
- The mining sector should be run only by the government
- The decline of UPA2 proves that subsidies don't win elections