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# TOPPERS' STUDY HACKS

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By

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## PREFACE

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After interacting with lot of students, I realized that most of the students fail not because of lack of knowledge or hard work or intelligence but because of lack of guidance, planned approach and poor study techniques. So, **the problem most of the students face, is not of potential but of converting that potential into performance.**

Success in study depends not only on ability and hard work but also on effective methods of study. Apart from working hard, success today demands working smart also. The book recapitulates and reinforces the basic techniques of effective study and lays a platform for the student to convert this potential into performance. The book has been written after interaction with thousands of students, hundreds of toppers of all major examinations and teachers from different corners of the country involved in training /preparing students for different competitive examinations.

The book would be useful for students preparing for different competitive exams at different stages of preparation. So whether you have **just entered class X** or dropping an year to prepare for competitive exams or you have to appear in the exam one week from now, **this book has techniques & ideas which have the capability to change things dramatically in a short period of time.** The book has been written keeping the general student in mind. Some of the points in the book might look old and simple while some may look new and interesting. But remember, in order to get maximum benefit from the book, the focus has to be on implementation rather than reading the book like a novel.

**I am sure every time you read this book you will find something new and useful in it. So read it as many times as possible. Read it whenever you get stuck in your preparation and I am sure you will find an answer to every possible problem you can face during preparation.**

Some of the suggestions may seem to be ordinary advice but believe me they are time tested & will definitely benefit a student who practices them sincerely. Consistent study of six to seven hours with proper planning can give success even to average students. **And remember there are no shortcuts**

to success. Success is not something, which you will find lying on the road. Success demands lot of sacrifice, discipline and hard work. As Henry Ford has rightly said “the harder you work the luckier you get”.

In the end I would like to thank all teachers, parents & academicians whose encouragement, feedback & guidance has helped in coming up with this new & thoroughly revised edition.

## AVINASH AGARWAL

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Many examples, stories have been collected from different sources like newspapers, magazines, seminars, websites over last couple of years. Unfortunately, sources were not always noted or available; hence, it becomes difficult and impossible to provide an accurate acknowledgment.

Regardless of the source we wish to express our gratitude to those who may have helped us directly or indirectly in writing this book. If inadvertently we have omitted giving credit, future publications will give due credit to those that are brought to the author's attention.

## **YOUR QUESTIONS ABOUT THIS BOOK?**

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### **When to Read this book?**

- Whenever you get stuck and are not able to proceed further. The reason can be not able to
    - Manage time
    - Achieve targets
    - Concentrate
    - Improve scores
  - The book in these cases will act as a guide and would suggest remedial measures.
  - Whenever you feel you are beaten and out, the book will help you in motivating and rejuvenating you to start working towards your goals again.
- To summarise, you are advised to use the book right from the beginning of your preparation. The book would serve as a guide and motivator, a friend you can rely on, you can fall back upon whenever you have any kind of problem.

### **Have I got time to read it?**

### **Why should you Read this Book?**

Normally a student puts 3000 hours (10 months or 300 days @ 10 hours per day = 3000 hr) learning fundamentals and preparing for different exams. Would you mind spending 2 hrs if those 2 hours can improve your study efficiency by 50-60%. If yes, then this is the book you should read today. If NO, and if you feel you don't have 2 hrs to read anything meaningful which can help you prepare better, **then you are the one who needs it most.**

## **Who is the book written for?**

Anybody who is taking examinations at any level. It is also written for anybody who wishes to help the student study effectively, e.g. parents, teachers and friends. The ideas apply to any form of examinations – written or oral; subjective; number-based (mathematical, problem solving) and multiple choice exams – taken in schools, colleges and universities. Remember, the basic principles involved in studying for all exams are the same.

## **Do I have to read the whole book?**

No. Select those parts that are relevant to your needs now and use them. You may never finish reading the book from cover to cover and that doesn't matter. Try, however, to form an outline of what is contained in the parts of the book you have not used. They may be useful later on. This book is designed to be used, not just read.

## **Do I have to follow all these ideas?**

Definitely not. There is no one perfect or correct way of revising or taking examinations. There are hundreds of ideas that work. Pick and choose those ideas you feel would suit you and your needs. Try new ideas, continuously evaluate them and change them if they do not work.

But remember that new ideas often need a little practice. Sometimes, like any new skills, your performance may be less effective for a very short time, before you see the real benefits.

### **HOW TO USE THIS BOOK**

Read it as many times as possible. You are advised to read it at least once a month.

Focus on implementation. What ever you learn from this book try to implement it in your preparation.



**Questions in competitive  
exams are not difficult but  
they are just different**

# **COMPETITIVE EXAMINATIONS: MYTHS & REALITIES**

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**“Questions in competitive exam are not difficult, they are just different”**

Most of the questions in competitive examinations are not difficult but are different from that of the board. All they need is a different approach and a strategic mindset. Before we talk more about how to adopt a strategic approach and succeed in different competitive exams, it is very important to understand how they are different from regular board exams.

## **Board Exams vs Competitive Exams**

- In board exams the focus is on understanding the concepts whereas in competitive exams the focus is on application of the concepts. The board exams test whether you know the fundamentals or not but competitive exams are designed to test whether you can apply these fundamentals to real life situations or not.
- The question pattern in board exams is subjective whereas most of the competitive exams follow an objective type question pattern. Therefore, in board exams handwriting and presentation skills are given importance but in competitive exams the emphasis is not on your writing skills but understanding of the fundamentals and their application.
- In school exams the competition is marginal and you just fight to outshine among the bunch of students of your class of 50–60 students whereas in any competitive exam you will have to compete with the entire nation or at least state.

- In board exams absolute marks are given importance (%) scored) whereas in competitive exams relative marks are important (% doesn't matter what matters is how many students have scored more than you). So in board exams your target is let us say to score 95% marks whereas in competitive exam your target is to get Rank in top 100 or 99.5 percentile score. In boards both 95% and 98% are good but in competitive exams just one mark can make a huge difference and can result in selection or rejection.
- Board exams are designed to filter below average students from good whereas competitive exams are designed to filter excellent students from not only the average but also the good students. Only top 5-10 % students are selected in competitive exams.
- Board trains the raw mind whereas competition trains the ripe mind. So the former is easier than the latter.
- Competitive Exams have an element of surprise whereas Board exams can be predicted to a large extent.

What makes competitive exams different is the cut-throat competition for the limited seats. Therefore, students should adopt an altogether different approach to crack any competitive exam.

### Type of Questions

The questions in competitive exams can be categorized as follows:

- **Memory based questions:** These are direct questions & can be solved without /bare minimum calculations
- **Application based questions:** These questions involve practical situations & involve application of fundamental concepts .These problems can be further categorized into:
  - **First level application:** involve application of only one concept
  - **Multilevel application:** involve application of more than one (usually 2 to 3) concepts.

Most of the questions in competitive examination are not tough, they are like riddles, which have a catch in them and involve application of several concepts. Each question has an element

of surprise in it and a student who is adept in tackling surprise questions is most likely to sail through. The questions in most of the competitive examinations are new & have not been taken from any of the books. So it is important for the candidate to be regularly exposed to such questions so that he doesn't lose his confidence on the examination day.

## **Last But Not Least: The Time Pressure**

Competitive Exams is often understood as a selection process, but in real sense it is nothing but an elimination technique. The basic objective of the test is to filter excellent candidates from an average one. In a competitive examination it is not important whether you know the question or not, whether you can solve the question or not, what is important is whether you can solve the question in the shortest possible time or not. So your success in competitive exams depends upon your approach towards these questions i.e. the way you attack these questions because that defines the time you would take to solve the question. Most of the questions can be solved by two or three methods but it is important to understand the trick and adopt the shortest method so as to solve the question in the shortest possible time. So, apart from the type of questions what makes Competitive Exams different is the time pressure that they impose on you. Out of 180 minutes that you get in a Competitive Exam normally a candidate uses 18 to 20 minutes of it for darkening the circles that means in the remaining 160 minutes you have 200 questions in front of you. Isn't that race against time?

To summarize, **Competitive Exam is not only a test of your knowledge but it is also a test of your aptitude, time management skills, nerves, consistency and ability to apply basic fundamentals to real life situations.**

## **Are Toppers God Gifted?**

During my different seminars, a question comes up very frequently

*“Are topers god gifted?”*

Or

*“Do they have a very sharp brain?”*

Let me answer this question first by explaining how the brain works.

Do you know that your brain has trillions of cells? **The higher brain has around hundred million neurons and each is more formidable than a supercomputer having the ability to create twenty thousand connections with other neurons with structures called “dendrites” and “axons”** which branch out of the main cell body. When you memorize or learn to solve new questions, you tend to create new dendrites. A simple man and Einstein would have the same number of neurons i.e. same basic potential, the real difference is in the number of connections between each neuron.

When you challenge your mental capacity by learning new things and going beyond your intellectual comfort zone, you will be creating new dendrites and new connections to other parts of your brain. You will be increasing your intelligence. And, it's never late to increase your intelligence. Dendrites can grow at any age but it can disappear if one doesn't actively regulate his/her brain power. Therefore, keep exercising your grey cells regularly to increase your efficiency.

Let me elucidate the fact that '**every individual is born with equal potential only if he/she knows how and where to use it**' with the help of a short story.

A shepherd once found an injured baby eagle while taking his sheeps to the mountain. He then decided to take care of it and in a few days even though the eagle recovered, it decided to remain with the shepherd. Every day, the eagle used to follow the sheeps but was always the last one in the herd. The Shepherd was very surprised to see why the eagle was last. So, one day he met a guru and told the entire story of the eagle to him. The guru then took the eagle on the mountain top and threw it in the air. Suddenly, the eagle with his big wing started flying in the air.



Similar to the eagle, **many students simply follow a herd without realizing their individual potential.** You might be doing something you are not good at and stuck in the herd of sheep. Sometimes, even if you know all the answers to the questions, you don't have enough time to complete the paper and all your preparation go in vain. In the process, you end up considering yourself as an underachiever. But you fail to realise that the fault lies not in your capability or potential but in your study technique and preparation strategy. Remember, you are capable of much more than you think you are. Also, you should know that **if you are not good at one thing you can be good at ten other things.** Invest in yourself and do everything you can learn, grow and expand. And there's no better way to take a proactive approach to self-advancement. Remember everybody has got a different journey and all of us are meant to fly.



Any fact facing us is  
not as important as our  
attitude toward it, for that  
determines our success or  
failure

- Norman Vincent Peale

## **POSITIVE ATTITUDE, FIRM DETERMINATION & WELL THOUGHT PLAN**



Research says that it is self-confidence and motivation that plays a more important role in one's success than that of subject knowledge. It further states that attitude and other soft skills (concentration, confidence, inner strength etc.) contribute upto 70-80% to success. Unfortunately, very few students give importance to their soft skills. As a result, **most of the students are functionally very strong and behaviourally very weak. Often, their reason for failure is not lack of knowledge or hard work but that of motivation and a positive attitude.** So the first and foremost step is to build a positive attitude towards your preparation. And, to embrace a positive attitude it is very important that you question yourself as to -

### **Why am I Studying?**

As a child you are encouraged to ask questions, to be curious about life, and to find out what you love and do that. However, as you grow into an adult your curiosity diminishes, you stop asking questions, and become more concerned with fitting in than questioning certain things in life. As you grow and develop, your fears, doubts and worries grow too, the questions stop, and your childhood individuality and uniqueness disappears.

**Asking yourself 'why' is part of life's journey and you should ask this question to yourself more frequently. 'Why do you do what you do?'** In particular, why do you study and do the hard work that, for many of you, occupies most of your waking hours? When you know the answer you tend to live a more meaningful existence because you know who you are, where you're coming from, and where you're going. You then begin to live your life positively with a sense of purpose, try to stay away from destructive habits and seek out good ones. The beauty of knowing why makes you more willing to embrace your studies and remain more informed which, therefore, makes you better suited to make decisions.

The 'why' lies in the answer as to 'why a child wants to pursue a career that he/she has planned to? When a child says that IT or

# WHAT DO TOPPERS' SAY



**Amey Gupta – All India Rank 8 in JEE Advanced**

"I maintained pace in regular studies and always focused on enhancing my question solving speed. I spent the past two years in dedicated studies to gain clarity on fundamental concepts of Physics, Chemistry, Maths (PCM) along with monthly/weekly tests to ascertain my exam preparation strategy.

Routine study was always a strong part of my exam preparation but it used to be flexible study hours. I used to study for 2-3 hours in three stretches in a day. On an average, I used to study 8-9 hours including coaching classes. It was my habit to complete the study assignments, which carried mock questions, on a regular basis.

Besides, I also attempted a lot of mock tests to improve my exam preparation. In fact, the numerous mock tests that I took in the past two years brought an impressive improvement in my speed to attempt and solve questions.

Mathematics was the easiest section for me. The toughest section was Chemistry but I am satisfied with my performance in the section and I managed to score 105 marks.

I believe that enrolling with a coaching class is not a guarantee to crack JEE examination or any other competitive examination. Apart from your intermediate exam preparation, you need to have a different preparation strategy to crack JEE Main/ Advanced examination. Candidates equipped with shortcut methods to solve questions in a time efficient manner have a better chance of securing a decent rank.

At coaching classes, students are taught several time saving tricks. So, joining coaching offers a few added advantages.

My message to aspirants is to stay focused, study consistently and believe in hard work to achieve success. Students should be cool and confident about achieving their target."

mathematics is his forte, it means he is interested in Engineering. If a child is willing to be in a medical profession, his *why* can be to serve humanity. An engineer's *why* can be love for mathematics, IT or coding whereas a CA's *why* can be love for numbers. Similarly, when a child says that he aims of becoming an IAS officer, his *why* can be a desire to bring a change in the society. So, **when the 'why' becomes clear you automatically get an answer to the 'how'** i.e. "how to study to reach the goal and fulfill the dream?"

For instance, if someone asks you to jump off a running train, you'll never do that until you've a valid reason to jump. But if the train catches fire, the first thing that will come to your mind and the one that you'll try as a reflex action is to somehow jump off the running train. So, in the second case you yourself find out How because Why is clear to you. Let me tell you an amazing real-life inspirational story to answer how this 'why' and 'how' works.

Govind Jaiswal, the son of a rickshaw vendor in Varanasi, had grown up with cruel taunts like 'however much you study, you will still be a rickshaw puller.' He attended a government school and a modest college in Varanasi and secured 48th rank in the UPSC in his first attempt. He achieved success at the young age of 22 when most people struggle to recognize their ambition. Becoming an IAS officer was the only thing he had ever wanted. Behind this focused and firm determination of Govind



there's a story. At the age of 11, he once went to his friend's house who belongs to a well-do-to family but within a few minutes he was thrown out of his friend's house in a very disgraceful manner. He was also warned against their friendship. This humiliation was taken by Govind in a positive way and made him strong and determined to achieve something big and respectable. At that time, the most desirable and prestigious job that came to his mind was that of an IAS officer and since then it became a goal of his life. He says that he had no option. The only thing he could do was work hard at his studies.

He had studied with cotton stuffed in his ears to drown the noise of printing machines and generators below his window in a poor neighbourhood where small workshops existed cheek by jowl with tiny residential quarters. Govind had given Math tuitions to supplement the paltry sum his father could afford to send him each month. His ailing father had sold a small plot of land to give Govind about Rs 40,000 so that he could move to Delhi to provide him a better place to study and pursue his childhood dream of becoming

# WHAT DO TOPPERS' SAY



**Chitarang Murdia – All India Rank 1 in JEE Advanced**

"I was expecting my AIR to be in top 20 but it really is an unexpected result and I am very happy that my hard work really paid off. The achievement has been possible due to my hard work, focus and determination that I put in the last 2 years. Moreover my curiosity of exploring the facts, fundamentals and concepts helped me a lot in understanding the basics of the entire subject which plays a key role for the success in the exam. Regular study is very important for success in exams. I always tried that whatever is taught in coaching must be revised on the same day and all assignments given, must be completed in the appropriate time. I used to study in the slots of three hours, as the exam of JEE is of three hours.

According to me, Physics was easiest to prepare as it is my favourite subject and Chemistry was toughest as the chemistry has very huge course content.

The syllabus of JEE MAIN and JEE ADVANCED is very enormous and coaching helps a student in creating the environment and the motivation to go through the whole syllabus. Coachings also help the students in resolving their doubts. As far as self preparation is concerned if a candidate can create such an environment and resolve his doubts by his own then he should not take admission in any coaching.

The period of fifty days between JEE MAIN and JEE ADVANCED is very crucial. We must create some short notes on the whole syllabus in the earlier days of studies so that we can revise the whole syllabus in the 45 days. In the last 5 or 6 days we must remain stress free and try to do the revisions only and must have a complete sleep one night before the exam.

More than helping social media channels are the hindrance in the preparation, so I always try to keep the distance from different social media channels during my preparation period of two years. During the two years of my studies I have always tried to learn from my mistake. One should never ignore his/her mistake as even the silly mistakes can destroy your dreams."

an IAS officer. Later, in an interview his father said, “Until now, even the courier delivery boys found our house with great difficulty but now even the fruit cart-wallah, one-and-a-half kilometres away, will tell you where the ‘IAS’ house is.”

This story of Govind exemplifies why every task should have a sense of purpose and the most basic definition of purpose is the “why” question—why someone is working on a task. When you’ve a sense of purpose, it can make you feel as though what you do matters, but that’s just the tip of the iceberg. The sense of meaning that you can derive from purposeful studying will translate into elevated levels of engagement. As human beings, we’re wired to connect, and part of purpose is serving others or serving the greater good, something outside of us that allows us to feel more connected. When you can see the impact that you have on another person or the world, it carries a lot of weight. And, **it all begins with a simple belief - belief in yourself.** If you have faith in yourself, nothing can stop you from reaching new heights.

## Belief System

Most of my interaction with students highlights the fact that despite having the similar basic potential, **students fail to progress in life due to absence of a strong belief system.** Too often students look for corroborating evidence to support their right to feel worthy and capable. And like everything else, it all begins with your mindset, with the conversations you have with people and the messages you choose to believe. Every time I ponder over what people have to say, I think of a beautiful story from my childhood that was narrated to me by my grandfather and that’s how I retain my energy and confidence.

Once, a group of frogs were travelling through the woods, when suddenly one of them fell into a deep pit. When the other frogs crowded around the pit and saw how deep it was, they told the frog that there was no hope left for them. However, the frog decided to ignore what the others were saying and proceeded to try and jump out of the deep pit. Despite his efforts, the group of frogs at the top of the pit were still saying that he should just give up. That he would never make it out of the pit. The frog continued to jump as hard as he could. Again, the crowd of frogs yelled at him to stop the pain and just die. He jumped even harder and finally made it out. When he got out, the other frogs were



# WHAT DO TOPPERS' SAY



**Arvind Subramanian – All India Rank 4 in AIIMS**

"I secured AIR 6, 17, 32 in KEAM, JIPMER, and NEET respectively. Yes, I put extra effort to crack the Jawaharlal Institute of Postgraduate Medical Education & Research entrance examination. My mind was preoccupied with a desire to achieve a good rank in JIPMER this year. There was an emotional equation for the mentioned inclination. I am very fortunate that my hard work has paid off and I will soon enroll with JIPMER located in Pondicherry. Preparation strategy was to work hard and have clarity on basic concepts of Physics, Chemistry and Biology subjects. I started preparing the various medical competitive examinations simultaneously with my intermediate examinations.

During my Intermediate first year, I invested a lot of time to strengthen zoology and botany subjects because these two subjects have vast theory parts. Thus, the Biology section demanded exam preparation to be started early.

Then, as I entered Intermediate last year, I also focused on physics. I made a point to attempt and solve at least 20 numerical a day within a set deadline to boost question-solving speed. This really helped me solve questions in a time efficient manner during several entrance examinations. A month before the AIIMS exam, I was busy revising notes and solving previous years sample papers after 10-15 days. Revision exercise allowed me to analyze my weak areas and brought good improvement in my exam preparation.

I also used to take 4-5 mock tests a week, which helped me to improve my question solving speed. And a day before the exam I indulged in activities like listening to music and playing video games to bust exam restlessness."

furious and said, "Did you not hear us?" The frog explained to them that he was deaf. He thought they were encouraging him the entire time he was trying.

Similarly in life, you might come across a lot of negative people who would try to discourage you or put you down. Such people will only tell you that clearing NTSE,IIT,NEET entrance or getting 95% and above in Boards is difficult. They will demoralize you by saying the subjects are going to be challenging for you or that it's simply not your cup of tea. At such times, just **turn a deaf ear to all the negative comments and pick up your inspiration to move on**. No matter how much the world tries to hold you back, think only about your dreams and stand firm on them. Don't let negative people drag you down. Because based on your belief in your ability, you'll be able to take chances, risks and opportunities. **The choices you make are often determined by your belief in yourself.**

The reason I am advocating for focus and dedication on self-belief is that too many of you have already spent far too much time focusing on that which you feel you lack. It's time you start focusing on the good. **It's time you start believing in yourself that 'you can'**. Rebuild your belief system if you feel you're stuck somewhere because of the discouragement of people or lack of confidence. If you don't do it now, you'll spend all your life doubting your potential. I'll elucidate my point with the help of a short story.

Not many years ago, a gentleman was walking through an elephant camp, and to his surprise he spotted that the elephants weren't being kept in cages or held by the use of any chains. All that was holding them back from escaping the camp was a small piece of rope tied to one of their legs. As the man gazed upon the elephants, he was completely confused as to why the elephants didn't just use their strength to break the rope and escape from the camp. They could easily have done so, but instead, they didn't

try at all. Curious and wanting to know the answer, he asked a trainer nearby why the elephants were just standing there and never tried to escape. The trainer replied:

*"When they were very young and much smaller we used the same size rope to tie them and, at that age, it's enough to hold them. As they grew up, they are conditioned to believe they cannot break away. They believe that the rope can still hold them, so they never try to break free."*



# WHAT DO TOPPERS' SAY



## Prakhar Mittal - CBSE Rank 1 for Class 10 Board Exam

"I am really overwhelmed with the results, I can't explain in words how I feel about my result and success but I didn't expect to top the board examination with 99.8 percent. I thought I would be able to score up to 90 percent only.

I used to study consistently throughout the year according to a well-planned study schedule for exams so that exams didn't feel like a burden to me. I believe, you don't have to spend 8-10 hours on studies, you just have to be regular and focus on the subjects you feel are difficult.

Even my parents didn't pressurize me to study. They supported me a lot during the entire preparation and exam phase. They were really supportive that they didn't even stop me from pursuing extracurricular activities during exams to relieve stress. Infact, I was taking coaching for both class 10th and engineering at the same time."

# WHAT DO TOPPERS' SAY



## Bhumi Sawant - CBSE Rank 2 in Class 12 Board Exam

"I faced a lot of problems while preparing for CBSE Class 12 board exam. But with the support of parents and with the help of teachers, things become easy for me.

I had solved a lot of CBSE sample papers and practice papers before the exams. After solving sample papers I was quite sure about my success. I was quite sure that I shall score above 95% marks but didn't expect 99.4% marks.

I believe practice is the key to success. No matter how much you study, you can't score well in the board exam until and unless you have not practiced on pen and paper before appearing for the exam. Therefore, it is very important that you must solve as many sample papers as you can before appearing for the actual exam."

The only reason that the elephants weren't breaking free and escaping from the camp was that over time they adopted the belief that it just wasn't possible. Similarly, **is there any rope that is stopping you from achieving what you want in life? Do you have any firm belief that any particular subject or an exam is difficult to crack or that you're not as intelligent as the topper in your class? Just break free from the particular belief that's holding you backward.** You've to trust yourself and know that nothing is impossible. No matter how many times you think you've failed and despite how successful and talented you deem everyone else to be, when you believe that the future is whatever you choose to make it and design a target, that's exactly where it begins.

### Well-defined Target

Whenever I talk about goals and planning it reminds of the story of a Topper who had his education from a small village. Couple of months ago, I travelled to Rajasthan with the objective of meeting and interviewing the student who had topped IIT-JEE. He lived in a village which was between Jaipur and Kota with no pakka roads and electricity until recently. In order to reach his village I had to get down from Tanga and travel 1 km. by foot. When I entered his village what I could see was kaccha roads and mud houses. I was so inspired by the feeling that 'how can anybody prepare and top in a competitive exam in such an adverse situation?' When I met the student I immediately asked him

**“What is your secret of success?”**

The boy took me to his study room and pointed to a white chart which was pasted on the top of his study table, and said

**“Sir, this is my secret of success”**

**Target IIT-JEE Rank 1 to 10**

**Detailed 1-year Plan**

On the white chart there were 3 rows. On the top row was written

# WHAT DO TOPPERS' SAY



**Lalit Agarwal (AIR 24), NEET Topper**

“NCERT books are enough to crack NEET.” I’ve managed to score 690 in my first attempt and bagged the 24th place in NEET. I’m very happy. When you have worked hard for 2 years and it yields good results, it feels amazing! I cannot express in words the role my family has played in my success. They created a study environment at home and focused only on me for 2 years. I decided to make a career in medicine in the last 6 months of class 10 considering it as an elite profession. I was in a dilemma and did not know which direction to choose between engineering and medicine. Then I consulted my teachers and spoke to my parents, discussed my career options. I checked both Mathematics and Biology and I found Biology interesting, that’s when I decided to opt for medical.

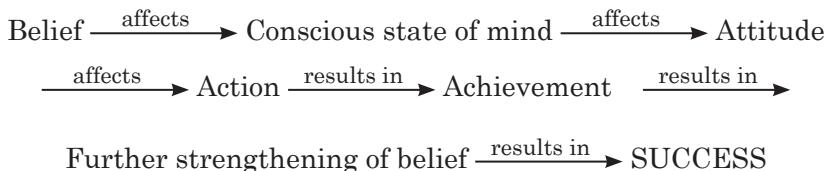
During my prep days, I did not compromise my attendance in school. After spending 6 hours in school, I used to study for 10 hours a day on an average and tried to refrain from all the extracurricular activities so as to get more time for self-study. I practiced a lot and solved questions on a regular basis.

I think if your goal is to merely qualify the examination, coaching is not necessary. If you focus on self-study and maintain regularity you can clear NEET. But if you want a good rank or you want to be among the toppers then coaching would definitely help.

My advice for future medical aspirants is to stay calm and composed, build your self-confidence. NEET is an easy examination and can be cracked by anyone who has worked hard and is confident about his/her preparation. Good hold on the NCERT books is also essential. All this is enough to crack NEET.”

### “Target IIT-JEE - Rank 1 - 10”

In the second row was a detailed plan on how he was going to achieve the above target. He said that it was this white chart and target written in bold which made him believe that he can do it and once the belief became stronger it started getting reflected in the actions. So, always remember:



The next step is to define your goals and to work out a sound and feasible plan on how to achieve the goals. The most common difficulty student's face is failure to get down to regular concentrated work. This difficulty is much greater for those who do not work on a plan. Many students muddle along, studying one subject or another as the mood takes them on or letting their work pile-up until the last possible moment and the reason is very simple, they do not have a written plan with them.

### Set Clear and Compelling Goals

Having a clear, compelling goal mobilizes your focus toward actionable behaviour. Let me explain the importance with a real life success story.

“On June 4, 1962, Florence was about to become the first woman to swim the Catalina Channel. She had already conquered the English Channel. The entire country was watching. Florence fought the dense fog, bone-chilling cold and many times, the big sharks. Florence was striving to reach the shore but every time she looked up, all she could see was the dense fog. Unable to see the shore, she gave up. Florence was disappointed when she found out that she was only half a Km from the shore. **She quit not because she was tired but because she could not see her goal.** She said in her public meeting “I’m not making excuses. If only I had



# WHAT DO TOPPERS' SAY



**Keerthana (AIR 12) NEET Topper**

I feel extremely happy and elated. The result was truly more than what I had expected and that is very gratifying. I secured All India Rank (AIR) 12 by scoring 676 marks out of 720 and was one of the top ranks with a 99.99 percentile. Besides, I stood third among all the female candidates.

I've always been fascinated with the idea of being able to save people. My parents are both doctors and I have seen how doctors can contribute to society. My parents have been extremely supportive at every stage of my preparation and have been a great source of motivation.

To talk about my preparation routine for NEET, I did not have a subject wise daily schedule. Rather, I had chapter wise and concept wise time allocations. I felt physics was very conceptual and easy to grasp. On the other hand, I felt biology was tedious just because it was volatile and you had to keep revising. I used to attend coaching regularly and spent 1-2 hours on self-study every day after coaching. I used to also take a lot of breaks while studying. Listening to music and sketching helped me cope with any stress that I faced.

I think coaching is a choice. It can help you to augment your preparation but even if you don't have access to coaching, you can still clear NEET with focused study. With coaching, preparation becomes more clear cut and comprehensive, that the advantage. Besides, being thorough with the books at hand, instead of having a diffused idea of a lot of books helped my preparation. I believe one has to be thorough with the basics before going on to higher concepts.

My message to aspirants is to start early and keep your spirits high throughout your preparation. Consistent smart work will surely yield good results."

**seen the land, I could have made it.”** And one month later she tried again and this time in spite of bad weather she not only crossed the channel but also broke the men’s record.

Like Florence, ask yourself what do you need to do to achieve your goal? Write it down! **Having clarity and then breaking your study goals down into manageable study tasks will help you to apply your energies where you need the most.** Creating specific goals around the exam syllabus and dividing the course material into achievable targets can help reduce the anxiety surrounding exams. It can also align your focus and promote a sense of self-mastery. Initially it may seem tough, but by taking one step at a time, you’ll accomplish your goal with ease.

Some of the guidelines which the student should follow while setting his goals are as follows:

### ***Write down your goals***

Not only does it make the goal more concrete, but the physical act of writing and expressing the idea in words engages at least two of your intelligences and brings more seriousness to the entire process.

### ***Set priorities***

You cannot do everything you want to do. You must define priorities or you will end up dissipating your energy and not accomplishing anything to your fullest potential.

### ***Challenge yourself***

Keep your goals high enough to inspire you as well as reasonable enough to be always within your reach.

### ***Be specific***

Goals are useless if they are not specific. The more exact you are, the easier it is to measure your progress. It’s also a better way to tell when you’re through and can move on to the next goal. A specific long-term goal is more inspiring for the future. A specific immediate goal on your to-do list is more inspiring for today because you can cross it off your list and know you are one small step closer to that wonderful future.

### ***Expect failure***

If you find a path with no obstacles, it probably doesn’t lead anywhere. That which is truly challenging and inspirational is rarely easy. Don’t give up just because you are not immediately successful or the path seems too difficult.

# WHAT DO TOPPERS' SAY



## SAMYAK JAIN, NTSE STAGE 1 DELHI RANK 1

"Hailing from a family of Chartered Accountants, I had no idea till the last moment that I wanted a career in science. I started to fall in love with science in class 8 and relate to the subject in my day-to-day life. After that I've appeared in a number of Olympiads and competitive exams and cracked NTSE Stage-I 2020 exam with a score of 184 out of a total 194 marks. My intent was to give my best shot and based on my NTSE preparation. The result was a pleasant surprise because I wasn't expecting to be the Delhi state topper. I'm thankful for the support and guidance from my parents and teachers.

In my opinion, National Science and Mathematics Olympiads like NSE's and RMO are the toughest as they require deeper understanding of various topics, good problem solving ability, higher order analytical skills and much practice of the various types of higher level questions.

The preparation for NTSE is significantly different from the preparation of class 10th board exams. So, I adopted a strategy. I followed all that was taught at school, revised regularly and practiced MAT on a regular basis to enhance speed and improve accuracy. Taking more mock tests helped me improve my accuracy. I had a weakness in SST for it involves a lot of rote memorization. So, I studied each topic of SST from NCERT and referred to class notes and NCERT textbooks for PCMB. Initially, I gave equal time to both NTSE and board exam preparation but closer to NTSE exams; I started focusing more on NTSE and exclusively devoted my time to it. I followed a reasonable routine in which I usually study for 4 to 5 hours on school days and about 6 to 7 hours on holidays. I took a 30-minute break after 2 hours of studying to refresh myself. I also took out 30 minutes to 1 hour for regular exercise, jogging and playing outside. And, most importantly I spoke to my parents and grandparents regularly. This did the trick of reducing anxiety along with a full eight hours of sleep."

## **Rewrite, revise, revisit, review – CHANGE**

Setting goals, especially in the long and intermediate terms, does not set your life in stone. Take time to review your goals and revise them a little or change them completely if necessary.

Change the priorities, change the long-term goals, change the intermediate route to the long-term goals, and change the strategy for getting to the intermediate goal. You're in control. When your interests, needs, desires change, alter your goals. Don't feel defeated if you change because you want to. But make sure you set new goals before you start to drift.

## **Making a plan to achieve the goals**

Your long term goal is to achieve success at the end of the preparation. But in the early stages of your preparation the final examination is too far in the future, to be a real motivating force. Hence, it is necessary to have a series of short-term attainable goals, which will take you steadily towards achieving your long-term goal. This brings us to the next step i.e. making a plan to achieve our goals.

During my different seminars one question which always comes from students is

**“Sir do you think planning is really important?”**

To illustrate the importance of planning I had to revert them with a question:

**Would you go for a movie without planning?**

(Which movie, which show, how to go, with whom to go etc.)

**Or**

**Would you sit in a bus without knowing where it is going?**

The obvious answer to both the questions is No. Then why do most of us go ahead with our preparation without any plan. We have plans for trivial things in life like going for a movie but we do not have plans for the most important thing i.e. success in JEE or NEET and it is not that we think planning is not important. If we would have thought planning is not important we would not have planned when going for a movie. The reason why most of us do not plan is

# WHAT DO TOPPERS' SAY



**PRANAV GOYAL, AIR 1, JEE ADVANCE**

"It is unbelievable. I did expect a good rank but never in my dreams did I imagine that I would be the topper of JEE-Advance. It feels that I have achieved my goal. Nothing could have been possible without my teachers' guidance and my parents' sacrifice. They played a major role in motivating me.

Engineering always fascinated me because of my interest in both Physics and Math. So I decided that I would take up Engineering in class 9th. I started my JEE preparation when I was in class XI. JEE Advance requires more focus on conceptual understanding than rote memorization which is essential in JEE Mains. So, the first one and half year my focus remained mainly on JEE Advance and it was in the last one and half month that I prepared for JEE Main. During board exams, however, my preparation was different for JEE. For boards, I developed a good memory by studying NCERT books thoroughly. On the other hand, Advance was better done by practicing, solving and developing new ideas. I would dedicate 3-4 hours for the board exam on an average and remaining 5-6 hours for JEE Advance. Once my board exam got over, my entire focus was on JEE Main.

The primary challenge during my preparation was Chemistry. I had a problem in memorizing Organic and Inorganic Chemistry. So I gave extensive time speed tests to improve accuracy not only for chemistry but for physics and Math as well. I also solved previous years question papers to get a proper idea about the difficulty level and a rough estimation of time distribution. Test series, online tests and timed speed tests are crucial to achieve JEE dreams.

My message to aspirants is to stay focused. If you focus well your study hours would not matter. Just stay focused and calm and ensure that your knowledge is conceptually sound."

- Because we are afraid of failure
- Because we do not want to work under pressure but want to work in a relaxed manner
- Because we are afraid of others' perceptions (If I do not make it what will others think about me?)

Someone has rightly said, "**If you fail to plan, you are planning to fail**". Remember, behind every success there is a concrete plan.

### How to make a plan that works ?

Planning is important but the most important part is to come up with a plan that works. Most people fail at this because they give up when the first attempt at planning does not work out perfectly. The best thing to do is to expect changes and be ready for the process. Needing to make changes in your plan does not mean failure - it means inexperience at planning. Quitting all planning when things go off the rails - **THAT really is failure!**

Very often students plan with great vigour in the beginning. Once they start implementing the plan, they find that the plan does not work. After a short period of time the plan is consigned to the dustbin. So the question arises what is the secret of good planning?

#### Good Planning Means

- Consult your seniors about how they started their preparation. Study the trend of previous year question papers and draw marks distribution of each subject to find out which topics are most important and which are least. Give priority to important topics and try to put them in early stages of your preparation to avoid any possibility of them being left out.
- Divide your entire time into periods of one month each and plan to complete a block of lessons by the end of each period. Set up milestones after every period to find out whether the objectives have been met out or not. Chart out this plan on a calendar clearly and place it above your study table.
- Do not overestimate the time you have. If you actually have the extra time you can always do more studying, but if you plan more than what you actually have, you feel depressed and your entire plan might go haywire. You are also advised to leave a little gap (free time) in between two periods so that if any module gets delayed you don't have to change the whole plan.

- **Set study goals for each day, each week and each month.** Remember the characteristics of good study goals should be specific, reasonable, verifiable, and rewardable. If you have a written set of easy-to-start and soon-to-be-finished study goals, procrastination is much less likely. It is a huge daunting task that is easy to put off. A small goal that will be finished in 30 minutes and will be a contribution to a larger goal is one of the best procrastination beaters.
- The plan should not be too detailed and neither should it be too sketchy. For example, a plan which goes down to the level of say 10 minutes is too detailed a plan and cannot be implemented. On the other hand, a plan which is very sketchy and deals only at the topic level is too high level. Ensure that the plan is balanced.
- Students sometimes plan in such a way that there is no scope for errors. For example, they may have scheduled for 12 hour of study a day. Now if they go out of schedule, there is a little scope for accelerating so as to catch up with the schedule. The secret is to have say 20-25% flexible unallocated time. Students can then use this to catch up.
- It is important to review the plan after working it out . It is also important that a student tries out the plan and sees how it works before adopting it. Students may have missed out some activities or estimated some activities incorrectly. If they perform a mock run, the estimates will be more accurate.
- Study soon after lecture type courses. Retention and understanding are aided by a review of your lecture notes immediately after class, e.g., one study showed that students who wrote a 5-minute review test following a lecture remembered one and a half times as much material when tested 6 weeks later as students who did not review, when tested the next day .
- List and do tasks according to priorities. Remember Parkinson's law that states, "work expands to fill the time available for its completion." If you allot 2 hours to read 10 pages, it'll probably take you 2 hours to complete this 30 minutes task.
- Discover how long to study. As a rough starting guide, for every hour in class you should plan to study for two hours outside of class. Then, adjust up or down as necessary to achieve your goals.

- Your first short-term goal will be the first completion date. If you concentrate and complete the pre-determined number of lessons by that point of time, you will be safely on your way to achieve your long-term goal.

### **While making a daily plan keep following things in mind:**

- The longest study period should not exceed 3 hours. It is hard to concentrate for longer periods so after 3 hours a substantial break is a must.
- A break of 5 to 10 minutes is needed after every 45-60 minutes of study. After concentrating for that long, experiments show that our brain momentarily needs time to assimilate and consolidate the material it has received. During the rest period, a change in activity or posture is desirable. A walk around the room, stretching your arms, light refreshment is enough to restore your energies and recharge your concentration.
- **Remember shorter periods are fine for studying notes and memorizing materials. Longer periods are often needed for problem solving tasks and for writing papers.** Breaks relieve stress and help sustain motivation and provide a transition period when switching subjects
- Determine the time of day that is best for you to study.
- When you are not fully alert in the afternoons, sleep for an hour and then study.
- At the end of each day reflect on what you did and what you need to do on the next day.
- Highlight what has been left undone.
- Cover difficult subjects when you are fresh.

If you have really adhered to your schedule as planned, the free-days before the beginning of the second phase is your reward for hard work. As each deadline is met, it will instill confidence in you that you are on your way to the final goal. This will boost your morale and determination to succeed.

So planning brings clarity of what you want to study and accomplish and helps in improving study efficiency in the following ways

- It helps overcome procrastination by eliminating the time wasted in deciding what to work on and hence prevents stress and anxiety.
- It helps keep you on task while you're working. Having a specific objective makes it harder to rationalize quitting before you've achieved it.
- It generates a feeling of progress and success when you complete a concrete goal. This kind of success can easily begin to cascade.
- It helps break large, daunting tasks into more easily manageable small chunks. It motivates you and at the same time keeps you focussed on each study session.

### **Whereas if you do not make a Plan:**

- You do not succeed in studying as much as you had planned.
- You waste a lot of time moving from one activity to another.
- You fail to concentrate on even one task.
- You have difficulty focusing on your studies.

So a plan does not restrict one's freedom, rather keeps you informed about your progress and broadens your horizon by giving you time to do things you could not do without planning.

Remember there is no one golden method that will work for all. This book can only outline guidelines for preparation. Every student will then have to evolve his or her own method. Once you have defined your method, try it out on a few topics and evolve the method.

### **WAKE UP AT A DESIRED TIME**

- Sit in a prayerful posture on the floor.
- Breathe in and exhale in a rhythmic way.
- Think of the time you want to get up.
- Initially set an alarm clock.
- After 7 days, you may not need the alarm clock
- You will wake up at the desired time.

To end this chapter always remember it is very important to -

- Evolve a method/make a plan, which takes into account your strengths, weaknesses and skills.
- Stick to this method throughout your preparation and remember **planning is a kind of mental muscle, it will improve the more often you use it.**

# WHAT DO TOPPERS' SAY



DISHANK JINDAL, JEE MAIN TOPPER

“Initially, I was shocked upon knowing my JEE Main result but I’m really happy. I believe JEE requires a tactical approach and every student needs to find out which approach works well for him/her. Moreover, coaching helped me channelize my approach towards the exam. My long-term strategy was to work hard and gain enough confidence in myself so that the final day I would be entering the examination hall knowing that I will secure a good rank and my short term strategy was to work on my weakness as much as possible.

Apart from classes at my institute, I used to self-study for at least 5-6 hours. I did a thorough revision of topics that were confusing or difficult to understand, solved previous year paper and worked upon my mistakes consistently. I followed NCERT for a good understanding of Physics and Chemistry. And, for math the best way was to solve previous year question papers. In between study hours, I also took breaks and at times watched cricket to relax myself.”



**Always bear in mind that your  
own resolution to succeed  
is more important than any  
other thing**

- Abraham Lincoln

# MASTERING FUNDAMENTALS AND LEARNING NEW SKILLS



There are a lot of students who work very hard but inefficiently and whose performance in examination is a surprise and disappointment both to themselves and their teachers, families and friends. At the same time there are students who are able to achieve sometimes satisfactorily and sometimes excellent results without hard work. The basic differentiating factor is the study techniques. **Hard work should bring achievement but only when coupled with efficient and appropriate study techniques.** Surprisingly, in our entire school education we spend thousands of days learning different subjects but not even a single hour on “how to study or how to learn”. **Learning how to study can equip us with skills and techniques to learn more in less time and with less stress.**

In the last chapter we talked about why to study. The next step is to learn how to study effectively. In this chapter, we would discuss various study techniques and their application to master the fundamentals. This chapter provides insights into why some study strategies work so much better than others and why you may have been working very hard but not achieving the results you'd hoped for certainly not the results your effort deserved. This is where you begin to see the difference between working smarter and harder.

## How to Study

Most students experience “starting trouble” with their studies. Sitting down to do concentrated work requires determination. If you have re-organized your life for study, set aside a few hours for it, and if you still cannot get down to study, find out where the problem lies.

1. Does it lie in the work itself?
  - (a) Do you find the subject difficult?
  - (b) Are you afraid of failure?
  - (c) Do you lack the necessary books and course materials?

2. Do you think of other activities?
3. Is something distracting you?

If your problem centers around any of the above, it can be easily dealt with. If you find the subject difficult it could be due to lack of fundamental knowledge of the subject. Look for books which start with the fundamentals of the subject and start reading them. This should give you a better grasp of the subject. The time spent in going through the basics is worth it, very soon you will find that the present material makes more sense and that you are able to concentrate better. The fear of failure will be automatically removed.

If you have other tasks in your mind, deal with that which needs immediate attention. The not-so-important tasks can wait for the next day. Make a reminder note and keep it aside. This will set your mind at ease.

Make sure that your study area is free from any distraction and noise, with books and materials before you and your mind relaxed, you should now have no difficulty in starting your studies. If you still have things distracting you, try to start your studies in the morning hours. In the morning, your mind is fresh and very receptive. There is little opportunity to become pre-occupied with something else or get distracted. If you cannot study in the morning, the next best period is the evening. It is quite possible that you will be tired after the day's activities to study. Give yourself an hour for relaxing in the evening. You can relax while traveling home, eating a meal or taking a walk. Forget about the day's happenings and start planning your evening's study. Think of this time as an opportunity to realize your goals and fulfill your desires.

### Preparing for studies

Your goal in the preparation phase of studying is to create the optimum state of mind for learning. You want to be confident, enthusiastic, relaxed, calm, focused, and alert. When you do so it results in activating alpha type brain waves which then results in relaxed alertness, an ideal state for learning anything. (see FAQ for more details)

The five basic elements to reach the stage of relaxed alertness are

- Preparing your study environment
- Relaxing to control your anxiety and stress

- Gearing up your self confidence and determination
- Sharpening your focus
- Activating your brain for the subject at hand by reviewing the past knowledge of the subject.

### **How to improve concentration power ?**

### **How to remove the flow of distracting thoughts?**

How sharp is your ability to concentrate? I have asked this question to thousands of students in the last two years. More than 95 percent of them replied, “poor, absolutely zero!”

So, the next important question arise -

### **How to develop concentration?**

When we watch a favourite film, we are able to concentrate for three hours. We hardly realize who's beside us, when did he/she get up in between and so forth. Similarly, a cricket match absorbs all our attention and our eyes get glued to the TV screen.

We can concentrate when we are watching a movie or a cricket match but when it comes to studying a subject especially a difficult subject we feel distracted by the slightest noise, the faintest whisper, even by the most distant sound of music. So, the basic problem is not that of concentration but is of interest in the activity which we are doing. **Concentration is nothing but the extent of interest and involvement in the subject.**

The equation is -

$$\text{Learning} \propto \text{Concentration} \propto \text{Interest}$$
$$\propto \text{Confidence}$$

The amount of learning is dependent on the amount of concentration, which is further dependent on the intensity of interest. Some of the characteristics of students who have confidence in a subject are:

1. They enjoy learning the subject or topic.
2. All their efforts to study are self-motivated. Nobody needs to tell them that they have to study the subject.
3. They develop the killer instinct, which is necessary to solve tricky problems.

On the other hand, those who lack confidence in a subject or a topic display the following traits:

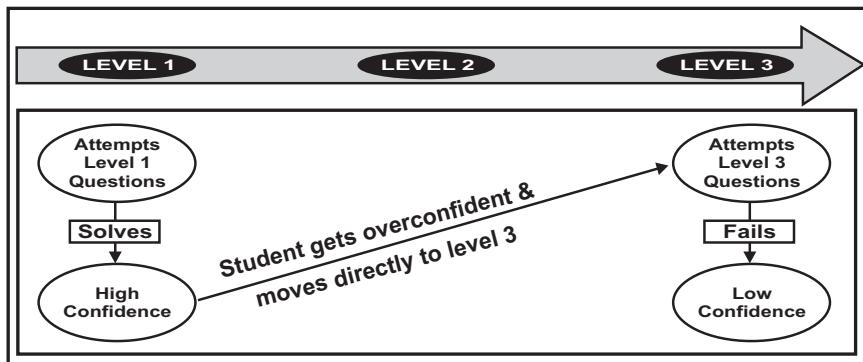
44

1. They dislike the topic
2. They have to force themselves to study the topic
3. They approach any problem with a negative frame of mind.

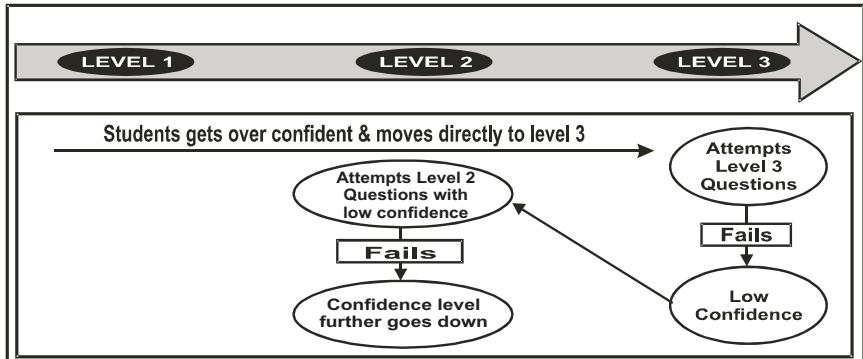
## How to Develop Interest / Confidence in a Subject?

An easiest way to develop confidence/interest is to approach the subject in a systematic and step by step manner. Usually, students skip some of the fundamental steps and approach problem solving with half-baked knowledge because of which they get stuck and slowly and slowly develop dis-interest in the subject. Let us find out different approaches adopted by the students.

### Approach 1

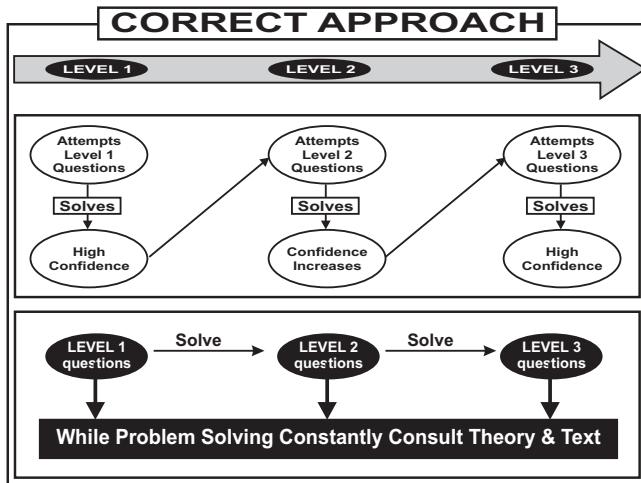


### Approach 2



In both the approaches the student skips certain steps and the net result is inability to solve problems which lowers the confidence level / interest in the subject. **This is the stage when suddenly the subject starts looking difficult and boring.** The correct methodology is explained in Approach 3.

### Approach 3



In Approach 3 the student moves from Level 1 to 2 and then to 3 and constantly refers theory and text as and when the problem occurs.

It is very important to develop confidence in a subject. Confidence level also leads to higher interest in the subject. The student can develop confidence in a subject in 5 to 6 sittings. Even if the scores are low during the initial sitting the student should not give up rather spend more time on the topic.

### A Focused Approach

Another thing which helps in developing interest and building confidence is a focused approach. **Your interest depends on your focus and your focus completely depends on your ability to eliminate distractions** (T.V./Mobile/Social Media/Computer Games) that come in between your studies. If you have clarity, know what to study and what not to then you can successfully wipe out all the distraction and be able to focus. There are many students who create a mess by following 5-6 books for a single subject, where

most of the problems are the same. What makes more sense is to follow one or two books and complete them 100% to master the concepts and fundamentals. This will not only develop interest but also build your focus. I'll try to justify my point with an interesting story.

A village was facing acute scarcity of water, absolutely no water in



the village. In the panchayat it was decided that the entire village will dig a well but it was a controversy as to exactly where the well should be dug. Somebody said the well should be dug near the neem tree, somebody said that the well should be dug near the panchayat whereas somebody said that it should be dug near the temple. They started with digging

near the temple but they didn't find any water even after digging 20 feet. The other person said that I already told you that it doesn't make sense digging well near the temple. You should dig the well near the panchayat. When they did not find the water near Panchayat even after digging 20 feet, the third person said that I already told you that it is a good omen that you should dig the well near the neem tree. The same was done near the neem tree, 20 feet was dug but they did not find the water. Looking desperately for water the villagers tried at one or two places but they did not find the water and finally they called it a day. Next day morning again the panchayat was called to discuss what should be done, suddenly one old man got up and said "instead of digging 20 feet at 5 places, if you would have dug 100 Feet at one place, you would have found the water." What he said was tried at one place and finally the villagers found water.

If you think from a student's perspective, the approach of focus is very important. Infact, one of **the key differences between a topper and an average student is that of a focused approach.** Focused approach also helps in improving concentration power and removes the flow of distracting thoughts.

**Some other tips to improve your concentration power are given below:**

- Whenever you find your mind wandering, become conscious of the fact that your mind has wandered and bring it back to what you are studying. Do not let frustration come in the way. You will find that with passage of time, you become better and better at catching the mind from jumping here and there.
- Everyday set aside 10-15 minutes during which time you are going to completely concentrate on a particular activity. The activities which you can concentrate on can be - praying, walking, eating, and looking at a still picture/clock and so on. Whenever you find that your mind has wandered, gently bring back the mind, review the thought that distracted your mind and get back to the task of fully concentrating on your activity.
- Environment of study: Proper lighting is important. If your eyes are getting strained, you will not be able to concentrate. Ensure that you are sitting comfortably and the light is optimal. Again, noise distractions should be minimal. It is difficult to concentrate when you are in a noisy room.
- Studies should be concentrated around your peak performance. Study hard during your peak hours of performance. Schedule your study such that the peak consumes those activities which need concentration, high problem solving skills and alertness. During the remaining hours you may perform routine activities.
- Be active in what you do, e.g. speak aloud, talk to someone, and write notes.
- Set yourself realistic small targets. This will give you more chances to succeed in reaching your goal. Success will increase both your self-confidence and your study efficiency.
- Vary both the topics you study and the methods you use.
- Study for a short period of time, at least initially.
- Check your sleep: Lack of concentration is often due to lack of complete sleep. So don't increase your study hours at the cost of your sleep.

Apply above mentioned techniques in your studies and soon your concentration related problems will go away.

## Consistency is the Key to Success

During the Trailer launch of M.S. Dhoni biopic in 2016, a student asked Dhoni about the ways that could help her maintain composure in stressful situations like exams. Dhoni replied that he learnt a life lesson from his father long back when he asked for his permission to play cricket during his board exams.



Do you know what his father replied?

He said "*Agar saal bhar mehnat kiye hoge, toh ek din se farak nahi padega*"

*"Agar saal bhar mehnat nahi kiye hoge, toh bhi ek din se farak nahi padega"*

(If you have studied for the whole year, then one day won't make a difference.

If you haven't studied for the whole year, then also one day won't make a difference")

What we infer from Dhoni's story is that consistency is the most fundamental virtue to achieve what we want. When a person is consistent, they do the same thing over and over, they repeat the same process until it produces a desired result. Consistency can decrease the amount of time we are unprepared for the curve balls life throws at us. If you're passionate and determined to clear an exam, then stay consistent throughout your preparation. It will surely yield a result and help you escape any sort of traumatic experience a day before the exam or on the day of the exam.

Another important thing is to give 100 % without expecting 100% in return. Dhoni further said that his passion was cricket and whenever he played cricket he played with 100% intensity and commitment but he never worried whether he would get selected in the Indian cricket team or not. Similarly, when you prepare for any examination you should not worry too much about the outcome and failure instead give your hundred percent commitment. What is important is the process not the result. You should enjoy the journey rather than worrying too much about the destination.

## Time Management

The first thing to learn about Time Management is that time is theoretical so you can't really manage it. What you do when you get into time management, is that you manage yourself. You decide what has to be done, when it must be done and how to do it in the stipulated time.

Remember, good time management for a student is not about creating a complex schedule that gives you account for every second of your day. It is about one simple choice: either you will control your homework, or it will control you. Good time management puts you in control. On the other hand poor time management can put you behind your schedule and hence gives a feeling of unhappiness. At times, it may even cause frustration and anxiety which may further affect your studies. To avoid this situation, it is imperative to carefully plan and monitor your time spent. When you settle to study, questions like the following will occur:

***What should I begin with?***

***Should I start with theory or attempting problems?***

It is here that careful planning of your weekly schedule and proper management of time plays an important part. Here are some principles to guide you.

- Arrange things in your study-room in such a manner that if you want a thing you can get it fast.
- Use checklists and time-tables and try to strictly adhere to them.
- It is important to list your study tasks in order of their importance. Don't make the mistake of reading relatively easier and interesting lessons first and accumulate the difficult ones. Next, begin on the first task in the priority list and use your study time wholly to concentrate on it, until it is complete. Then move to the second, third and so on. If you are not sure of what to read, you will waste time flipping from one lesson to the other and in the end achieve nothing.
- When you have finished a study period, spend a few minutes assessing whether the period was well spent or not. If you feel you have not utilized the time well, find out the reasons and resolve to use your time efficiently.

- Keep your door closed if you do not want to be disturbed by visitors. If visitors come, stand in the doorway of your room and discuss the matter with them. Once you sit down with a friend the conversation will go on for hours. Finally get into the habit of saying “no” assertively to others, when you want to concentrate on your revision work.
- Last but not the least, while making the schedule, do not forget to include 8 hours of sleep each night and regular relaxation time. If you work too hard and over exert yourself too much, you will not be at your best when you ought to be. Rest and recreation will result in mental and physical refreshment.

Remember, most time management problems are symptoms of problems in other fundamental areas, such as preparation, goal setting, motivation, and concentration. Read and reread chapters, where all these issues have been discussed. Put the strategies into action, and you will discover most of your so-called time management problems disappearing.

***Remember, time is money!***  
**Spend time as if you spend money**

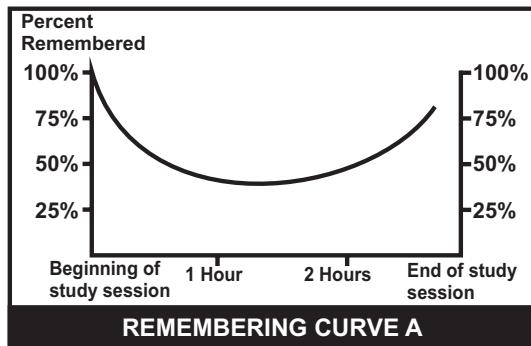
## Recency and Primacy Effects

### **Plan lot of Beginning and Ending in your Study Schedule**

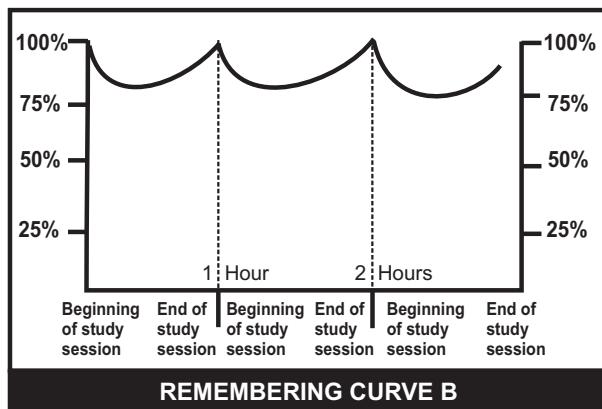
Research says that you remember more of what you study at the beginning and at the end of your study session. So if your study session is of 3 hours then learning is maximum in the first 30 minutes and the last 30 minutes. What does this mean for your studying? If you remember more of what you study at the beginning and the end of a study session, doesn't it make sense to have a lot of beginnings and endings in your study schedule? So organize your study sessions to take advantage of the primacy and recency effects.

For example, if you have three hours available to do your studying, the most inefficient way to spend the time is to use it all on one task in one subject without a break. Studies have shown that 45 to 60 minutes is the maximum amount of time you can spend on a concentrated study task before you start to experience a degradation in your ability to retain what you are learning. Therefore, you should divide your three-hour block into 3 sessions of 60 minutes each and at the end of each session it is advised to have a short break of 5 to

10 minutes. By doing so you increase the number of those highly productive beginnings and endings from two to six.



**Note :** Percentage remembered is highest at the Start and the End of study session.



**Note :** By dividing your study session in to small durations you can improve the effectiveness of your studies

## Break For Speed

### Have Frequent Breaks While Studying

As discussed earlier a planned break during a study period increases the effectiveness of further studies. A break after every 45-60 minutes is optimum and each break could be of the order of about 5 to 10 minutes. Further, a break should be a complete rest otherwise too many competing or interfering associations will be formed and they will confuse the memory track laid down in the study period. In the break, one may:

- Get up.
- Stretch.
- Have brisk walk in the room
- Get something to eat or drink (preferably a glass of water)
- Do some light exercise like stretching hands
- Then go back to study.

So do not study for more than one hour continuously without a break. Take a break for 5-10 minutes after every hour. But before that you must remember two important aspects of a break -

- (1) you must relax
- (2) you must continue studying after about 5-10 minutes. Remember there is a possibility of wasting time if you start talking with someone or if you lie down to relax: you may continue talking for a long time or you may fall asleep.

### **Ends are More Productive / Sleep on it**

As discussed earlier it is the characteristic of the brain to retain the first and the last information better than the information given in between. When we are attending a lecture or a seminar, we remember the first information and the last much more clearly than things in between. Similar is the case while watching movies.

So the last one-hour before sleep and an hour just after getting up from the bed is the most productive time. Always use these two productive times of the day for studies. **Preferably if you have something to revise, utilize the last one hour of the day (one hour before the sleep) for revision. The brain is fresh to accept any new thought, so learn any new topic in the first one-hour after getting up from sleep.**

Research shows that sleep is a necessary component to good memory. **The brain uses the sleep period to consolidate things in the long-term memory. What you review immediately before going to sleep is what your brain will most quickly and efficiently file away.** It's almost as if your brain needs some "down time" to process the associations and connections required to make long-term memories.

Test this on yourself. You will find that you remember things much more easily and effectively if you review just before sleep and then

test yourself in the morning. You will remember more this way than if you study the material in the morning and test yourself that same evening without any intervening sleep.

## Techniques to Improve Retention and Memory

Given below are some techniques which will help you in improving your memory and retaining things easier and longer:

1. **Pneumonics**- i.e. artificial codes to remember difficult formulae etc.
2. **Association Formation** - e.g. to remember the spelling of 'Believe', it is i.e. or ei? We say Never Believe A Lie
3. **Image Visualisation** - An image is best stored in the brain if we visually link one thing with another making a ridiculous funny link e.g. for remembering a name 'M.P. fishti'-Visualise a big fish sitting in our Parliament.
4. **Pattern Technique** - Patterns are analogous to the brain's own pattern of relations and interrelations. Make a pattern map in the hierarchy. Just give heading, section heading, in the map. Put specific data at the end which requires remembering e.g. formulae. It is believed that by going over the pattern map the brain awakens a dormant memory and kind of revises it thus making it a long term memory.
5. **Make flash cards.**
6. **Make rhymes, rhythms, and songs.**
7. **Practice output** - Practicing output is essential for the recall stage of memory. Don't get stuck in repetitive rehearsal that focuses only on getting the material into long-term memory. Practice getting it out - under pressure. Practice using the actual kind of exam questions you will be required to answer. Make up your own multiple-choice or essay questions and practice answering them.

## One subject or many subjects in a day

Imagine you are going to appear for an exam after five days and you have four subjects (of equal length) to study. In order to revise your syllabus you can adopt any of the following methods -

**Method I:** Studying and completing one subject a day for four days and making a final revision on the fifth day of all the subjects.

**Method II:** Every day studying a combination of subjects like two hours Chemistry then Physics for the next two hours.

Let us analyze and understand how the brain works to find out which method is better.

**The Analysis:** When we study a particular subject, say Physics, a particular part of the brain is working more than the rest of the brain. When we shift to say Inorganic Chemistry, practically the other part of the brain would become active and the part studying Physics will go for rest. So by changing the subject after periodic intervals, we give a chance to refresh a particular part of the brain and also prevent ourselves from feeling tired.

If we study a particular subject throughout the day, we stress a particular part of the brain, more which is inefficient and undesirable.

By engaging a different intelligence each time on a different subject, your brain actually consolidates and reviews the previous session in the “background” while it focuses a different part on the new task. You will learn more, faster, with a lot less pain and boredom than by spending three hours on the same subject.

So, study a combination of subjects, i.e., after studying 2-3 hours of Physics shift to Chemistry for two hours. By doing this the efficiency of your study increases.

You can raise your productivity and get an effective output only if you follow smart study techniques.

## Study Smart Not Hard

Effective studying is the only element that guarantees success in life. But it's ironic that we have never been taught these methods in school. Teachers and parents always advise students to study hard but seldom tell them how. Very little time is devoted to teaching students to break down the course into manageable chunks. As a consequence, they face hurdles regardless of their intelligence. Here are a few smart ways students can follow:

## 1. Eliminate the Black Holes

Just as you make a plan before you embark on a trip, you need to make a record of how you spend the hours of your day. For most students the day is spent in black holes. That is, students spent non-productive time in web browsing, chatting, watching television, playing video games and smartphone usage. So, the question arises how you can complete your study targets effectively. The answer is to remove or minimize the black holes as also saving time on other activities. For example, a young boy reduced his engagement in video games from 2 hours to half-an-hour and started utilizing the remaining one and half an hour on effective studying. The worst part is that you spend 2 hours and you don't realize that it has taken so much time. It sort of becomes addictive.

## 2. Speed Reading Skill

Some students believe that they cover huge material towards examination time by using techniques such as speed reading. During our initial learning phase, we often read aloud called as vocalization. But as our reading and language skills increase, we stop reading aloud but hear each word mentally while reading it. This is called sub-vocalization. Sub-vocalization can increase our reading speed to about 150-200 wpm. Thus, when you are reading your lessons for the first time, you need to read at your normal speed with sub-vocalization to effectively understand new concepts and languages. Just as chewing while eating is preferred to gobbling, normal-paced reading with sub-vocalization is preferred to speed reading.

What about revision? That's where speed reading can really be effective. You can read faster than usual by using a finger, pointer or a pencil to move under words slightly faster than your usual reading speed. You could even use a ruler and move it below the line you are reading and thus enhance your speed. When you use this technique, you will instinctively make progress and realize that smaller words can be ignored and still make sense of what you're reading. You can accomplish speed reading if you work on developing this skill.

### 3. Mind Mapping

Students have to constantly learn new concepts and apply them. But simply memorizing dates, facts and phrases is not a great idea. Understanding the concepts is important if you're willing to pursue higher studies or appear in a competitive/entrance exam. In such a case, a mind map can be created to depict how a concept breaks down into its parts, what those parts mean and how they tie into each other. This approach helps students understand new things in ways that make sense to them, allowing them retain new information for much longer.

Mind map is basically a visual thinking tool used to stimulate students to organize information. It allows students to think and branch out major ideas from a central concept. Even though the basic concept of a mind map has been in existence for a long time, the idea was firmly brought into the world of learning in the seventies by a book called *Use Your Head* by Tony Buzan.

### 4. Pomodoro Technique

The human mind cannot focus on a single task efficiently for too long. So what's the solution? In that case you can use the Pomodoro technique, a technique invented by Francesco Carrillo after he was inspired by a kitchen tool named Pomodoro. This is a tomato shaped timer that is often kept in kitchens to help monitor baking, freezing, toasting or roasting time. Once you have your daily task planned, all you need is to work with a system that will enable you to get your work done efficiently and effectively.

**There are five basic steps to implement this technique:**

1. Decide on the task
2. Set your timer to 25 minutes
3. Work on the task for 25 minutes with zero distractions
4. Take a break of 3-5 minutes once you finish the task and then move on to the next task for another 25 minutes.
5. Complete 4 such tasks and then take a longer break of 15-30 minutes

As you split the tasks into smaller segments, they become more manageable. Splitting down a mega task into smaller chunks is the key in getting through the bigger task.

### 5. PQRST Method

PQRST is a reading, comprehension and testing method that is named for its five steps- Preview, Question, Read, Self-recite, and Test.

The first step is to preview the chapter by scanning it. This means reading the chapter outline and giving some attention to the heading and sub-headings of each section to gain an overall idea of the material.

The second step is to question yourself by framing questions for you from heading and sub-heading of each section and subsection.

Third, read the chapter while alertly checking for answers to the question that you framed in step 2.

Fourth, close the book and try to self-recite the key points of each section or subsection to yourself. If you find yourself fumbling, return to step 3.

The fifth and the last step is to test yourself by attempting to answer the questions you had framed previously or that are provided at the back of the chapter. It is important for you to understand the number of key issues you can recall for the chapter you've read.

### How and why to Revise?

### Memory: How to improve it?

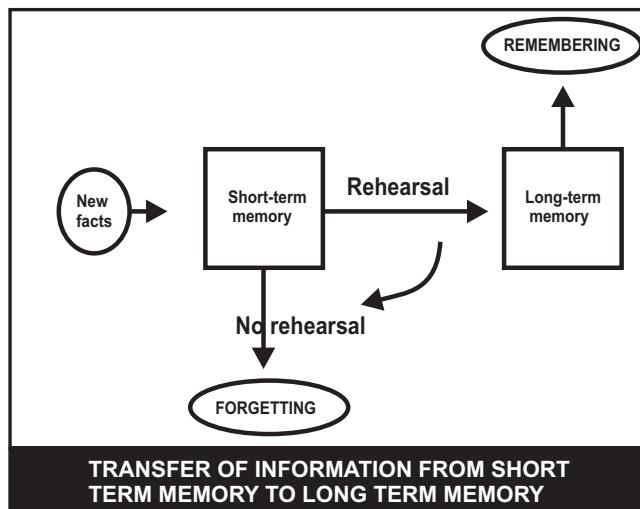
**The three Rs of memory:** Our memory works in three stages, each representing a different level of intensity - registration, retention, and recall.

The first stage, **registration**, is the stage at which something comes to your attention and has meaning for you. Whether or not you turn this initial registration into a permanent memory will depend on your purpose. If you simply want to remember a phone number long enough to dial it, then you won't go any further. If you want to remember the phone number of someone important to you, then you have to do something more to make it a permanent memory.

**Retention** is the stage at which you make a conscious decision to remember something, and you must decide on how to make that

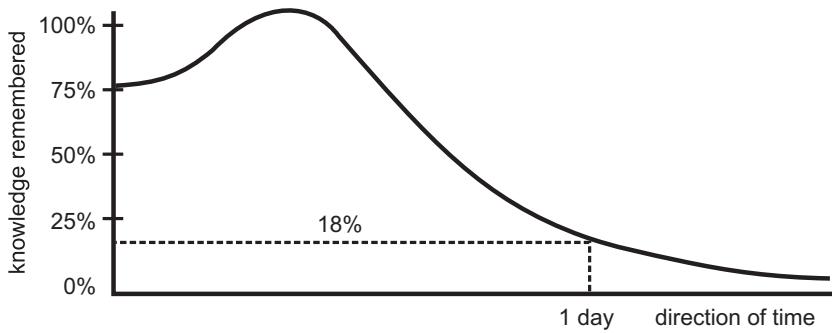
happen. Your goal is to retain the information for a long time.

The third stage is **Recall**. Retention is of no use if you are not able to recall the information when it is needed. Therefore, the technique used to retain it must be one that will enhance the likelihood that you can access the information at some point of time in the future.



### Method of Systematic Revision

Research shows that we remember only 18% after 24 hours. We forget 82% of all that we learn within 24 hours! This is a very important fact for you to remember.



Memory after the learning period. Without revision, we forget 82% within 24 hours

We will discuss below how you can prevent this loss by using the method of systematic revision. Systematic revision is an extremely

powerful scientific method for transferring information from the short-term memory to the long-term memory. It is important for you to note that systematic revision improves your learning, thinking and remembering. This advantage gets added up as you use this method every day. The student who does not use systematic revision method is in fact wasting the time he has already spent on learning something.

**The Systematic Revision Method:** Let's try to understand it with an example. Let's say one takes about two hours to learn a particular topic by heart. When should one revise it? Scientifically speaking, the first revision should be done after twenty-four hours. On an average the brain is able to retain the newly learnt information up to 80-100% only for twenty-four hours. The forgetting cycle becomes faster as soon as twenty-four hours of the learning are over.

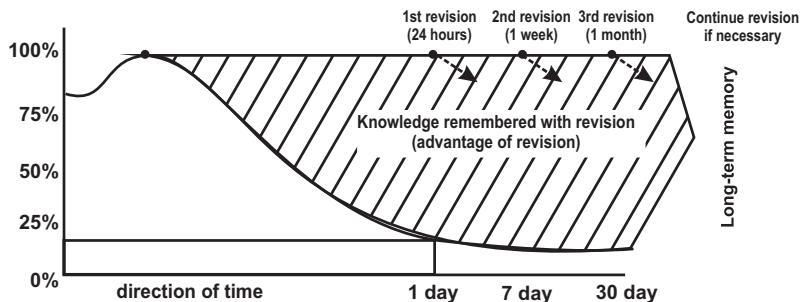
Once revised after twenty-four hours, the brain is able to hold it for approximately seven days, then the forgetting cycle once again becomes faster. So the next revision must be done after seven days.

Surprisingly, if you revise at these two periods, i.e. first after twenty-four hours and the next after seven days, your revision time will be just 10% of the total learning time (in this case you will require just twelve minutes to revise the material).

You should revise the previous day's work before the teacher takes a class. If you are in the classroom before the teacher comes, then you can revise the previous day's class work. Some teachers take attendance, and that is a good time to revise. If the teacher has started teaching, even then take one minute to revise the previous day's class work. Then revise the new lesson when the class is over. This method will give you a great advantage over the vast majority of students in any competition. But you may be wondering "How can you spend so much time revising?" Try to implement the following techniques to accomplish this.

- The first technique is reading faster.
- The second technique is that you revise quickly-spend just 5 seconds per page.
- And the third technique is to write notes in special style that will help in quick revision-these notes are called "mind maps."

- Make flash cards and revise them as and when you get time



So, you can make dramatic improvements in the amount of information you retain and recall simply by doing a short review of the material on a regular basis. This easy technique will change the normal “forgetting curve”. With review, your curve will change and look like the figure given above.

We must accept the fact **“The strongest memory is not as good as the weakest link”**. Unless we revise, it has no value.

### **Reading is fundamental to Study**

Let's look at how you can use your reading skills and improve them to get higher grades. Here are some suggestions that help people read more efficiently-

1. When a chapter in a textbook has questions at the end, read the questions first. Why? They will give you an idea of what the chapter is all about and they will be “clues” as to what you should look for in the text.
2. Underline or highlight main points in the text. Don't mark too much or your efforts will be meaningless. At the same time, pay special attention to words and phrases the author has “highlighted” by placing them in italics or in boldface.
3. Don't skip over the maps, charts, graphs, photos or drawings. Much of this information may not also be in the text. If you skip it, you're skipping vital information.
4. **What's the “big picture” here?** We can get bogged down in the footnotes and unfamiliar words and lose touch with the purpose of the chapter. Review subheads, margin notes and questions and discussion points to get a grasp of the big picture.

5. Keep balancing act between class discussion and notes on one hand, and the text-book and any other workbooks on the other. They will complement each other in their content.
6. Shortly before class, look over the chapter once again. Review what you and the author have decided are the most important points and mark topics you want to ask the teacher to explain.

## **How to plan studying in school/coaching**

### ***Before class***

What you do before each class will have a significant impact on the quality of learning that takes place during that class.

- Read all the assigned material. Part of your study time each day should consist of looking ahead to those sections in your text that are to be covered the following day.
- You do not necessarily have to study and learn the material on your own, but if you survey the concepts, terminology, diagrams, and examples, the new ideas will seem more familiar to you when the instructor presents them.
- You can take note of concepts that appear confusing or difficult to be ready to listen carefully for your instructor's explanations.
- You can be prepared to ask the questions that will increase your understanding.
- Previewing new material enables you to see what is coming and prepares you to be ready to absorb it.
- Review lecture notes from previous classes.

### ***After class***

The work isn't over as soon as class is over. You still have some learning and note making to do. The time immediately after class and the days that follow will be the most crucial to your learning what was taught in that classroom or lecture hall.

#### **1. Immediately after class**

After the class lecture you can double how much you remember, and double the effectiveness of your notes, if you do some work immediately. It is vital that you do this step right away, before the forgetting factor starts to erode your memory of the class. If you only have ten minutes between classes, USE IT.

Take the 10 or 15 or 20 minutes you have available and review your notes from the lecture you just had. While it is still fresh in your mind, add material to your notes that you may have missed the first time. Use the white space you left when the instructor was going too fast for your brain and your pen, or when you didn't quite understand the concept well enough to write it in your own words. Squeeze every last drop of detail out of your memory and write it down. Finish the sentences you couldn't finish at the time. Complete the diagrams or examples while the images are still vivid enough. Write down your impressions of what was important

Leave a lot of blank space throughout your notes to allow space for those things you missed during class. Your goal during the class is to leave some space on the paper to accommodate this extra material when you review the lecture and enhance your notes. Always err on the side of excess - leave more space than you think you'll need.

Another thing which you should do after the class is thorough self study of what has been taught in the class. It requires studying in detail, referring to details, referring text books, solving problems and doing exercises. The objective is to firmly understand the topic taught in the class.

## 2. Before next class

Some time before the next class in that subject, you should find time to review as much of your previous notes as possible. The ideal time is the few minutes spent waiting for class to begin. Obviously, the time required will be shorter at the beginning of a course and longer as time goes on and you accumulate more material. The goals of this kind of review are –

- (a) to constantly refresh your mind with the older material, and
- (b) to activate your prior knowledge immediately before being exposed to new material.

Be active when you do this. Do not merely read over the notes passively. Rehearse important points to yourself. Amplify points in the notes that were once vague but are now clearer to you. Write things down when you test yourself. Draw a quick mind map of the lecture. Make this short time a very active session.

**3. Within one week of the class**

It is important to devote some time each week to go back over the previous week's notes in some detail. Add more detail if it comes to you. Close your eyes and test yourself on the level of detail you can recall. Recite major points over several times. Make flash cards of important ideas and facts.

Your goal is to further consolidate the essence of the past week's lectures in your long-term memory. It doesn't take a lot of time and the review does not have to be terribly intense. Just the exposure to the information again, along with some active thinking techniques, can work wonders for your exam performance.

**4. Within one month of your class**

It is advised to keep the last day of the month for revision of your notes.

## Practice, Practice and Practice

Learning the information requires a lot of practice. So, it is advised that

1. As soon as possible, do your first practice. This is best right after class.
2. Before the end of the day, do another practice.
3. After a few days, do your third practice. In this practice you might be going over the whole week's lectures.
4. Stretch out your practice sessions as you go, forcing yourself to remember the key points for longer and longer periods.
5. Soon you will note that you have several consecutive ticks beside many topics, and there may be some that you are finding hard to remember. These problem topics probably are unclear to you, and you should do what you need to clarify the information. Perhaps you can consult the text or ask your professor for more memorable information or clarification.
6. Once you have several consecutive ticks for each item, you've got it all learned. One more review before the exam will probably be sufficient.

**Consistent and regular practice has more of an exponential than a linear effect.** If you practice your questions weekly, you advance very slowly over time but if you practice it daily, the jump is not linear, it is exponential. In other words, it's a big jump that makes the difference between good and great, mediocre and topper.

**Have you ever heard of the struggle story of Navjot Singh Sidhu?**



Be it cricket, politics or entertainment, his enchanting personality has wooed the Indian audience for years now. Mr. Navjot Singh Sidhu is one person who has been remarkable in every field he chose to venture. He started his career with cricket and in this cricketing career from 1983 to 1999, he saw many ups and downs in between.

Initially, he wasn't serious about his practice and was dropped out of the cricket team due to his pathetic performances but an article by noted cricket columnist, Rajan Bala, with a heading '*Sidhu: The Stroke less Wonder*' changed the game of his life. This criticizing article gave Sidhu, a focus and motive and consequently he geared up his performances. He pasted this on his cupboard, donated all his colourful clothes and practiced hard for four years without break with just a few hours of sleep and an hour break for his meal. His hands would bleed but he never stopped practicing. He devised a new pair of gloves filled with cotton to soak all blood and continued to score 126 sixes every day. Later, he got selected in the team and with a mind blowing performance in 1987 world cup, the same columnist wrote an article '*Sidhu: From Stroke less Wonder to A Palm-Grove Hitter*', praising his performance. After this there was no looking back and he took his cricket to new heights.

As said, 'Practice makes a man perfect'. Therefore, allow your passion to drive you. Brave people take risks and practice their passion thoroughly to achieve their dream. They live, breathe and sleep on one idea and convert their weakness into strength, obstacles into stepping stones and threats into opportunities. **If you test yourself repeatedly after studying a topic then you can retain confidence. And the confidence gained by such repeated practice will wipe out the tension you may**

**get while writing the actual exam** because if you find anything difficult and tricky during practice or make any error then you'll have the time to correct yourself and adopt the right approach.

If you need some structure on how you approach your day you might want to try your hand at one of the many common time management techniques that rely on scheduling blocks of time to accomplish your study targets throughout the day. At recent times, mobile phones are becoming a great productivity-boosting tool in managing your study targets.

## Use your Mobile phone as a Productivity Booster Alarm

Before we talk about how to use your smartphone as a productivity booster, your internal voice should be loud and clear that you have to crack the exam at any cost and at any stage you will not get demotivated. So whenever you fail to achieve your target, the internal voice should be '*I can do it, I will try again and work harder.*' Once you have reached that stage you are all set to use your Mobile phone as a productivity Booster.

- Divide your study time in slots of 1 hour each.
- Set the alarm on your phone in a way that it runs after every hour. So, if you are studying from 5am to 8 am. The alarm would run at 6 , 7 and 8 am.
- Keep a productivity dairy with one page for each day. After every hour when the alarm runs, you will fill following details in your productivity diary

Time Slot	Course Covered	Overall Productivity of Session (1 to 10)
5.00-6 am	1. Revise Concept	
Physics Chapter 5 Newton Law of Motion	2. Solved Examples	7
	3. Exercise-10 Questions	

- You can spend 2-3 minutes to fill this and rate yourself in the overall productivity of the session. If the session was fruitful, you can give yourself a score of 8 or more and if it was an average one then you can give yourself a score of 5 or less. Similarly, you can fill it for all the sessions for all the day separately.
- Over a period of time you will observe that whenever your productivity is low, you will become conscious of not giving your best and your inner voice will motivate you leading to higher productivity in subsequent sessions and when it is good it will further motivate you.

Using this technique will improve your productivity by 30 to 40% in a period of one month. After all, at the end of the day all of us want to work hard and succeed.

### General Suggestions

- Since most of the questions are based on fundamentals & their applications so the first step is to establish a solid base by mastering the fundamentals. For mastering the fundamentals you have to be focused. Don't use too many courses or books. Most of the students end up buying 5 to 6 books for one subject. Remember that more than 80 to 90 % problems in most of the books are the same so what you are doing when you use 5 to 6 books is just repetition of the same problems. Instead of it what makes sense is that just buy 1 or 2 books to master the fundamentals and then go for different question banks to do more and more practice. Decide about the course and books after discussing with your seniors and friends and then stick to them.
- Try to correlate the learnings of your subjects with the day to day life practical examples. In other words, correlate your classroom learning with real life learning. This will help you in understanding the fundamentals better.
- Whenever you study/learn a concept, try to go deep into the concept and try to understand the correlation of the concept with other concepts of the same subject for example the relation between a heat and light concept.
- When you start a new chapter, the learning curve is slow, that is you do not accomplish a similar amount of learning every day even though you spend the same amount of time everyday. Remember, learning is always in jumps and before a jump

happens a certain amount of energy (quantum) in the form of hard work is required. So even if your learning process is slow, keep studying day after day without getting discouraged and finally you will see a jump in your learning.

- Too many students read the question & the answer and then satisfy themselves that they could have attempted the same answer. Remember adopting this approach is a DISASTER. Work the problem yourself, and look at the answer only after you have given it your best shot. It is our conviction that more than one half of the learning that you do in any subject is a result of working on the problems. You must develop enough discipline to try and work each exercise without looking at the answer.
- All subjects are equally important. Devote more time to the subject/topic you are weak in (remember most of us tend to devote more time on areas we are strong and often avoid focus on our weakness). In most of the examinations minimum qualifying marks are there for each subject. Hence, make sure that you do not ignore any subject & allocate adequate time to each subject. Equal importance given to all the subjects ensures equal performance resulting in the uniform achievement. Equal importance doesn't necessarily mean uniform distribution of study hours for different subjects. Subjects in which one is good may be given less hours and subjects which are hard nuts to crack for a particular student should be allotted more time. Analysis shows that in IIT-JEE and other Engineering Entrance Examinations generally many students could not be successful only because of their poor marks in Chemistry in spite of their very good performance in Physics and Maths. Even the successful students could get lower rank in the merit list only because of poor marks in Chemistry. According to a survey, even intelligent students devote approx. 50% of their total time to Physics, 40% to Mathematics and only 10% to Chemistry. So a student must give sufficient time to Chemistry every day. The above analysis is not given with the objective to divert the students from Physics or Maths but to tell them to have a balanced study and utilize the same time to secure more marks. While preparing for any exam always remember that the objective is to acquire more or less balanced competence in all subjects so as to maximise the total score.



**Any fact facing us is  
not as important as our  
attitude toward it, for that  
determines our success or  
failure**

- Norman Vincent Peale

# HOW TO SHARPEN PROBLEM SOLVING SKILLS?



In a competitive exam it is not important whether you know the question or not or whether you can solve the question or not but what is important is whether you can solve the question in the shortest possible time or not. The goal of this chapter is to teach problem solving approaches so that you can become an expert problem solver. Effective, expert problem solving involves answering six questions:

- What's the problem about?
- What am I asked to find?
- What information am I to use? What principles apply?
- What do I know about similar situations?
- How can I go about applying the information to solve the problem?
- Does my solution make sense?

As a student you will decide, “is this an energy problem,” or, “is this a Newton second law problem.” A novice is more likely to decide, “is this a pulley problem,” or, “is this a baseball problem.” The novice concentrates on the surface features of the problem while an expert concentrates on the underlying principle. An expert problem solver, will answer the above questions, play around (briefly) with the problem, and make drawings and sketches (either in your mind or on paper) before writing down formulas and plugging in numbers. A novice problem solver, on the other hand, will try to write down equations and plug in numbers as soon as possible. So the key issue is -

***“How to become an expert problem solver?”***

## Toppers Approach to Problem Solving

There's a story of a very strong and skilled woodcutter who asked for a job with a timber merchant. He got the job with a good salary and decent work conditions. So, the woodcutter was determined to do his best for the boss. His boss gave him an axe and on his first day, the woodcutter chopped down 15 trees. The boss was pleased and said, "Well done, good work!" Highly motivated, the woodcutter tried harder the next day, but he only could bring down 13 trees. The third day, he tried even harder, but he was only able to bring down 11 trees. Day after day, he tried harder but cut down a smaller number of trees.

"I must be losing my strength," the woodcutter thought. He apologised to the boss, claiming he could not understand the reason for his unproductivity. "When was the last time you have sharpened your axe?" the boss asked.

"Sharpen? I had no time to sharpen my axe. I have been too busy cutting down trees." He then decided to sharpen his axe immediately and was back to chopping down 15 trees a day. Since then, he begins the day by sharpening his axe.

Most students are too busy studying and trying to excel in academics and other competitive exams but they do not have the time or patience to update their study skills or approach. They fail to understand that if you're overworking yourself and your productivity drops, you need to take a break. Take time to think and reflect where you are going wrong and then work towards it. Stop assuming that you've the best approach yet you're unavailable to yield the desired result. The woodcutter only becomes more productive by sharpening his blade, analysing new woodcutting techniques, exercising to become stronger, and learning from other woodcutters. Similarly, you have to sharpen your skill, analyse new study techniques and learn from people around. Stretch yourself (mentally and physically), sharpen your critical thinking through interaction, and identify your blind spots (understand, acknowledge and address them). Get out of your comfort zone to bring a change



in the approach and increase your personal production capacity by daily self-maintenance and introspection.

After interacting with a lot of students I observed that most of us do not have the correct approach towards problem solving. Some of the common made mistakes are:

- Many students read the question and the solution and then satisfy themselves that they could have attempted the question in a similar manner.
- Many students lay too much emphasis on solving a higher number of questions.

Remember that there is no dearth of books and problems available. One has to draw boundaries and concentrate on quality rather than quantity. Doing 100 quality and concept based questions is more important than doing 1000 questions which have not been selected carefully. The purpose is to sharpen problem-solving skills. It is possible to prepare a topic by doing 30-40 problems but only if you try to solve them completely by yourself. This may also involve devoting half an hour or one hour or may be even more on an occasional problem. On the other hand, your preparation can be very weak and hollow even if you have attempted more than 200 problems on the same topic in the same time, thereby devoting much less time on difficult problems and leaving them as doubts to be cleared from your teachers. The key to success in sharpening problem solving skills is to practice quality questions without seeing the solution.

In fact, it should be noted that Problem solving is the end result of many other important activities like

**STEP I:** Proper understanding of concept and its application.

**STEP II:** Mastering skills such as visualization

**STEP III:** Continuous interaction between theory and problems.

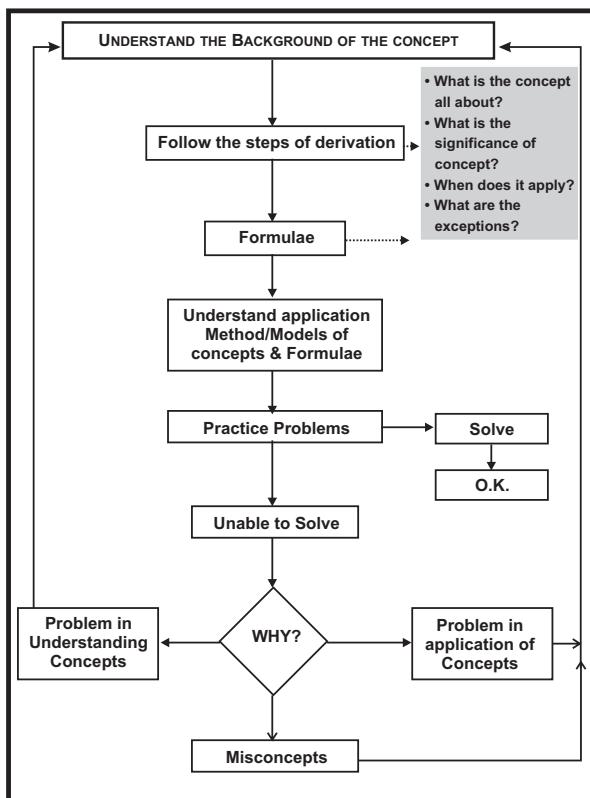
If you have done all these activities properly, only then you would be able to solve problems successfully. Another misconception is collecting problems from all sources and then trying to solve them. Plan beforehand and tell yourself that you will solve a particular number of problems in the topic. Once you have achieved proficiency you need not waste your time in collecting still more problems. Also

important here is that we have to solve relevant problems, problems of the level that are asked in the exams. Solving problems from here and there can lead to frustration which can disturb the entire plan. Let us now discuss each of the above key steps involved in problem solving.

## STEP I: Proper understanding of Concept and its Application

It has been seen that normally students move directly to the formulae and start solving problems. The result, after solving a few problems they get stuck and ultimately get frustrated. This is basically because of the wrong approach towards the subject. It is advised that students should follow the following steps in order to have proper understanding of concepts and their applications.

### *Basic steps of learning any concept*



- Understand the background of the concept
  - What is the concept all about?
  - What does the concept say?
  - Focus on significance of the concept
  - What are the exceptions to this concept?
  - When, Where and How to apply this concept?
- Follow the steps of derivation of the concept
- TRY TO REPRODUCE CONCEPT IN YOUR WORDS
- In case of any doubt read and understand the concept again
- Understand the application method of the concept
- Practice questions on the concept (Start from the easy and gradually move to the difficult ones)
- Diagnose the problems and take corrective measures

### While practicing, try solving questions completely

After mastering the concept and application methods, try to solve the question on your own. Try solving questions completely until you achieve mastery of the application method and concept. Write every step of the application method and solve the question. ***Remember that trying shortcuts or solving questions in a brief manner in the beginning itself will lead to serious problems and you will not be able to gain mastery.*** Let me elucidate my point with a short and interesting story.

A salt seller used to carry the salt bag on his donkey to the market every day. On the way they had to cross a stream. One day the donkey suddenly tumbled down the stream and the salt bag also fell into the water. The salt dissolved in the water and hence the bag became very light to carry. The donkey was happy. Then the donkey started to play the same trick every day. The salt seller came to understand the trick and decided to teach a lesson to it. The next day he loaded a cotton bag on the donkey. Again, it played the same trick hoping that the cotton bag would become lighter. But the dampened cotton became very heavy to carry and the donkey suffered. It learnt a lesson. It didn't play the trick anymore after that day, and the seller was happy.



Most of the students are always looking for shortcuts. They never follow the steps of derivation and directly move to formulae and start solving the questions. Also, when they get stuck instead of trying on their own they refer to the solutions. Sometimes shortcuts work and luck favours you but that cannot always work. Luck might favour you once or twice but what counts at the end of the day are your passion, hard work, creativity, smartness and patience. **You need to have a proper strategy without cheating and cover up everything so that no matter how twisted or difficult the question paper appears, you are able to get through.**

Remember what Dr A.P.J Abdul Kalam said – “**Don’t take rest after your first victory because if you fail in second, more lips are waiting to say that your first victory was just luck.**”

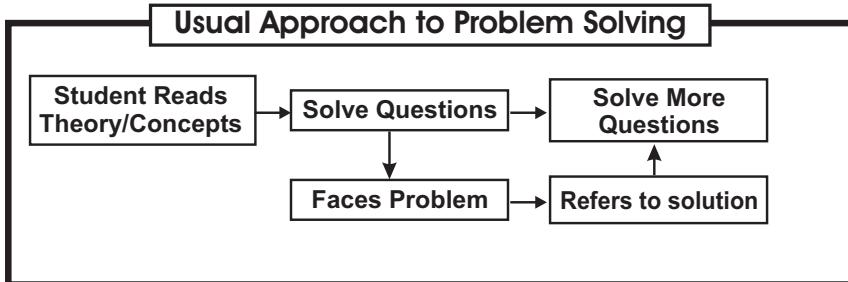
## STEP II: Visualization of the Problem

Follow the following steps to convert the problem in the form of a diagram. Conversion of a problem in the form of a diagram helps in better understanding of the concept. Visualisation of a problem involves following steps -

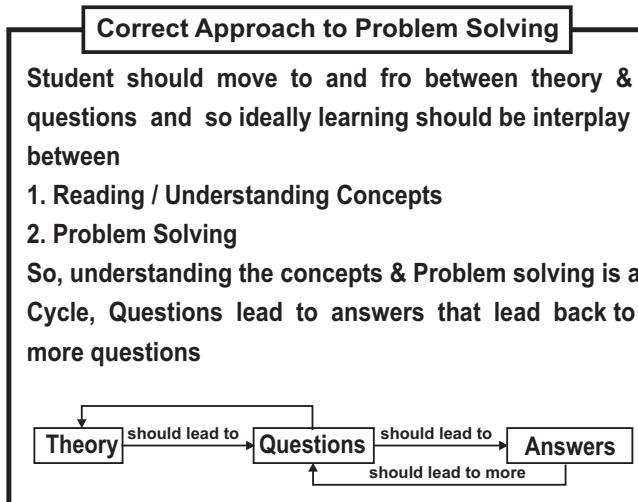
- Step 1.** Draw the diagram as per the problem.
- Step 2.** Once the diagram is drawn, check the problem again to see if what is asked in the question is clearly represented in the diagram.
- Step 3.** Check if the diagram makes sense. If the diagram looks absurd, there is some problem in your understanding of the question.
- Step 4.** Understand the question now by going through the diagram. If you find that this is not possible, then your representation is wrong. You should be able to explain what is required by interpreting the diagram.
- Step 5.** Make modifications in the diagram till you are clear that the diagram is the exact representation of the problem.
- Step 6.** Do not proceed to the next step till you are confident about the diagram.

### STEP III: Interplay Between Theory & Problem Solving

Normally students read the theory, understand the concept and then they keep on solving more and more questions. So the approach followed can be shown by the following diagram.



This is a wrong approach. Ideally, the student should move to & fro between text & questions. Remember, reading the text and solving homework problems is a cycle - questions lead to answers and that lead back to more questions. It is recommended that students should solve questions in rounds and in multiple sittings.



We have already learned that learning always happens in jumps. So rather than trying to complete the entire exercise at one go it is recommended that students should attempt exercises in multiple sittings. The aim of sittings should be

**First Round Objective :** You should be able to solve 60 to 70% questions

**Second Round Objective :** You should be able to solve 70 to 80% questions

**Third Round Objective :** You should be able to solve 90% and above.

Remember, you will learn more in six 1 hour periods spaced through the week than in one 6 hour period.

## What is a Misconcept ?

### How to identify and remove Misconcepts ?

The normal sequence of steps followed by student in problem solving are :

1. The student solves a problem
2. The student checks up the answer
3. The student finds that the answer is wrong
4. The student reviews the solution
5. Sometimes they find that they have made a simple mistake which when corrected gives the correct answer. This is a very good state of affairs and the student need not be worried if most of the time they face such a situation. However if they make such silly mistakes too often it is a cause of worry. They should then figure out reasons why they make such mistakes and remove these causes.
6. A far more dangerous possibility is that after verification also the solution seems to be correct.

**This is the Stage of Misconception.** At this stage, the student is confused. They either -

- Try to find some way of getting the solution right by trying out alternate methods or by hit and trial approach, or
- Ignore their method and understand the solution.

Both of them are not the correct way to approach the problems. Ideally, what a student should do is to critically analyse his approach to the solution and try to find out where did he go wrong and what is the corrective measure he should take so as to avoid these kinds of mistakes in the future. It is very important to find out the misconception and initiate steps to remove the misconceptions.

## Approaches to Problem Solving

**Concrete Method:** In this method you do the calculation using the given values from the start, so that the algebra gives numerical values at each intermediate step on the way to the final solution. The disadvantage of this method is that because of the large number of numerical calculations involved, mistakes are likely, and so you should take special care with significant figures. However this method has the advantage that you can see, at every step of the way, how the problem is progressing. It also is more direct and often makes it easier to locate a mistake if you do make one.

**Formal Method:** In this method, you calculate the solution by doing as much as possible without using specific numbers. In other words, do as much of the algebra as you can before substituting the specific given values of the data. In long and complicated problems terms may cancel or expressions simplify.

**My Advice:** Gain experience in problem solving by substituting the numbers when you start but gradually adopt the formal approach as you become more confident. Many people adopt a compromise approach where they substitute some values but retain others as symbols, for example, “ $g$ ” for the acceleration due to gravity.

So, if the final answer called for in the question is a number, then you will ultimately have to plug numbers into an equation. But even in such cases it is almost always easier and less error-prone to keep the quantities as symbols until the very end. (For one thing, it is easier to do algebra with the symbol “ $m$ ” than with the value “2.59 kg”.)

### What should I do if I am not able to solve a question?

**Don't get demotivated at any point of time if you aren't able to solve a problem,** rather take it as a challenge, struggle and think like if you solve it you'll be able to learn something new. Let me clarify my point with an interesting story.

Once upon a time, a man found a butterfly that was starting to hatch from its cocoon. He sat down and watched the butterfly for hours as it struggled to force itself through a tiny hole. Then, it suddenly stopped making progress and looked like it was stuck. The man then decided to help the butterfly out. He took a pair of scissors and cut off the remaining bit of the cocoon. The butterfly then emerged easily, although it had a swollen body and small, shriveled wings. The man thought nothing of it, and he sat there waiting for the wings to enlarge to support the butterfly. However, that never happened. The butterfly spent the rest of its life unable to fly, crawling around with small wings and a swollen body.



Despite the man's kind heart, he didn't understand that the restricting cocoon and the struggle needed by the butterfly to get itself through the small hole were God's way of forcing fluid from the body of the butterfly into its wings to prepare itself for flying once it was free."

The example of the butterfly highlights the importance of struggle in life. You have no other option but to struggle to reach your goal. Some students when stuck with a problem solving, immediately check the solution mentioned towards the end of the chapter/book because they are not willing to work hard. So what happens is such students get stuck in the same question again when they are to solve it later. While **there are a few other students who struggle with difficult questions for hours. In the process they develop their problem solving skills and take their preparation to the next level.** Such struggle is helpful for brain growth and is important if you are to achieve something. If you are not struggling, you are not learning.

I will suggest you a simple and effective approach to solve questions without seeing the solution

**Step 1:** Approach an exercise only when you have thoroughly mastered the fundamentals

If you are unable to solve a problem at first attempt, come back to that question after some time, say half an hour or an hour. While making the second attempt start on a fresh page. Try to think independently of the first attempt and never get driven by the approach in the first attempt.

**Step 2:** If you are not able to solve the problem even in the second attempt then the next step is to identify the basic concept involved in the question. For e.g. if the basic concept is  $E = MC^2$

**Step 3:** The next step is to open your Physics Book. Open that unit, that chapter and that page where this concept is being discussed. Read that page with half the pace with which you normally read Physics. So study the relevant theory again, paying attention to the finer points and keeping the problem in mind. **Research shows that if a student follows this method seriously then there is a 70 % chance that he would be able to solve the problem. It also sharpens his problem solving skills.**

**Step 4:** If you are not able to solve the question even by step 3 then the last step would be to consult the teacher or refer to the solution. But here also the key is not only to understand the solution but also to find out what were the clues/steps/tricks you missed because of which you could not solve the question. So the idea is to analyze the problem threadbare so as to find out the steps you missed and then practicing more similar kinds of problems so that you can master the tricks involved.

Practice this problem solving approach for some time and continue if you find it useful. Another frequently asked question by students is -

### **“How can we develop our own shortcuts & tricks?”**

I will answer this question with the help of an incident which happened in my student life.

One day in Maths class our teacher asked -



**"What is the sum of the first hundred digits?"**

At that point of time we were not told the formulae

$$\frac{n(n+1)}{2}$$

Most of the students started writing the numbers. While all of us were writing the numbers, one of my friends immediately raised his hand and on being asked the answer, he answered 5050. We all were surprised by his quick response. When we asked him what method he adopted to calculate it so fast, he said take one digit from beginning and one from end i.e.  $1 + 99 = 100$ ,  $2 + 98 = 100$ . Similarly, you can make 49 pairs of 100 so that makes it  $4900 + 100 + 50 = 5050$

**Few years later that friend of mine cleared JEE with an AIR of 6**

That is thinking out of the box. The message is to think in a non-conventional manner. What is important is what comes to your mind when you see the problem, how and in what direction you attack it. Remember this is the only way to develop your own shortcuts for solving problems. So, do not give up solving a problem after one or two attempts and always remember that it is only by practicing problems that you can improve your analytical skills.

**Relax and don't get tense as this kind of thinking power does not develop overnight. It is developed gradually and for it to happen you have to be patient in the initial stages and keep on thinking diversely even if that is of no use.** So while solving a problem, try to strengthen and develop your conceptual understanding by analyzing deeply and correlating the problem with real life situations and look at the solution only after you have given it your best shot. It is my conviction that more than one half of the learning that you do in any subject is a result of working on the problems. You must develop enough discipline to try and work each exercise without looking at the solution. Start with conventional methods of problem solving. Then improvise constantly and build your own shortcuts & ways of attacking a problem. **Remember the process of learning new things can be an exciting adventure.**

## How to Develop Critical Thinking Ability and the Ability to Think Out of the Box?

Critical thinking is one of the most desired skills, especially in competitive exams. You must have often heard people saying that you need to think out of the box to succeed. But what exactly is this thinking out of the box? Well, **thinking out of the box means coming up with ideas that are unique**. With the arising competition in the competitive exam, it is imperative that one develops an out-of-the-box thinking. Let us understand “Critical thinking ability” or “the ability to think out of the box” with the help of a short story.

In a small town, there lived a poor farmer with his beautiful daughter. In the same town lived an old merchant. He was known for his shrewdness and had a dishonest way of dealing with business. Once, the poor farmer finding no options had borrowed a considerable sum of money from the old merchant. The interest was very high. Years passed, and the poor farmer was not able to clear the debt. His evil eyes were on the beauty of the farmer's daughter. Grabbing this opportunity, he played a bet on the poor farmer and the daughter.



There was a mix of white and black pebbles on the ground. The bet was in case he picked the white pebble he would waive off the debt and leave the marriage proposal, and in case he picked the black pebbles he would waive off the debt, but would marry the daughter. The merchant intention was to marry the farmer's daughter so he bent down and intentionally picked both black pebbles, but the daughter noticed it. When the merchant asked the daughter to choose between two hands, the daughter picked one and intentionally dropped the pebble down and said:

“I am sorry. I could not see the colour of the pebble. So show the pebble on the other hand.”

The merchant showed the pebble he had. It was black since he held black pebbles in both the hands. Hence, the dropped pebble would logically be white. In this way the daughter was able to save both

herself and her father. The old merchant lost the bet. The debt was cancelled, the daughter and the poor farmer left happily.

The story highlights the fact that you have to think smartly in situations that appear difficult. Similarly, **competitive exams are not about routine thinking. Success in competitive exam is about the ability to think both critically and out of the box in front of new situation.** Such exams are designed to analyse your critical thinking skills. So, when a question looks difficult, put your undivided attention to every detail of the problem. Keep your eyes open, try to be smart and think outside the routine ideas and there you go!

As Albert Einstein once said, “Creativity is seeing what everyone else has seen, and thinking what no one else has thought.” Remember **success in competitive exams is about the ability to think critically and creatively in front of new situations.**

## Strategies to develop critical thinking ability

- **Note down your questions and ideas**

Whenever you have an idea or a question in your mind while reading, make sure you write it down somewhere. A lot of times we come up with a new question or idea and assume that we will remember it. However, that does not always happen and a good point is lost because of negligence.

- **Ask open-ended questions**

Asking open-ended questions help students to think outside the box. Many times during the school days, students keep responding to closed questions. The thinking involved in this is quite minimal and there is only one possible correct answer.

- **Establish discussion routines**

Student-centred classroom discussions give students ample opportunities to think outside the box. If students are involved in regular discussions with teachers and tutors about topics taught in the class or coaching, it prompts the higher-order thinking skills of the students. As students become accustomed to such prompts as a routine part of class discussions, it creates more space for creative thinking.

- **Find connection**

Re-organize the material into categories or groupings, by asking, “How do these things fit together? What elements are related and how are they relative? What general groupings are there?” You will be surprised to know interconnected various topics are. If you want to enhance your ideation process, read carefully. This way you will be able to come up with ideas that are unique. Mind maps can help you to find connections.

- **Start from the beginning**

Just as in chess, you sometimes take a few steps back to take a leap forward. This is similar in terms of studies. If you feel like that you are unable to think and come up with effective ideas, it's best to start fresh. A small nap or a little entertainment can do some great wonders to help you out with a new and better perspective.

### **Garner's Ten Commandments on Problem Solving**

“I read the chapter and followed the lecture. But when it comes time for me to work on problems I'm lost.” I've heard this comment thousands of times. Problem solving is an art form that only develops over time and after hard work. The more problems you solve the better you get at it. Here are a few pointers on becoming a good problem solver.

- I. **Read** the textbook and class notes, then start the problems by reading a problem slowly to make sure you understand the question.
- II. Make a big **figure**. **Write** down the given parameters and circle the unknowns. Introduce **symbols** for all quantities- don't work with numbers.
- III. Find what basic physics **principles** apply to the problem. You will then express these principles in terms of the symbols you introduced in II.
- IV. Do the **math**, i.e. solve the equations you found in III for the unknown.

- V. Make sure the **units** are correct.
- VI. Ask yourself, does the answer I got seem **reasonable**.
- VII. The **level** of difficulty of problems varies substantially. Some problems will be straightforward, some would be moderate whereas some would be difficult.
- VIII. If you can't solve a problem, put it aside and take it up later. Many times you will then be able to solve it quickly.
- IX. Work in a **team** of two or at most three students. You can help each other learn.
- X. Life's most difficult problems require you to ask, "**Does a solution exist, and if so, is it unique?**"

### Summary

There are no tricks or short-cuts when it comes to succeeding in your studies. Remember, there is no substitute for hard work. But what is meant by "hard work"? One component is time spent on tasks. When we speak of time, we should consider both the quantity of time spent and the quality of time spent.

There is so much material to be understood that a substantial time commitment is required. There is time spent in classes, but also time spent preparing for class, reading the assigned pages, upgrading notes, and studying for tests. Yet, a student can devote a lot of time to these activities and still do poorly. This is because the quality of time spent is also an important factor. Many students become discouraged when, though they spend hours and even days studying for tests, they still get unsatisfactory scores. Usually this occurs because what they do when they study is low-quality work.

What are some examples of low-quality work? One example would be reading the textbook just to complete the assignment. A student who reads properly, on the other hand, reads with a critical eye, constantly asking himself/herself questions such as, "If I had to teach this to someone, could I do it?" or "What if this process were screwed up somehow; then how would the results differ?" or "The text's treatment of this topic differs from what I learned in high school (or what I learned in class today); what question could I ask in class that might clear this up?"

Another example of low-quality work is going over and over your class notes. This is an activity that assumes one will be tested in a low-quality fashion, i.e. with test items that require you to do nothing but recall and repeat. This is a false assumption. You will be asked to integrate concepts from different lectures, to apply the principles covered in class to situations that were not covered in the lecture or text, to evaluate new situations in light of the material covered during the test unit. High-quality work entails preparing for such questions. Preparing entails organizing the mass of new information in such a way that it helps you understand the way the concepts are related to each other.

A final example of low-quality work is coming to class regularly and just taking notes. Why is this low-quality work? Because many students become passive when they take notes. They switch off their brains and assume that they will understand everything after the class. As in other things, your attendance at lectures can be either low-quality or high-quality. High-quality attendance entails being critical during the lecture, asking questions like: "Why does it work that way?" or "How do we know that? What is the evidence?" "How does that relate to what the professor said the other day about...?" There is a world of difference between questions such as those listed above and questions like: "Could you repeat that?" or "Could you spell that?" or "Do we have to know this for the test?" The answers to these questions might be important, but asking them does not indicate that critical thinking has been going on, as do the earlier questions.

As you can see, the successful student will necessarily have to work hard. **The suggestions above are labor-intensive; they require more mental gymnastics. But just as a gymnast would be foolish to expect to succeed at a complex maneuver on the first try at an important competition, as foolish would be a student who expected to pass tests requiring higher-order thought processes without first practicing the basic principles.**



You see things; and you say,  
'Why?' But I dream things  
that never were, and I say,  
'Why not?'

- George Bernard Shaw



# IMPROVING YOUR OUTPUT (NET SCORE)

## Importance of Output

Success in a competitive exam is not only dependent on your knowledge level but also on to what extent you are able to apply that knowledge in the examination hall. In Other words, what matters is to what extent a student is able to convert his knowledge (input) into net score (output). Results of a survey said that most of the students fail not because of lack of knowledge (input) but because of inability to convert input into output. In Spite of this it has been frequently seen that the student still spends 99% of his energy and time in gaining input i.e. acquiring more and more knowledge and ignoring output.

Hence, it is very important for a student to measure / monitor and improve his output. The best tool to monitor your output is by periodically appearing in tests. A test will not only help in measuring your output but will also provide you an answer to what steps you should initiate to convert your input to output. The three factors you should monitor regularly are :

- **Speed** : Ability to solve questions quickly
- **Strike Rate** : Ability to solve questions correctly
- **Selection** : Ability to select what to do & what not to do

### Speed

In competitive exams, apart from solving the questions, what is equally important is whether you are able to solve the question in the shortest possible time or not because that would determine the total number of questions you would be able to solve. Speed means the average time you take to solve a question. Let us understand the definition with the help of an example -

Study the following table very carefully.

	Phy.	Che.	Bot.	Zoo.	Total
Total number of questions	50	50	50	50	200
Questions Attempted	42	48	44	40	174
Correct Answers	36	26	38	36	136
Wrong Questions	6	22	6	4	38

### Speed would be given by the formulae

$$= \frac{\text{Total time spend (in seconds)}}{\text{Total ques. attempted}}$$

So, the overall speed for the table above is  $\frac{150 \times 60}{174} = 51$  sec per question.

I will share with you an experiment we did a couple of years back. We were running a testing program for NEET students. This program was running in 27 cities of the country. And that's when we thought of doing a small study. We started monitoring the students of Lucknow, Varanasi, Kanpur, Allahabad and Gorakhpur Branch. In Allahabad we pasted a big white chart in the test room and started writing the speed of the students on that white chart after every test, whereas the students of other cities were not told their speed.

After 4 tests or after 2 months, I found out that-

The average speed of the students of Allahabad had improved by 15%. Whereas the average speed of other students was more or less the same. We went back to the students of Allahabad and asked them what is that they have done so as to improve their score? Their reply was "**Sir, we haven't done anything whatever improvement has happened, it has happened on its own.**" The thing which helped us was that white chart. After every test we used to write our speed on the white chart there was a voice which used to come from our heart that in the next test you have to improve it. Your speed in this test is 62 sec. So, the target for the next test is 55 sec." Sir, it was this feeling which forced us to improve our performance. So the first step is measuring the current speed & monitoring it over a period of time.

**Speed building comes through the following:**

- Memorizing landmark problems (remembering standard formulae, concepts so that you can apply them directly)
- Being strong in mental calculations (never use the calculator during your entire preparation, try to do first and second level of calculations mentally, remember as vocalization reduces reading speed, similarly doing calculation on paper reduces the speed. Tools for solving numerical problems faster can be: memorizing tables up to 30, knowing the values of fractions; knowing squares & cubes up to 40).
- Working with choices (see all the options and do not go for last digit accuracy unless required by the problem)

One of the techniques by which you can improve your speed is by developing the ability to solve questions mentally. What I am trying to say is that usually most of the students try to adopt a systematic approach when attempting a paper in an examination hall. i.e., they write proper formula and then approach the question step by step. Friends, it is advised that the student should try to solve at least 15-20% questions mentally. It is our conviction that in most of the competitive exams more than 30% of the questions can be solved without using pen and pencil. So, when we are actually trying to solve them by writing complete steps we are doing nothing but wasting time. So, it is advised that students should start practicing question solving on their own mentally. **However you should start using this technique only when you have mastered the basic concepts thoroughly.**

When you are doing subject wise exercises you can also calculate speed subject wise. **Here I would like to highlight one more point that just good speed is not enough because most of the competitive exams have negative marks, so a high speed with less accuracy may be harmful.**

Let us analyse the above example:

Here the speed is highest in Chemistry (assuming equal time was given to all subjects) but many of the questions attempted are wrong so the better way of measuring speed would be average speed of solving one question correctly and we call this speed as **Effective Average Speed**

So Effective Average Speed = Average speed of solving one question correctly =  $\frac{\text{Total time spent (in seconds)}}{\text{Total Correct Questions}}$

So, the overall effective average speed of the student is  $\frac{15 \times 60}{136} = 66$  sec. per question.

### Strike Rate

This originates from the second important factor, the strike rate. Strike rate means the percentage of correctly attempted questions. A strike rate of 90 means that 90 percent of questions attempted are correct and 10 percentage are wrong.

Strike rate is defined by the formulae

$$= \frac{\text{Total Correct Questions}}{\text{Total Questions Attempted}}$$

So, the overall strike rate of the student is  $\frac{136}{174} = 78\%$

The importance of strike rate can be gauged from the table given below. We can clearly see that students get only 86 marks in Chemistry as compared to 140 in Zoology. Although he has attempted a higher number of questions but because of the poor strike rate his net score is less than Zoology.

	<b>Phy.</b>	<b>Che.</b>	<b>Bot.</b>	<b>Zoo</b>	<b>Total</b>
Total number of questions	50	50	50	50	200
Questions Attempted	42	48	44	40	174
Correct Answers	36	26	38	36	136
NET SCORE					
Speed (assuming equal time for all subjects)	53	47	51	56	52
Effective average speed(sec)	62.5	87	59	56	66
Strike Rate(%)	86	54	86	90	78

Strike rate can be improved with the help of intelligent guessing. Intelligent guessing means guessing a question you are not completely sure but have some idea about. Your objective is not to solve the question but choosing the correct option out of the 4 given choices. So always try to eliminate the choices. Remember that if one choice is eliminated, chances of your guess being right is 33% (in comparison to a blind guess where the chances of being right is 25%) and if two are eliminated the chances of hitting the right answer are 50%.

Strike rate reminds me of a student who was using our Mock Test Series Package in Patna. He was having a major problem with his strike rate. In spite of all his measures his strike rate was continuously moving in the range of 70%. Whereas the required strike rate to get a good rank in NEET is 90% and above. The student visited us at our Delhi Office with all his report cards & test assessment and analysis sheets. We asked the student to write 2 tests along with our Delhi batch in the Classroom, and analyzed his performance in those 2 tests.

## The Result

The student had a low strike rate not because his fundamentals were not clear. But because of a lot of confusion and wrong approach to attempting MCQs. He used to see the options before trying to solve the question on his own and most of the time he ended up in a confused state after seeing all the 4 options.

We recommended him not to see the options at all and solve questions on his own (i.e. without seeing the options). The results were amazing. In the next 2 tests his strike rate jumped from 70% to 85%.

Remember that most of the time the options are very close to each other and seeing the options before trying to think on your own to find out the answer can create a lot of confusion.

A good speed or strike rate alone can not give you success. One without the other is a good way to mess up a potentially good performance. **What is required is a good combination of both speed and strike rate for which all you need is consistency.** Let me elucidate this point with an interesting example.

I am sure you've heard the well-known tale that brings home the point 'slow and steady wins the race'. Once upon a time a tortoise and a hare (rabbit) ran a race.



It was agreed between them that the one who would reach the particular given spot first would win the race. The race, thus, began and the rabbit in a short time covered a long way. He looked back and saw that he had left his friend far behind. So he went into sleep

thinking that when the tortoise would come up, he would take another run and beat him. But the tortoise went on slowly and steadily and won the race due to his continuous struggle while the hare was still asleep. 30 years back someone came up with this story of hare and tortoise.

Moving fast forward 2020, the moral of the story is no longer relevant. **In the new context, being slow and steady will never bring you success.** In this current world of cut-throat competition, you cannot assume that your competitor will sleep for a particular period. Everyone is equally awake, hustling every minute and hour to achieve their goal. Neither can a student succeed by just studying 1 hour a day even if he is consistent. **To be a winner in this intense competition, you need the consistency of a tortoise and the speed of a rabbit.** That's the mantra of success in the newer context.

Here I would like to share one of my experiences. I was doing a seminar in association with HT Horizons in Delhi. In the question-answer session one of the students asked me, "Sir, I think I have reached the peak of my speed & strike rate, that means I think I cannot further improve upon my speed & strike rate. But, my net score is still less than the expected NEET cut-off. What should I do so as to improve my score?"



This brings us to the third very important factor for improving performance i.e., selection of questions.

## Selection

It is very important to understand what you have to attempt and what you have to leave. There is a limit to which you can improve your speed and strike rate beyond which what becomes very important is your selection of questions. So success depends a lot upon how judiciously one is able to select the questions. To optimize your performance, you should quickly scan for easy questions and come back to the difficult ones later.

Always keep in mind that normally questions in any competitive exams can be categorized into 3 areas

**Easy:** Approximately 25% questions in a paper are easy

**Average:** Approximately 60% questions in a paper are average

**Difficult :** Approximately 15% questions in a paper are difficult

**Remember what percent of easy and average questions you are able to attempt correctly will decide your selection whereas difficult questions will decide your merit.** So, while attempting a paper you should focus on careful selection of the easy and average questions and avoid difficult questions in the first and second round and come back to them once you have completed the entire paper once.

Also remember that the cut-off in most of the exams moves between 62 to 67% (except JEE where the cut-off is usually between 40 to 50%). So if you focus on easy and average questions i.e. 85 % of the questions, you can easily score 70% marks without even going to difficult questions. Try to ensure that in the initial 2 hours of the paper the focus should be clearly on easy and average questions, after two hours you can decide whether you want to move to difficult questions or revise the ones attempted to ensure a high strike rate.

Focus on these 3 aspects and try to improve your score (Ideally you should attempt 85% paper with 85% strike rate to achieve a good rank in most competitive exams)

## Test Planner

An ideal way to improve upon the above mentioned three factors is to start monitoring them. You would be surprised that during my presentation at different places most of the students often ask me a similar question, "***Sir how can I improve my speed ?***" I immediately counter-question them asking, "What is your current average speed of solving a question today?"

Can you guess what the reply of most of the students is? Well, more than 99% of the students reply saying 'I don't know'.

My reply to such students is that you cannot improve your speed unless you know what your current speed is. So, the first step of improvement is realization. Start monitoring and tracking the above discussed factors with the help of the test planner given below.

	T1	T2	T3	T4	T5
Date of test					
Total number of questions (a)					
Questions Attempted (b)					
Correct Answers (c)					
Strike Rate (c/b)					
Speed (Total time in seconds/b)					
Effective Average Speed					
Net Score					
Percentage Marks(c/a)					
Highest Scoring Subject					
Lowest Scoring Subject					

Keep the above test planner always in front of your eyes, it will help you in tracking as well as motivating you to make further improvements.

**Note :** Read chapter on "**Tips & Techniques on How to Attempt a Paper?"** to find out how you can further improve your speed, strike rate and selection of questions.

## Testing : A tool to improve your speed, strike rate and selection

### What is the importance of testing ?

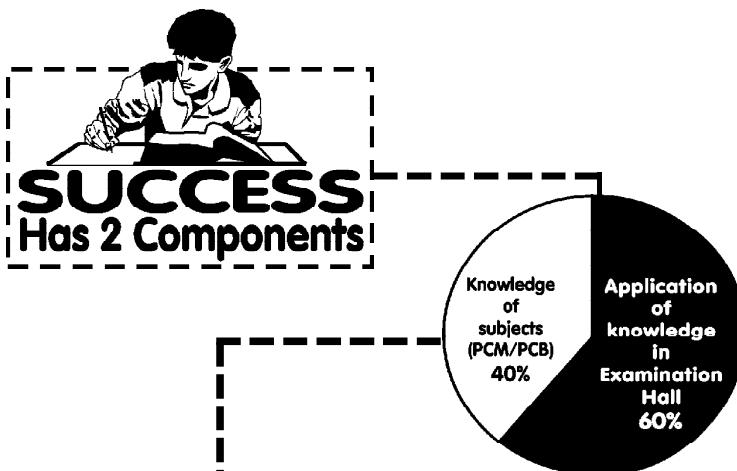
Success in competitive exams requires excellence in two areas:

- Learning the fundamentals
- Application of fundamentals to solve problems.

While the focus of school/coaching institute / books / correspondence course is on the first area, the focus of a testing organization/test series is on application of fundamentals. Apart from strengthening the application and benchmarking, the mock tests decrease the anxiety and increase the confidence of the examinee on the test day. (**A survey found out that most of the students in examination lose 10 to 15% marks because of silly mistakes** & these mistakes can be reduced by mock tests as they boost the confidence of the candidate by strengthening time & temperament management skills)

Some of the benefits of a good mock test series are

- Benchmarking - relative & absolute to be able to find where do you stand amongst thousands of students
- Highlights strong and weak areas
- Improves Speed and Stamina
- Builds up confidence and strengthens time and temperament management skills
- Reduces silly mistakes
- Acts as a revision tool
- Gives a platform for experimenting with different strategies (recognizing the weak and strong points and thus dividing time on different sections accordingly)
- Builds up the competitive spirit
- Builds test stamina-sitting for two hours at a go and working speedily



Results of a survey said that most of the students fail not because they do not work hard or they do not know the subject but because they fail to apply their knowledge in an examination hall. Normally a student loses 15-20% marks because of lack of application of knowledge in examination hall. This loss is due to examination fear which translates into silly mistakes, calculation errors, confusion and other mistakes.

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Application of knowledge means ability to solve maximum questions in shortest possible time. It comprises of :



Note : Application of knowledge can be strengthened by a regular practice under examination hall conditions.

### When should you join a testing program?

Usually most of the students feel that they should join testing in the last stages of their preparation. But remember if you join a testing program in the last stages it might lead to a situation in which it is too late to react. You might be able to find your weak areas but

you might not have time to take corrective measures. Remember a good test series

1. Acts as a guide/counsellor in the initial stages of your preparation.
2. Develops and sharpens problem solving skills during the preparation.
3. Acts as a scientifically designed revision tool in the final stages of preparation.
4. Last but not the least, a testing programme keeps you focussed during your entire preparation. It tells you where you are, where you have to be, what is the gap and how exactly that gap can be filled up. The moment you get deviated from your track, the testing programme helps you in bringing back.

Keeping the above in mind in order to get maximum benefit it is advised to subscribe to test series in the early stages of preparation. However, be careful enough in finding out whether the tests are full-length or part tests. Join a test series which starts with part tests and has full length tests in the end.

### **How to appear in a test at home ?**

- **Follow the mentor Approach:** Each student is advised to appoint one mentor during his course of preparation. The role of the mentor would be to provide a testing environment to the student while he is appearing in a test. Mentor can be your friend, parent, guardian or any relative who would be in close touch with you during your course of preparation.
- Prepare the schedule exactly similar to the schedule of the final exams. For example if you are appearing for JEE exams, give both the papers in a single day with the breaks as given in the real exams.
- Fix up the date and time of the test with your mentor.
- On the specified timings the mentor will give the paper to you. The room should not have any kind of study material or any other aid (calculator, rough paper etc.). In case of online test, wait for the exam to get started and follow the instruction of the invigilator
- Keep a glass of water in the room.

- In order to get maximum benefit you have to use it with complete honesty by exactly simulating examination hall situations. Remember the idea is to feel pressure and examination tension so many times before the actual examination so that we are confident before going for final examinations.
- After appearing in the test, give the response sheet back to the mentor for evaluation.
- After you appear in a test it is very important to analyze your performance threadbare. We suggest you spend at least 2 to 3 hours in post-test analysis and to understand all the areas where you made mistakes. Analyze your performance in the test and subsequently keep track of your key performance indicators Speed, Strike Rate and Net score.
- Fill up the score in the Test Planner along with all the tests you have appeared in. Monitor & compare your progress with the other tests. Follow the same strategy with all the future tests taken by you.

### How to do post test performance analysis?

Our internal research shows that very few students lay emphasis on post-test analysis, fewer still identify their strong & weak areas & very few of the rest learn how to avoid these mistakes in future. Remember the key to success is identifying the mistakes and avoiding them in future.

After each test analyze your performance for at least 1 to 2 hours to find out where did you go wrong & what are the areas of improvement (is it the speed or the strike rate or both or something else). Post-test analysis should clearly identify your strengths & weaknesses so that you can work upon your weaknesses before you take the next test. I recommend uses a scientifically designed “**Test Assessment & Analysis sheet**” which highlights your weakness & helps in analyzing your performance in the test.

After you have attempted the test check the Response Sheet with answer keys to find out the marks scored. After that try to attempt on your own the questions not attempted and questions attempted but wrong and find out the reason for each and every question which will subsequently help you in filling the tests assessment and analysis sheet.

## How to get feedback from “Test Assessment & Analysis Sheet”

**Learn from returned tests :** When a graded test has been returned rework your errors trying to reason out why the correct answers were correct. Identify why you might have missed a question. Did you fail to read it correctly? Did you fail to prepare for it? Was the test at a more difficult level than you prepared for? Did you run out of time? Did you have any problems due to anxiety before or during the test? If you did not do as well as you expected on a test, examine the way you prepared and adjusted your style of learning and studying to equip yourself to do better on future tests.

Test Assessment & Analysis Sheet helps a student in identifying his strong & weak areas. There are certain direct inferences which can be drawn from this sheet. For example,

- If you knew some questions but were short of time, then speed or selection of problems is one area where you need improvement.
- If the number of questions you do not know is more than 20 % of the total questions that means your coverage of the topic needs improvement
- If you are losing marks because of calculation mistakes or confusion, then you need to practice similar kinds of questions more so as to reduce these mistakes.

### Analysis of type of question

- To do question-wise analysis the students have to categorize questions in two broad categories.
- Memory based questions or direct questions
- Application based questions

The action suggested is as follows

Type of Wrong	Action answered Questions
<i>Memory based questions or direct questions</i>	Need to go through the fundamentals again as coverage of the topic is poor. The student would also not be able to do application-based questions.
<i>Application based questions</i>	Need more practice

**Analysis of “wrong questions”**

Divide the questions which you have done wrong in 3 broad categories

<b>Reasons for wrong question</b>	<b>No. of ques</b>	<b>% of wrong ques</b>
Due to calculation mistake (Self-solved, but after exam)		
Due to confusion/did not read question carefully (Self-solved, but after exam)		
Due to incomplete study (Did not knew the question, Could not solve even after exam)		
Total number of question attempted wrong		

The action suggested for questions attempted wrong can be put in the form of following table

<b>Reasons for wrong question</b>	<b>Action</b>
Due to calculation mistake (Self-solved, but after exam)	Need more practice/Read instructions more carefully
Due to confusion/did not read question carefully (Self-solved, but after exam)	Go to the basic concepts again and try to find out why did you go wrong
Due to incomplete study (Did not knew the question, Could not solve even after exam)	Revise the basic concept again and practice more similar kind of problems

**Analysis of “Questions not attempted”**

Divide the questions not attempted in 3 broad categories

Reasons for unattempted questions	No. of ques.	% of wrong ques
Due to lack of time (Self-solved, but after exam)		
Due to confusion (Self-solved, but after exam)		
Due to incomplete study (Did not knew the question Could not solve even after exam)		
Total number of unattempted questions		

The action suggested for questions not attempted can be put in the form of following table

Reasons for unattempted questions	Action
Due to lack of time (Self-solved, but after exam)	Need to work upon speed (time taken to solve one question) also simultaneously you need to be selective while choosing which questions to attempt.
Due to confusion (Self-solved, but after exam)	Go to the basic concepts again and try to find out why you go wrong. Need more practice/Read instructions more carefully
Due to incomplete study (Did not knew the question, Could not solve even after exam)	Revise the basic concept again & practice more similar kind of problems

### **Use your Marks Secured/Time Spend(M/T) score to fine tune your Time allocating strategy**

While preparing for any competitive examination, candidates go through a number of mock tests to gain accuracy and excel in time

management. By appearing in mock tests you also find out what time you should give to each section. Given below is a technique called M/T score which can help you in deciding what time to allocate to each section and how you can improve your score by shifting some time(say 10 minutes) from one section to another. Let us understand this with the help of an example. Given below is the performance of a student in 3 tests.

**Table 1**

Subject	Test 1		Test 2		Test 3	
	Time Spent (Min.) (T)	Mark Scored (M)	Time Spent (Min.) (T)	Mark Scored (M)	Time Spent (Min.) (T)	Mark Scored (M)
Physics	60	72	65	78	60	70
Chemistry	50	40	45	42	45	40
Math	70	55	70	54	75	60

**Table 2 : Marks Scored (M)/Time Spent (T)**

M/T Score	Test 1	Test 2	Test 3
Physics	1.2	1.2	1.16
Chemistry	0.8	0.93	0.88
Math	0.78	0.77	0.8

**Table 1** represents the subject wise time spent and marks scored in that particular subject.

**Table 2** represents his M/T score i.e. Marks in subject/Time given to the subject or in other words marks secured in 1 minute.

So in Physics the M/T ratio is highest it means that by spending 1 minute in Physics section the student gets 1.16 marks whereas this ratio is lowest in Maths. So if the student can shift 10 minutes from Maths to Physics his score can be improved.

However this strategy is dependent on many other factors but this definitely gives a student a direction to think on how he can improve his score by allocating time to different subjects.

## CASE STUDY

An UG NEET candidate attempted several mock tests before appearing in NEET. Despite giving his best, the student couldn't score more than 540 marks out of 720 in the tests (Attempt 160 questions, 140 correct and 20 wrong out of a total 180, each question carrying 4 marks and one fourth negative marking). Due to continuous inability to score above 540 even after attempting several practice tests, his parents decided to bring him to our academic coach for guidance. On asking to solve a paper, he again scored 515 marks out of 720 marks (Attempt 160, 135 correct and 25 wrong). In order to improve his score we advised him to work on 2 areas

- Questions attempted wrong (25) and
- Questions unattempted (20).

We started analyzing his performance with questions attempted but wrong and gave him 25 minutes extra asking him to re-attempt the 25 wrongly attempted questions to figure out the problem area and suggest a strategy to improve the score. To our surprise, the student now solved 15 questions correctly out of 25. Now solving 15 questions correctly meant 60 marks + 15 marks lost due to negative marking. Forget about selection 75 additional marks can take you to the top of the merit. It also proves that the problem with the student was not of knowledge because with the same knowledge he solved 15 questions without any additional help. The problem areas were test taking strategy and exam temperament.

Subsequently we asked the student to write the reason why he could not solve the question correctly in the exam and the results were surprising and shocking to the student himself.

- Silly mistakes
- Confusion
- Calculation error
- Not reading the question carefully



In order to further analyse the Questions Unattempted, we again asked the student to reattempt 20 questions and gave him 20 minutes of time. He was able to 8 questions correctly and 12 were either attempted or attempted wrong in the second attempt too. When we, further, went in the details of 8 questions the student said that out of 8, 6 questions were very easy and he did not reach them in the first attempt whereas in 2 questions he got confused in first attempt. So, missing out on easy questions means there is problem in selection of question. Now 6 additional question means 24 extra marks.

Now these mistakes cannot be eliminated totally but once you make the child conscious and start monitoring them closely you can definitely reduce them quickly. The net result of the student shot to 620+ in 15 days' time. As the student learned about his area of weakness, it helped him improve in his later exam.

### **Success Gap Concept and how to use it in your preparation**

Success gap helps in analyzing the performance of the students in a test by identifying strong & weak areas so that the student can prepare accordingly. Success gap is a scientifically developed technique developed by the team of AIETS to help students knowing how far are they from success or what are the extra marks (subject wise /topic wise/question wise) they should score to clear the exams. Success gap is the difference between the marks you are currently scoring in a test & the marks which you should score to clear the exams. The cut-off in various tests is based on the experience of our faculty & our interaction with the students preparing for different competitive examinations.

For example, if in a mock test of NEET your marks are 520 & the cut off marks (passing marks) is 560 then the success gap is 40 marks. Now the question is where is the success gap (which subject & which topic) and how to fill this success gap. To find out this we go for the detailed analysis of the score.

	<b>Phy.</b>	<b>Chem.</b>	<b>Zoo.</b>	<b>Bot.</b>
<b>Total Marks scored</b>	100	130	150	140
<b>Cut off Marks</b>	130	140	160	130
<b>Success Gap</b>	30	10	10	-10

From the result you can clearly see that the student over-performed in Botany & under-performed maximum in Physics. Now we further analyze the success gap in Physics, which is the highest by doing question by question analysis of Physics paper. The result of the analysis says that the student scored poorly in Physics because of two reasons

- Level 1 (Basic) problems in Heat (meaning his basic concepts of Heat are poor & he needs to go through them again) In this case the student would also not be able to solve application-based problems of HEAT.
- Level 3 (Proficient) problems of light: This means that the basic concepts of the student are all right but his application is poor so he needs more practice of similar problems.

Hence it clearly states that analysis of tests with a success gap can help you in knowing the areas where you should focus your energies.

### General Suggestions

- Do each exercise and every question under a time limit. Allocate time for an exercise keeping your existing speed in mind. For example if you are solving a Physics exercise consisting of 60 questions. Your current average speed of solving a physics question is 60 seconds and you want to improve it to 40 seconds. While doing this exercise allocate time slightly less than your current speed, say 50 minutes. This would put you under time pressure and hence would gradually help in improving your speed.

Always remember that in final exams it is not important just to solve the questions correctly but it is important to solve the questions in the shortest possible time. So, always keep track of your average speed of solving questions.

- Participating in identical test series helps in time and temperament management during the final exams. It has been observed that most of the students lose 10 to 15% of their marks not because they do not know the subject but because they fail to apply the basic concepts correctly. This is basically due to examination fear & pressure. These marks which a student loses because of silly mistakes (calculation error, confusion, failure to apply the right concepts, solving the problem by long method etc.) can be reduced if a student regularly participates in test series based on the pattern & level of final exams. The student can also simulate exam-like conditions in his home by following the mentor approach.
- Never treat a test series like a question bank. Some of the students have the habit of solving mock test papers without any fixed time. Remember that if a mock test is not attempted in a way the actual test would be, it ends up being a question bank.
- Most of the students do not analyze the performance after they have taken the test. They simply find out the marks scored and the solutions to the incorrect questions and move on to the next test. Remember that participating in the test series without analyzing the performance scientifically would not lead you anywhere. After each test rework on your own, all the questions you could not attempt or attempted wrongly. Analyze your performance for at least 1 to 2 hours to find out where did you go wrong & what are the areas of improvement (is it the speed or the strike rate or both or something else). Post-test analysis should clearly identify your strengths and weaknesses so that you can work upon them before you take the next test. So take as many simulator tests as you can right from the beginning of your preparation so that you come to know of your weak areas much before the final exams. I recommended a scientifically designed “Test Assessment & Analysis sheet” which highlights your weakness & helps in analyzing your performance in the test.

- Get feedback on your preparation by getting yourself tested by an independent body other than your coaching institute. Testing by a third party would give you an independent and unbiased feedback about your performance. It is preferable, if these tests give feedback and rank on National level.
- If you do bad in a test remember that failing and making mistakes are the only way to make true progress in something new. It has been said that the only way to be staggeringly successful is to double your rate of failure. So if you don't make mistakes, you aren't forcing yourself into new realms of possibility. Failure is normal at the beginning of something new or unfamiliar. Failure also fades away as you make an effort; do not stop until successes far outnumber failures. So, if you fail quite often, put in a lot of effort, and if you still do not see the promised results, DO NOT GIVE UP. Change strategies, review what you are doing and try something new.
- Always remember that speed, strike rate and selection are important for success. Continuously develop the ability to do things fast and accurately. Try to work out the best combination of the 3 factors.
- Keep interacting with students who are seriously preparing for competitive exams. Since the competition is on National level it is important to compare your preparation with other students preparing across the country.

In short we can say that "**competition is not necessarily a test of knowledge of basic fundamentals only but it is a test of application of knowledge to solve surprise problems with perfect time and temperament management.**



**The pessimist sees difficulty  
in every opportunity. The  
optimist sees opportunity in  
every difficulty.**

- Winston Churchill



## ACTION PLAN

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The next step is to prepare an action plan. Goals without an action plan are like empty dreams. An action plan defines how the goals would be achieved and hence helps in turning your dreams into reality.

### Be ready to give your 100%

We often regret in life when we don't get a desired result, wishing to reshape our past for not putting our 100% and working half-heartedly. This happens with every other student quite frequently and that is why it is important that you give your best while preparing for any exam to avoid regret later in life. I'll give you a clarity of my point with the help of a short story.

An elderly carpenter was due to retire after 40 years of service. He told his Boss of his plans to leave the business and start a life of leisure with his wife and extended family. He thought that the time was right and he would rather let go his income derived from his work. But his boss was disappointed as the carpenter had been a loyal and diligent worker for many years. He was sad to see him go. So, before letting him go he asked the carpenter for one last favour, requesting him to build one last house before retiring to which the old carpenter agreed but it was soon clear that his heart wasn't in it. As he took shortcuts, used inferior materials and put in a half-hearted effort. The final product was well short of his usual standards and it was a disappointing way to end his career.



After a few months of labour, when the job was finished, the boss came to inspect the work. After taking a look around, he handed the keys to the carpenter and said, "This is your house, it's my gift to you." The old carpenter was shocked and embarrassed. The retiring carpenter was lost in regrets. If only he had known, he would have demanded excellence from himself and made sure that everything was perfect.

Similarly, many times students procrastinate and don't pay complete attention to classes. Instead their focus is drawn towards social media and other unimportant tasks. Finally, when they are stuck in a question or fail to be efficient in an exam, they start contemplating how good it would have been if they had been more attentive or worked a little more. But the fact is nothing can alter what is already done. You have to give your time to build your career brick by brick. Once you move past this phase, you will either enjoy the fruits of life or live in regret for the rest of your life. How you spend your precious time at present is crucial to your future. So, **choose your actions with purpose and intent and never give any thing less than 100%.**

### Making an Action Plan

The first step in making an action plan is to make a Yearly plan. Yearly plans help you get a consolidated or big picture. The Yearly Plan should constitute following 3 phases :

- Learning phase
- Consolidation phase (6 to 8 weeks before the exams)
- Rapid Review phase (7 to 10 days before the exam)

**Learning Phase:** The basic focus during this phase is to learn and practice the fundamentals. This is the phase with which the preparation of a student would normally start.

**Consolidation Phase:** In this phase the objective is to consolidate whatever you have learned in the learning phase. Usually what happens is that students devote too much time in the learning phase and try to postpone the revision process. As a result they are not able

to revise things completely and properly and hence approach exams with some topics not being fresh in mind. Remember consolidation phase is a very important part of your preparation as it brings all the knowledge on your fingertips.

**Rapid Review Phase :** The objective of this phase is to do last minute revision and to prepare yourself mentally for the examination.

- **Monthly plan :** Break the yearly plan into monthly plan. Leave the last 2-3 days of the monthly plan as free days so as to cover up if there is any delay in the monthly plan. If there is no delay then you can use these days as bonus days for doing further studies in the allotted topics.
- **Weekly plan :** Break the monthly schedule into weeks accommodating all the subjects to be studied. Make realistic weekly targets. This will help you in not only completing the syllabus but will also give you a sense of achievement once you meet your weekly targets.
- **Daily plan :** Break the weekly schedule into 7 days keeping your weekly target in mind. It is advisable to keep one day in the week for the test on the topics covered in the week.

Try to allocate subjects according to your effectiveness in different sessions. For example, if you feel you can concentrate best in morning, keep morning time for difficult subjects. It is much easier to start studying if you know what you have planned. Your daily plan will be useful here. Before closing your studies for the day, plan your next day's study tasks. If you are clear with what you have to start your studies it will bring more focus to your studies.

### **Other suggestions while making Action Plan**

- **Built flexibility :** Many times students work out the schedule for the subject at the beginning. As time goes on they find it keeps up with the schedule. As a result over a period of a time the schedule itself loses meaning and fails to provide the

benefit, which it was intended to. Preparation for an exam and preparation of a subject schedule is very similar to any project management activity. This means that the subject schedule should be realistic and should be based on some try runs that the student might have already performed. Also the schedule should have enough flexibility so that mid-course corrections can be made without much of a problem.

- **Monitor the plan closely and regularly :** The most important part of any plan is monitoring, review and correction of the schedule. This should be done periodically. The most preferred frequency of doing this would be once every fortnight. Students could also do it once a week or in three weeks. Review at rates higher than this is not suggested. Once the students have decided on the frequency of review they should rigidly follow the review schedule. During every review cycle, they should look at what they planned to achieve and what they have actually achieved. Mid-course corrections need to be made
  - If a student is behind schedule, the first thing he should ask himself is how he can bring back their study onto schedule. This may mean spending more time than planned for a number of days till the schedule is met or reducing the study load.
  - If the student cannot bring his study back on track, he should review the schedule and look at new dates.
- **You may color code your calendar:** Red for assignments that must be accomplished that week, blue for longer-term assignments, yellow for personal time and appointments, green for classes, etc. make it easier for you to find at glance what you need to do and when you need to do it.
- **Select one person who is going to stay with you all throughout your preparation as your mentor:** Discuss all your plans, progress & status of studies with your mentor regularly. The mentor can be your senior, parents, relatives, friend, teacher or any other person who understands the importance of exams in your life.

- **Remove handicaps to study:**

- Always begin with some study that is easy or interesting.
- Try to cover up topics that are less time-consuming first, and not jobs that will require more time and effort.
- If you finish many jobs that can be easily done, you will get a sense of satisfaction and achievement.
- Make a task-list of the day by jotting down the things to be done instead of keeping it in your head. This is a good cure for worries and distractions.

## Action Plan Illustration

If you are preparing for JEE, which is scheduled to be held in the 3rd week of April, you should complete the whole syllabus by the end of January. If you start your preparation in the month of July, you have seven months to complete this syllabus. You shall divide the syllabus into seven broad units, which will be covered by January end.

Start Date : July beginning

Exam Date : April 3rd Week

Total Time : 9 months & 2 weeks

Learning Phase : 7 months

Consolidation Phase :  $7 + 1 = 8$  weeks

Rapid Review Phase : 10 - 12 days

Now, let us take the example of **Physics**, to make the detailed plan, in which the syllabus has been divided into the following 7 units:

1. Mechanics & Properties of Matter
2. Heat & Thermodynamics
3. Electrostatics & Current Electricity
4. Magnetism & Effects of Current

5. Wave Motion & Wave Optics
6. Ray Optics
7. Modern Physics

While allocating time to different subjects / units take following things into consideration

- Trend of past years to know what is important and what is not important
- Your comfort level with the topic
- Time available between now and the exam date

Now, we will allocate the above 7 units in the yearly plan. After allocation the yearly plan would look like

Yearly Plan											
SUBJECT	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	
PHYSICS	Mechanics & Properties of Matter	Heat & Thermodynamics	Electrostatics & Current Electricity	Magnetism & Effects of Current	Wave Motion & Wave Optics	Ray Optics	Modern Physics				Consolidation Phase
CHEMISTRY	Learning Phase										
MATHS / BIOLOGY											
Duration	(7 months)								(8 weeks)	(10 days)	Rapid Review Phase Examination

The syllabus of **Unit 1** scheduled in the month of July can be further divided into four parts to be covered in 4 weeks (considering 1 month = 4 weeks). After incorporating unit 1 the monthly plan would look like

Monthly Plan					
SUBJECT	WEEK 1	WEEK 2	WEEK 3	WEEK 4	
PHYSICS	Units, Dimensions & Vectors, Motion of a body along straight line, Motion under gravity, Projectiles	Uniform circular motion, Newton's laws of motions, Friction	Work Energy Power, Conservation of energy & momentum, Elastic & Inelastic collision, Gravitation	Centre of Mass, Elasticity, Buoyancy, Simple Harmonic Motion	FREE DAYS
CHEMISTRY					
MATHS / BIOLOGY					

Each of the above sub units has to be covered in subsequent weeks to be completed in one month. Each of the **sub unit** can be further divided among the seven days of a week as given below:

Weekly Plan							
SUBJECT	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
PHYSICS	Units Dimensions & Vectors	Motion of a body along straight line	Motion under gravity	Projectiles	Problem solving on each of the above topics	Solve more Exercises	Revision / Weekly Test
CHEMISTRY							
MATHS / BIOLOGY							

In the similar manner you can classify/distribute any syllabus into day-wise weekly schedules and can keep them as your weekly targets. You should make sure that the target set by you is realistic. We can further divide the daily plan into session wise plans. Given below is an illustration of a sample session-wise plan. This plan has been made assuming that the student is not going to the school and has an entire day at his disposal to study.

Daily Plan / Session Plan		
SUBJECT	Time	Activity / Subject
Session 1	5 a.m. To 6.30 a.m.	Physics Theory
	6.40 a.m. To 8 a.m.	Chemistry Assignment
Break	8 a.m. To 9 a.m.	Breakfast
Session 2	9 a.m. To 11 a.m.	Maths Theory
	11.15 a.m. To 1 p.m.	Physics Exercises
Break	1 p.m. To 3 p.m.	Lunch & Nap
Session 3	3 p.m. To 4.30 p.m.	Chemistry Theory
	4.45 p.m. To 6 p.m.	Maths Test
Break	6 p.m. To 7.30 p.m.	Sports & Snacks
Session 4	7.30 p.m. To 9 p.m.	Free time
Break	9 p.m. To 9.30 p.m.	Dinner
Session 5	9.30 p.m. To 11 p.m.	Revision / Planning for Tomorrow
Break	11 p.m.	Go to bed

If you are going to school or coaching institute then after spending hours in lecture, you have to invest time in self-study regularly with a proper plan.

While making a daily plan it is advised -

- To maintain a study diary: A study diary planned one day ahead has several merits.
  - Helps to start work immediately.
  - Indicates the progress made.
  - At the end of every session you will feel happy about your achievement. This will reinforce your motivation.
- You should keep 1 hour before sleep as revision period
- Divide the entire day in sessions of 2-3 hours each. It is advised that after every study session you should have a break of minimum 45-60 minutes.
- Plan to be reviewed at the end of every day and make changes accordingly in the next day plan
- Keep at least 1 to 2 hours of daily time as free time to do whatever you want to do (may be more practice or may be more revision)
- Start your day with a positive note. It will help in making your studies more productive.

### **Priority Task this Month/Week**

It is advised that the student should use the table given below to remember important dates/assignments and other engagements.

<b>Priority Task this Month/Week</b>				
	WEEK 1	WEEK 2	WEEK 3	WEEK 4
<b>Important Dates</b>				
<b>Any Test</b>				
<b>Any Assignment</b>				
<b>Appointments</b>				
<b>Social Activity</b>				

Students are advised to keep above mentioned charts for every subject and paste it in a convenient place. The bigger the chart the better will it be. This action plan should always be in front of your eyes which will help you in monitoring the progress of your preparation. You will see the magical effect that this will have on your performance and study.

### IMPORTANT

**It might look like a long and difficult task to do so much planning. But remember based on our experience an average student can make a complete plan of 1 year in 3-4 hours.**

## Planning for the Consolidation Phase

In consolidation phase you

- Make unit wise plan
- Gather all the material of the unit
- Intense review of the material
- Practice lot of output
- Regularly test and review your performance
- Keep going until you are confident about the steps

It is advised that during the consolidation phase you should make concept maps, write your own summary, and mark what you need to revise again. Remember these maps ,notes and marks will help you in the next phase i.e the rapid review phase.

**Duration of Consolidation Phase:** Ideally it is recommended that for every month of the Learning Phase, you should have one week of consolidation phase and add to that 1 extra week to finish the consolidation phase. So if the learning phase is 7 months, it is recommended that the consolidation phase should be 8 weeks. You can use the above discussed monthly/weekly/daily plan formats to plan the consolidation phase.

In the first seven weeks the objective is to test and revise the syllabus of all the seven units whereas in the last week the objective is to review the entire syllabus so as to get a consolidated and bigger

perspective. Revision should be supported by 3 to 4 part tests each week in the initial 7 weeks and 3 to 4 full syllabus tests in the 8<sup>th</sup> week.

**Important :** Most of the students commit mistakes that their learning phase is very long and consolidation phase is either not there or is very small. The result is that they know the concepts but due to lack of proper revision the concepts are not fresh in their mind.

### Planning for the Rapid Review Phase

Here you should take care of following things

- The objective is to do last minute revision
- You should not try to learn anything new
- Focus should be more on Psychological preparation

Ideally for every week of consolidation phase there should be 1 day of Rapid Review phase.

### Do not fear mistakes

Before I elucidate my point of why to not fear mistakes, let me give



you an example of failure. Chances are you're reading this article in a room with the use of lighting. Well, you can thank Thomas Edison for that. **Edison failed over 9000 times before perfecting the light bulb!** In my opinion, Thomas Edison's picture should be under the definition "perseverance" in Webster's dictionary! Don't you agree? After

Edison had invented and produced the light-bulb a reporter asked him how it felt to fail over 9000 times.

Edison replied, "I was glad I found 9000 ways not to invent the light bulb! From this point forward Edison went on to receive 1,093 patents, more than any other person in U.S. history.

Mistakes are the best teachers. Don't be afraid to try something new just because you don't think you will get it right the first time. Without mistakes you would not have any information about how to do better the next time. Doing something wrong the first time simply tells you that you are outside your comfort zone and engaged in something new. Each time you do something new and outside your normal experience, your neurons are making more connections. **Each time you identify a mistake, you've learned something about your task.**

**Remember there are four steps to making an Action Plan :**

- (a) Take action and make mistakes.
- (b) Review the result and identify mistakes.
- (c) Decide how to do better the next time.
- (d) Go to the first step (which is now the "next time") and make different mistakes.

**The only really disastrous mistake you can make is quitting after the first step. Mistakes help you eliminate wrong ways and guide you to the right way. With fewer mistakes you also have fewer chances of finding the right way to learn new skills and ideas.**



**If you want to discover new oceans you must first have the courage to leave shore**

- Winston Churchill

## **DIFFERENCE IN STRATEGY - STORY OF LAKSHYA, ABHYAS AND CHUNKY**

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**Have you ever wondered what separates the toppers from the rest of the students?** Why do most students end up being average and only a few are able to score great marks and make a mark? All students get the same date-sheet, timings and facilities for the exams. And it is a fact that most of the students study quite hard for the exams. In fact, they do the same things yet they get different results. Some win, some lose and some simply give up. While the rules of the game remain the same for everyone, **winners often have their own set of rules and tools which help them race ahead and beat others.** Because in the game of exams and ultimately in life, not just the fittest but the smartest person WINS! Do you know why? And how? What exactly is the secret of a topper? How is he able to produce such good results? Before I answer you why, let me explain the types of students you will usually witness. Any competitive exam comprises three different kinds of students producing different output. Why the output of all three is different from each other, let me explain that to you with the help of an example.

### **Lakshya is a hard working student**

- He attends all the coaching classes with 100 percent attention
- He self-study for 6-8 hours regularly
- With a focused approach, he solves 150-200 quality questions on a regular basis
- Remains calm and happy
- Follows selective books for each subject and is focused on quality

- Does not give up easily and goes out of comfort zone
- He always puts in 100% efforts

### Abhyas is also hard-working student

- Attends all the coaching classes
- Invests 6-8 hours on self-study
- Uses 5-6 books for one subject
- Solves 100-150 questions on a regular basis but not carefully selected
- He focuses on similar problems that are usually within his comfort zone
- At times, he checks the answer before solving the question
- Works with 70-80% efficiency and at times loses focus
- Always under pressure and at times SAD (Stressed, Anxious and Depressed)

### There is also a third category student like Chunky

- Irregular in classes
- Hardly does self-study
- He can be found in malls, cyber cafes and tea points
- His favourite book happens to be 'Facebook'
- He lives in the fallacy that his success is the responsibility of the coaching institute

Around 15-20% are like Lakshya, 70% are like Abhyas and 15-20% are like Chunky.

**Input is similar in case of both Lakshya and Abhyas but their output is totally different from one another.** The time invested by both Lakshya and Abhyas are equal but the problem solving skills of both the students are different. Abhyas is like local news channel which repeats the same news for half an hour

whereas Lakshya is like good news channel whose focus is on quality and innovative content. Like local news channels the focus of the average student is on Top 100 news in 30 minutes whereas the focus of good news channel is on 5 news with critical analysis and in depth information. Topper focuses on quality and others run after quantity.

Remember, problem-solving at different levels exercises your brain muscle to increase efficiency just as gym helps you exercise your body muscle. Lakshya achieves outstanding success. Abhyas, on the other hand, achieves success but not in proportion to his potential. For instance, if he deserves to be within 500 ranks, he ends up getting 2000 rank. Students like Abhyas also have chances of failure. In spite of being talented and hard-working, Abhyas don't get success as he deserves.

Whereas students like Chunky have no chances of clearing the exam and getting selected because their attention is drawn more towards the outside world than in books.

Worst sufferer is Abhyas who in spite of having potential and working hard and giving his best does not get success. What Abhyas misses is

- Appropriate study techniques to improve his efficiency
- Proper strategy to keep him focussed
- Counselling and motivational support to keep him on track

The difference between Lakshya and Abhyas is that of a topper and an average student. Both put effort but there is a stark difference in their output. Let us analyse what makes both different from one another.

## Topper versus Average Student - Winning Strategies

Most crackpots (average student) keep waiting for a jackpot. But can that bring success? Let me explain this with the help of an example -

A priest was driving by and saw an exceptionally beautiful farm.



He stopped his car to appreciate the bountiful crop. The farmer was riding on his tractor and saw the priest at the corner. He drove towards the Priest and when he got there the priest said, "God has blessed you with a beautiful farm. You should be grateful for it. The farmer replied, "Yes, God has blessed me with a beautiful farm and I am grateful for it,

but you should have seen this farm when God had the whole farm to himself!" What he means is **God only helps those who help themselves**. Fatalistic people only wait for things to happen, they never make things happen.

How come the topper moves forward with one success after another, and yet some are still getting ready? How come one goes through life crossing one hurdle after another, accomplishing his goals while another struggles and gets nowhere? If the answer to these two questions can become part of the curriculum, it could revolutionize the educational system.

**A topper seeks opportunity, whereas an average student seeks security.** Waiting for a jackpot is neither a strategy nor can it yield a successful result rather is an invitation to disaster. Success is simply the result of consistently applying some basic principles. It is the result of your attitude and your attitude is a choice. What an average student does is wait for a chance or say luck, therefore, their grade often keeps fluctuating. Sometimes, luck favours them and the question paper covers most topics they have studied so they end up scoring good. But this doesn't happen always and that's when they score less. On the other hand, a topper is consistent with

his/her studies. They don't wait for luck to favour them rather they work for it throughout the year. **Success, therefore, is a matter of choice and toppers make this choice. They don't wait for a chance to excel but earn it through their perseverance and hard-work.**

We all know the story of David and Goliath. There was a giant who was bullying and harassing the children in the village. One day, a 17-year-old shepherd boy came to visit his brothers and asked, "Why don't you stand up and fight the giant?" The brothers were terrified and they replied, "Don't you see he is too big to hit?" But David said, "No, he is not too big to hit, he is too big to miss." The rest is history. We all know what happened. David killed the giant with a sling.



Same giant, different perception. One's attitude determines how you look at a setback. **To a topper, a problem can be a stepping stone to success. To an average student, it can be a stumbling block.** A topper will struggle to find an answer but an average student will consider it as out of his/her reach to solve it and leave it unsolved. Topper is always ready to move out of his comfort zone whereas an average student always tries to be in his comfort zone.

### Average Students Look for Quick Fixes but not Toppers



There are two ways of getting rid of weeds in your yard- the easy way and the not so easy way. The easy way may be to run a lawn mower and the yard looks fine for a while, but that is a temporary answer. Soon the weeds are back. But the not-so-easy way may mean getting down on your hands and knees and pulling out the weeds by the roots. It is time consuming and painful, but the weeds will stay away for a longer time. The first solution appeared easy, but the problem remained.

The second solution was not so easy, but took care of the problem from the roots. The key is to get to the root of the problem. The same thing is true of a student's attitude in life.

Similarly, an average student wants instant answers. They are looking for quick solutions to everything. Just like instant coffee, they want instant scores. But there are no quick fixes or shortcuts. This attitude of average students leads to disappointment in the long run. **Toppers never adopt a shortcut, they go thoroughly to solve a problem so that they never get stuck in the same question again.**

### The Importance of Analysis

There was a farmer in Africa who was happy and content. One day



a wise man came to him and told him about the glory of diamonds and the power that goes along with them. The wise man said, "If you had a diamond the size of your thumb, you could have your own city. If you had a diamond the size of your fist, you could probably own your own country." And then he went away.

That night the farmer couldn't sleep. The next morning he made arrangements to sell off his farm, took care of his family and went in search of diamonds. He looked all over Africa and couldn't find any. He looked all through Europe and couldn't find any. When he got to Spain, he was emotionally, physically and financially broke. He got so disheartened that he threw himself into the Barcelona River and committed suicide. Back home, the person who had bought his farm was watering the camels at a stream that ran through the farm. Across the stream, the rays of the morning sun hit a stone and made it sparkle like a rainbow. He thought it would look good on the mantelpiece. He picked up the stone and put it in the living room. That afternoon the wise man came and saw the stone sparkling. He asked, "Is Hafiz back?" The new owner said, "No, why do you ask?" The wise man said, "Because that is a diamond. I recognize one when I see one." The man said, no, that's

just a stone I picked up from the stream. Come, I'll show you. There are many more." They went and picked some samples and sent them for analysis. Sure enough, the stones were diamonds. They found that the farm was indeed covered with acres and acres of diamonds.

An average student focuses only on marks and remarks and without paying much heed moves on. What matters to them is mainly the score and not the fault line. Contrary to an average student, **a topper will always analyse his/her test score to know where they went wrong and which section or area needs improvement** so that nothing can stop them from excelling. When average students don't know how to recognize opportunity, they complain of noise when it knocks. They will blame their teacher or situation for not being able to score good but a topper never does that. They work on their weaknesses and not blame others.

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We don't see things as they are, we see them as we are

- Anais Nin

## **CONSOLIDATION PHASE (6 TO 8 WEEKS BEFORE EXAMS)**



The last few weeks before the exams are most critical for students. It is during this phase that the bulk of the exam syllabus is revised and reviewed for the last few times. Any shortcoming that becomes apparent at this stage can be easily rectified. The focus of this phase is on **review, revise, recall, remember and reproduce**. Whatever you Revise and Reproduce during this period will be of most benefit to you in the exams. So, it pays to be extra careful about the activities you undertake during this phase.

At this stage, learning new areas may not be a great idea. This is the time to consolidate what you have already learnt and develop a higher level of application ability in those areas. The preparation methodology should be so planned that all the vital concepts of the entire syllabus become fresh at least one week before the end of this phase. Consolidation Phase can be divided into 4 broad steps

- Step 1 :** Intense review of material
- Step 2 :** Practice LOT of output
- Step 3 :** Getting used to Exam tension & pressure
- Step 4 :** Keep going

### **Step 1 : Intense review of material**

The last few weeks before your examination, should be set aside for revising the important points again and again from your revision notes. Do not attempt to learn new things. Prepare a revision plan for this period, so as to leave time for a final wrap up just before the examination. Now you have to utilize all seven days of the week. Begin revising each subject at the start of this final revision period .Do not revise one subject at a time as you may run out of time and find that you cannot revise some subject at all.

One of the most frightening aspects about examination revision is the very size of the task. The very sight of books and mountainous stack of notes can put you off. Very often it is found that students sit passively with books or notes open in front of them for hours, attempting to read and 'take it all in'. Frequently, the results are poor; you do not remember most of what you were reading; long periods are spent over the same page whilst feeling increasingly disheartened.

Break up this large task into small tasks. Divide each subject into units. Now set aside notes on each unit separately. If it still looks frightening, divide it further. This will make it easier for you to conquer. Make sure no one disturbs you after you have settled to do your revision. Before you start your studies, check that you have all your books, materials, pen, papers and notes. Avoid finding an opportunity to postpone your studies.

Set your target dates or deadlines by which you are to complete each part of your course. This way you will have objectives each day as well as each week and you can complete revision before the exam.

During the course of the year you must have prepared your own notes. As you revise the notes during your final revision just before examinations, jot them down in the form of points. In other words, make notes of notes. It is easier to go over them just on the eve of the examination. Remember to put only those points in the notes which you would like to revise just before the examination.

Some of the things you should keep in mind while planning revision are

### IMPORTANT

Efficient revision replaces shallow learning with learning in some depth.

- **Devise questions around a topic :** By practicing asking questions about a particular topic you can increase your flexibility and preparedness for the examination itself.
- **Vary subjects, topics and methods throughout your revision :** Vary these each week and each day. You will find that you are more likely to sustain your concentration by doing so. At the same time, mix the difficulty of the topics revised,

using the confidence gained from one piece of work successfully completed to help you tackle a slightly more difficult topic. Reducing your bulky notes to key words and key ideas.

- **Organising your time :** Make a revision time table. The problem with most of the revision time table is that very often they go wrong after the first day. In order to avoid this problem
  - Have a one week trial period to enable you to determine what tasks you can realistically complete in a day.
  - Be flexible, e.g. different subject headings for each day will enable you to vary the topics you revise.
- **Pin up your timetable or time plan** on a wall in a prominent place e.g. above your table or desk. Coloured pens can make it clear and attractive.
- **The revision period is meant solely for connecting, co-ordinating and assimilating knowledge not for collecting new matter. Hence spend all your spare time making up summaries.**

## A basic revision method

### **Step one**

Read your notes and seek answers to questions. Be as active in your reading as possible, e.g. talk to yourself, walk around the room, trying to recollect what you have learned.

### **Step two**

When you feel you have understood and can remember what you have read, close up your notes.

### **Step three**

Now actively recall what you've just been reading, asking again the same questions without looking at your notes, until you have exhausted your recall of the whole topic you've been revising. Whilst doing so write down what you have recalled in brief notes on a card or a sheet of paper. It may help you to have the question written down to refer to in the recalling process.

### **Step four**

Check the original notes with the new ones. Have you recalled all the answers to the questions you were asking?

If yes, you have created a *mastercard*, which you can use to re-revise without having to consult the original lengthier notes. If no, follow step five.

### **Step Five**

Re-read your original notes as in Step one above, looking particularly for those points you originally missed. Repeat Steps two to four above. Writing out all the points again, not just those missed the first time : by doing so, you will still be treating the topic as a whole and improving your recall on the whole topic.

**This may appear time consuming and cumbersome but it is not. It ensures a high degree of recall which reading a lot of notes does not do.**

### **Step 2 : Practice Lot of Output**

Let me narrate an interesting and popular scene from an American martial arts drama film, '*The Karate Kid*', to explain the importance of practicing output.



A child wants to learn kung fu but his teacher, instead of teaching him moves, asks him to take off his jacket, hang it, then drop it on the ground, pick it up and then wear it. He does the same for several days. One day, the kid loses patience and declares that he quit

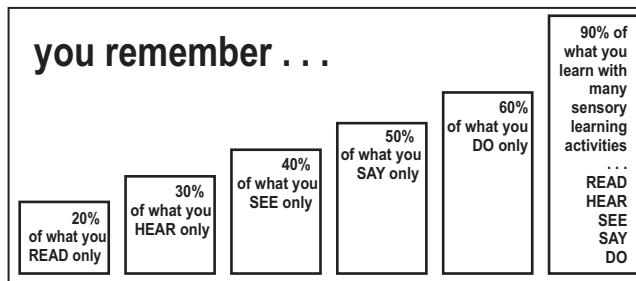
because his master doesn't know kung fu and only cares about the jacket. When he is about to leave, his master asks him one last time to repeat the jacket sequence but this time without the jacket. The kid then finds out that his jacket on - jacket off moves were actually kung fu moves. His master was actually training his muscles and brain so that when the real fight comes up, he'll have practised it a 1000 times and can do the moves effortlessly. He didn't realise but he was creating muscle memory by practising the jacket sequence.

**Practicing Output is essential for the recall stage of memory.** Just like the kid in *The Karate Kid* if you keep rehearsing your topic, it will focus on getting the material into long-term memory. Therefore, **practice the same thing repetitively under pressure to bring out the best in you.** Practice using the actual kind of exam questions you will be required to answer.

So after the initial intense review, 90% of the rest of your preparation time should be spent on output activities. Some of the examples of practicing output are

- Solving as many questions as possible under time pressure
- teaching it to someone else,
- making flash cards and using them,
- mnemonic devices,
- mind maps,
- giving a speech of whatever you have learnt
- writing down summary of whatever you have learnt

One easy way to improve your output is to increase the number of senses involved in the learning process. RECITATION, or repeating information aloud, increases recall through stimulating the hearing sense as well as the visual sense. Transforming ideas into DIAGRAMS or MAPS or CHARTS is another way to increase sensory input. In addition to the extra thought involved in developing a diagram, recall of that information will often be increased simply because of the newly created visual structure.



Many students also find that the motor activity involved in the act of WRITING out information they wish to learn helps them to remember it better. A technique that often accompanies silent review or recitation is the use of CUES. A cue is usually a word, phrase, or question selected because of its ability to trigger the recall of specific information you want to learn. Cues can be incorporated into your notes by placing them in the left-hand margin beside the ideas or information they summarize. You can then study the material by covering your notes and using the cues to help you recall as much as you can. To improve recall, this procedure is repeated until you are able to recall each idea completely.

A good variation of this technique is to write the summary word or phrase on one side of a 3×5 card and place the information you want to recall on the other side. STUDY CARDS offer two important advantages. First, the work involved in making the cards helps you begin to learn. Second, study cards allow you to physically separate and focus on one piece at a time, which can be important for some learners.

There are two techniques which can be of aid when you must learn a long list of information. The first is called **CHUNKING** and refers to breaking the list up into related groups of information. To chunk effectively, make sure that each group contains only those items which have something in common. When you cannot chunk information or you need to recall a list in a specific order, you might want to use a word or sentence **MNEMOIC**. A memorable word can often be created by using the first letters of the term you have to know. The word VIBGYOR, for example, can help you remember the first letters of each colour of a rainbow : violet, indigo, blue, green, yellow, orange and red. Where a word cannot be made, the first letters might be used as the first letters of words in a sentence. For example, if you needed to remember the order of the first nine planets of our solar system you might develop this sentence using the first letter of each planet as you move from the sun outward.: My Very Earthly Mother Just Served Us Nine Pizzas. The M in My is for Mercury, the V in Very represents Venus, the E in Earthly – Earth, the M in Mother – Mars, the J in Just – Jupiter. The S in Served – Saturn, the U in Us- Uranus, the N in Nine –Neptune, and the P in Pizzas –Pluto.

### **Step 3 : Getting used to exam tension & pressure**

**Examinations are for formal learning as races are to Olympic training.** They are the final performance for which the participant must travel a long road of preparation. The exam, like the race, is only a small part of the story. There are many long hours, weeks, and months of serious work that must be undertaken before the examinee and competitor can even hope to be at his or her best on the fateful day.

Although some people appear to take examinations in their stride, for the rest of us the feelings associated with examinations make it very difficult to get used to them. However, if we can familiarise ourselves with what is expected of us beforehand, it may well help to lessen their impact upon us and enable us to cope better in the examination room. In order to do that student is advised to -

- **Practise answering questions in examination conditions:** Simulate examination conditions by answering a question in silence without the aid of books or other materials; at a desk and within strictly applied examination time limit. You can do this for:
  - individual questions
  - a whole paper (2, 2  $\frac{1}{2}$  or 3 hours)
  - planning outline answers (linear, spider or patterned notes).

This will provide practise at thinking clearly and quickly in examination conditions. You may wish to try these approaches gradually, eg giving yourself less time each time to answer the question; working for a longer silent period each time. You could add to this by:

- Using a friend or parent as an invigilator, so you can get used to someone walking past you or standing behind you
- Sitting in the room where you will sit the exam to get the feel of it.
- Devote more and more time in testing and fine tuning your final strategy
- Try to take as many tests as possible in the last one month before the exams : It will also help you with overcoming the unacceptable levels of test anxiety. **Retake some mock tests to practice the test taking techniques.**
- **In the last few mock tests which you take at home, allocate yourself 15 to 20 minutes less than the actual time you would get in the final exams.** This will put you under time pressure and hence would help you in improving your speed and performance. Moreover, during the final exams you will also get a feeling as if you are not short of time.

- Try different strategies for appearing in the test and find out which one works best for you.
- Taking an adequate number of very similar tests will help you to naturalise with the exam process which involves **rapid shifting of focus from one topic to another and working under a certain amount of pressure and time constraints.**
- **Learn from mock exams or tests :** Once you have completed your mock exams, engage in a full postmortem of them by yourself or with the help of another. Whether they went well or badly, use the Test Assessment & Analysis Sheet to analyse what happened. Check your revision, exam techniques and your anxiety levels. Write down the changes you will make and start to put them into operation immediately.
- **Tuning your body clock :** In the last one month make your study schedule according to the schedule of the examination. For example if you are into the habit of studying late in the night your body and mind gets tuned for best performance and maximum concentration in the night but this may not be of any help during the exam (in some cases it may even harm you).

So get into the habit of serious studying during the hours of the day as per your exam schedule. I have seen students who have a habit of taking a short sleep after lunch and they face difficulty in concentrating on the exam which is scheduled in the second half. So the message is tune your body and mind to give the best output at the time the exam is scheduled. If the exam time is 10.00 am to 1.00 pm, schedule your serious study in one stretch (i.e without any break) during these hours of the day and most importantly all mock tests you take should be taken strictly at this time only.

**The recommended schedule -** Let us assume that you have taken 7 months to finish your learning phase. So, the ideal duration of consolidation phase should be 8 weeks. In the initial 7 weeks the focus would be in Testing & Revising the syllabus corresponding to 7 months of learning i.e. you can divide your revision into 7 parts and complete each part in 1 week. The recommended schedule during these 7 weeks should be

- Week 1-7** : Study 12 to 14 hours a day. The rough distribution of 12 hours should be
- 5 hours : Revision of all subjects
  - 2 hours : Mock test (focus on improving speed and strike rate). While giving the mock test allocate yourself 15-20 minutes less than the exam time.\*
  - 1 hour : Mock test Analysis. Try to find out areas, in which you need more practice.
  - 4 hours : Problem solving and practice. Work on your weak areas so as to perform better in the next test

\* The student is advised to take 3-4 tests each week in the initial 7 weeks. In case of days when you are not appearing in mock tests, devote more time on revision and practice output using other modes.

In the last week the student should get a consolidated overview of the entire syllabus. This week the student should attempt at least 4-5 full syllabus tests and review his performance accordingly. The schedule for the 8<sup>th</sup> week should be

- Week 8** : Study 10 to 12 hours a day. The rough distribution of 10 hours should be
- 5 hours : Recollect your rapid review notes. Have an overview of the complete syllabus
  - 3 hours : Mock test (focus on exam giving strategy). While giving the mock test allocate yourself 15-20 minutes less than the exam time.
  - 2 hours : Mock test Analysis. Try to find out weak areas which can be rectified quickly.

### Step 4 : Keep Going

Repeat Steps 1 to 3 until you feel you have almost *over learned* the material. Don't stop at a level at which you have just marginal recall of some vital information. Your goal is to know the material so well that you will be able to remember it under the pressure of the exam situation.

## Positive Thinking

Now you have entered the final stages of your preparation and by now you must have started feeling the pressure. In the last stages of preparation apart from subject knowledge what is equally important is the state of mind. As someone has rightly said, "**the difference between a topper and an average student is not much as far as subject knowledge is concerned but the major difference is in terms of mental preparation**". This reminds me of an incident.

India was to play a match against Pakistan. Sachin was the captain.



One day before the match, during the net practice, Ganguly and Dravid got injured and were ruled out for the match. The toss was very crucial in the match as the pitch was expected to deteriorate after 50 overs.

Next day in the morning Sachin lost the toss. Ravi Shastri asked a question to Sachin immediately after the toss "Sachin you have lost 2 key players and the toss as well so what is your plan for the game".

Sachin kept quiet for sometime and then replied,

**"Ravi, matches are fought and won in the mind and not in the field"**

**The Result :** Sachin scored an unbeaten century, and India defeated Pakistan by 4 wickets.

Last one month before exams is the time for a real test and a student should keep himself cool ,calm and collected. All your efforts and attempts to do well in the examination may collapse if you do not think positively about yourself and your performance. Motivate yourself positively. Think of your past successes and convince yourself that you will experience success in future. Always remember,

*If you think you are beaten, you are.  
If you think you dare not, you don't!  
If you like to win, but think you can't,  
It is almost a cinch you won't.  
If you think you will lose, you are lost  
For out in the world we find  
Success begins with a fellows will  
It is all in the state of mind  
If you think you are outclassed you are  
You have got to think high to rise,  
You have got to be sure of yourself before  
You can ever win a prize.  
Remember life's battles don't always go  
To the stronger and faster man  
But sooner or later the man who wins  
Is the man who thinks he can*

So, 'Whenever you find weariness approaching, rouse yourself and remember, that, if you give up, all that you have done will go in vain.' It is this belief, confidence and faith in oneself which helps a person in performing better and it completely depends on you how you condition your mind.

## Mental Conditioning

Mental conditioning plays a vital role in your success and failure.



One of the major distractions to consistent focus and concentration is the nagging doubt you may have about your ability. You need to learn to condition your brain to move in a positive direction for a satisfactory output. Let me explain the importance of mental conditioning with the help of a short story I have heard in my childhood.

A grandfather was once teaching his grandson about life:

“A fight is going on inside me,” he said to the boy.

“It is a terrible fight and it is between two dogs. One is evil—he is angry, envious, is sorrowful, regretful, greedy, arrogant, has self-pity, guilt, resentment, inferiority, liar, false pride, superiority, and egoistic.”

He continued, “The other is good – he is joyful, peaceful, loving, hopeful, serene, humble, kind, benevolent, empathy, generous, truthful, compassionate, and faithful.

The grandson gazed at the grandfather wanting to know the outcome of the fight.

Slowly the grandfather whispers at his grandson’s ears

“The same fight is going on inside you—and inside every other person, too.”

The grandson thought about it for a minute and then asked his grandfather: “Which dog will win the fight?”

The grandfather simply replied, “The one you feed.”

You know that the journey of a competitive exam is very lengthy and tough. It, therefore, requires a lot of patience and calmness. During your preparation, you might ponder on a lot of negative thoughts but what's important at that period is not letting those negative thoughts overpower you. If you keep thinking about failure, and consider other students as more intelligent than you, then your mind will eventually get conditioned for failure. If, however, you keep dreaming for the day when you will get a rank in the top 500 in JEE or NEET, and keep working and believing that there are few who can compete with you then you are conditioning your mind for success. So instil positivity inside you and focus your attention only on what you want.

Success is largely a game of mind. If you believe in yourself and keep on trying then you will not be bogged down by roadblocks that you may hit from time to time. You have to learn to master your mind because if you don't then it will master you and sabotage your purpose. Remember, ***‘the mind is a beautiful servant and a dangerous master.’***

## Post a lot of positive messages around your Study Table

When it comes to your physical learning environment, you can enhance your self-esteem by surrounding yourself with positive messages.

Pictures of yourself with family and friends are good to have around, especially if they depict you getting hugged. Don't laugh; it works. Have any awards, trophies, certificates, or testimonials on your wall or bulletin board. Put up motivational posters, quotes, or reminders of the positive value of what you are doing and just how vast your potential really is. Use some of the quotes and slogans in this book.

The point is to create a positive mental and emotional environment in which you will study. Surrounding yourself with things carrying a positive message will not have an immediate, dramatic impact but whenever your mind wanders and you begin to have doubts, believe me they can do wonders. I would like to share a beautiful poem which my teacher told me.

सामने हो मंजिल तो रास्ते ना मोड़ना  
 जो मन में हो ख्वाब वो कभी ना तोड़ना  
 हर कदम पर मिलेगी कामयाबी तुम्हें  
 बस सितारे छूने के लिए कभी ज़मीन न छोड़ना

Positive self-image and confidence in your learning ability must come from within, but just imagine how much better you will feel when a question starts to get you down and you look up to see something uplifting in front of your face - something in big bold letters that says "**You can do it and you will do it**".



You will never know how high  
you can fly until you spread  
your wings.

## RAPID REVIEW PHASE (7-10 DAYS BEFORE EXAMS)



If the preparation till now was tough, how would you rate this rapid review phase? Absolutely terrifying! Isn't it? Can't concentrate, can't eat or can't even sleep. Your elders will of course advise you not to worry, but that is much easier said than done. While it is natural to worry at times when we need to be quick, try to keep your feelings under control. Calm and a composed approach make a huge difference in such situations. Let me tell you a real life incident from the life of Mahindra Singh Dhoni, the international cricket sensation.

Dhoni and his friend were heading for an event on his new Range Rover on the Delhi-Chandigarh highway. A car from behind came in full speed trying to overtake and ended up taking a sudden U-turn. At that moment, Dhoni's friend pressed the brake and escaped an accident that was too close. Dhoni's friend got so furious that he started abusing the driver of the other car due to his rash driving skills and started threatening to call the police. But

A small, circular grayscale illustration depicting a car accident on a multi-lane highway. A dark-colored car is shown from the side, having just passed another car. In front of it, a smaller car is shown from behind, appearing to have been involved in a collision or being overtaken too closely. The background shows buildings and a bridge in the distance.

when he looked at Dhoni, he witnessed him sitting in a calm and composed position refusing to do what his friend just said. With a calm approach, Dhoni explained to his friend that even if it was the other driver's fault, he should not call the police as the incident may seek unnecessary attention from the media. Dhoni asked his friend to take the incident as a lesson and suggested that instead of calling the police they should rather insist the person to rectify his driving skills.

Most of the time, an average student becomes restless during exam preparation and puts his hand into 10 different study sources. But this will lead you nowhere. What's the difference between a topper

and an average student is that **contrary to an average student, a topper always prefers to remain calm and composed in situations where most people usually panic and this increases his efficiency.** In order to excel you have to opt for an effective strategy and avoid unnecessary books that can consume most of your time. Understand that ‘success is not about running fast but running in the right direction’.

The time just a few weeks before the exam can be crucial as it defines how well you’ve re-revised the information you have worked on. Here are some basic tips and strategies for what to do during this phase.

### Last few days before the exam

- Avoid any activity which may cause anxiety. Focus on whatever you have studied.
- Under no circumstance should you solve problems in the last few days. This may have a damaging influence on your confidence and ability to solve questions and problems during the examination.
- Stop discussion or review of the subject at least 1 to 2 days before commencement of the examination. Many students insist on cramming till the last minute. This is absolutely unnecessary and leads to additional tension and problems. Relax the day before the examination. Do what you like the best or do what makes you happy or motivate you.
- Focus your attention on the main points of revision. Time is very limited and how you spend it is important . This is not the time for learning minute details or a new topic. Write down the main points as you go through your notes. This will fix the ideas in your mind.
- When with friends, try not to talk excessively about how nervous you are, how you are going to perform and what the final results might be. This will only succeed in making you more nervous and will take your attention off your preparation.

- Be confident. But do not be over confident - this will cause you to become complacent and overlook important stuff during the revision process. Avoid discouraging yourself. Be optimistic and positive.
- Get enough rest and recreation.

### Day before the exam

- Verify the exact location of your examination center at least one day before the exam. When you are sure of the location, find out the buses or trains that take you there. If you are using your own vehicle, make sure it is in a good condition and has sufficient petrol.
- It is advised that if possible you should go to the Test Centre along with somebody. It can be your parents, uncle, elder brother or even your servant.
- Check the exact time of the commencement of your examination. Plan to be there at least half-an-hour before the scheduled time. If commuting is going to take you half an hour, you shall start at least an hour before the examination starts.
- It is very important to have the following items ready, on the night before the examination.
  - Your hall- ticket or registration slip.
  - Blue or black pens or ball-pens with fresh refills (that works).
  - Sharpened pencils/Instrument box/A foot- ruler/Eraser/ Watch etc.
- Anxiety and excitement are normal on the eve of the examination. Suppress excessive worry.
- Say to yourself. "Tomorrow is the day I have been preparing for all these weeks. Now is my chance to show that I have studied well."
- Have a light meal. Listen to some soft music.
- Review your key word cards with the emphasis on practising recall. Attempting to cram in *new* material, although tempting, will tend to use up energy and be self-defeating.

- To minimise exam anxiety, avoid gossiping about your preparation and state of mind with others.
- Go to bed relaxed with a sense of relief that the strain you have experienced for weeks is soon to end. Go to bed at least by 10.30 p.m. not later. At this point, **an hour of sleep is more valuable to your performance than an hour of extra cramming.** In fact, it is advised to go to bed a little earlier than usual. This way, even if you do not sleep well, you will still get enough rest.
- Sufficient sleep assists digestion and gives confidence and calmness before the exam.

### On the morning of the exam

**At last, the day of reckoning is here. How do you feel? Nervous? Tense? Scared? Anxious? Or, all of these! Relax. Just take it easy.**

With all your preparation, the exam enemy should be easily defeated. Exams are not just about testing your knowledge and study skills. They are also about testing you as a person and individual. Exams test your ability to work and think under stress, and deal with difficult situations. By facing exams bravely, you begin to feel more confident of yourself, irrespective of the final results. In the next few pages, you will learn how to control stress so that you can perform to your fullest capacity and demonstrate your true potential.

- **Revision:** Many students feel an early morning revision on the day of the examination is very helpful. If required you should just go through the main concepts and ideas for an hour or so. Close your books at least three hours before the examination.
- **Breakfast:** You will be pre-occupied with the examination but do not skip your breakfast. You need sufficient nutrition in your body to carry you through 2 to 3 hours of high mental activity. Let your breakfast not be too heavy or too light.
- Try as far as possible to stick to your normal routine.
- Arrive early.
- Use positive visualization and self-talk. Imagine yourself doing well, recalling easily, and calmly dealing with uncertainty and difficult questions.

- Review your anxiety strategies. If you're really ready, you probably won't get an anxiety attack, but at least you will be ready if you do. Use the deep breathing and other relaxation techniques when you feel the need for them.
- Generally, avoid talking to other nervous students. It will feed your anxiety and inhibit your concentration.
- Find a seat where you will feel most comfortable (e.g., near heat if you tend to feel cold, or by a window for fresh air). Arrive early enough to get the seat you want.

### **Finishing your studies for the exam**

Follow the following instructions while closing your studies for the exam.

Select 3-4 numerical questions of which you are very-very confident of solving correctly. You must have attempted these questions many times during your preparation so the chances of doing them wrong or getting confused is zero. The questions should be logical in nature. Solve them completely step by step with proper understanding.

Our research says that this small exercise will give you the confidence and motivation much required just before the exams. Also it would initiate your mind and put it in thinking mode (some of the students have a problem that their mind gets choked and stop working just before the exams)

### **Outside examination centre**

- **Minimise your waiting time outside an exam room, know the location of the room and time your walk, rehearsing it if necessary. You may either come directly from your home or find a temporary waiting place near the exam room that you can use until a few minutes before the examination.**
- Meet only those people you want to meet, if any. Avoid conversation with friends, eg about how nervous you are feeling, what topics you have revised or questions you think are going to be in the paper.

- **Stay away from others just before the test.** When you have arrived outside the examination room, the sight of students pouring their books or discussing excitedly can make you nervous or anxious. It is best to avoid all of them. The last few minutes should be spent alone in peace. Sit calmly in a place and relax. Should someone come and discuss the subject, tactfully leave/avoid him. If you feel very tense, go to a calm place near the examination hall (before the commencement of the exam), close your eyes and take deep breaths for 2-3 minutes. If you have been practicing meditation regularly, this may be a good time to do so.

Anxiety is highly contagious. It is best to focus on what you know rather than on what you don't know. Reinforce your strengths and confine your weaknesses.

### **During the exam**

- Once you are inside the room, check up and take the seat assigned to you. If you find your table or chair uncomfortable, seek the supervisor's help and get it changed.
- If possible try to sit in the front so you will get the exam first and have some precious few seconds at the end while the other papers are being passed to the front. It also places you near the teacher or proctor for easier access for questions Avoid sitting near someone who has a lot of noisy jewelry, who is cracking or popping gum or who is too friendly with the others in the area. Be a hermit, in other words. Choose a quiet area. Just a couple more tips: Wear loose, comfortable clothes, the kind that you love the favourite shirt or sweater or slacks. If you're left handed, look for a left- handed desk. Check out the room for sunlight (too much or too little), lighting and heat and cold.
- Complete the identification details regarding your name, registration number, correct name/code of your course, name/code of your examination center and date.
- **As soon as you receive your question paper, read and re-read the directions carefully. Read all directions**

**carefully. The single biggest cause of error on exams is simply failure to read the instructions.** I would illustrate this point with the help of an incident. In 2019 there was a change in the pattern of JEE Mains. The total number of questions in a subject reduced from 30 to 25 and the biggest change was that in each subject 5 numeric questions were introduced. There was no negative marking for numeric questions but many students did not read the instructions carefully. In case they would have read the instructions they would have probably answered the questions even in case of confusion. I hope now we can understand the importance of reading instructions carefully.

So remember reading instructions is not a waste of time. Always turn over the question sheet to check if the list or questions goes over on the back. The first reading of the question paper may produce mixed feelings. For some questions, you may be very confident. Now, having read the instructions and the questions, establish your plan of attack.

- List the order, in which you intend to do the questions, in the beginning of the examination. Keep in mind two criteria while doing this: your knowledge of the question and the marks value of these questions. In case of a subjective paper you may answer the questions in any order but be sure you put the correct question number in the margin, including the main question number, section number and sub-section number, if any.
- As soon as you answer a question, put a tick mark against the question. If you are not sure about an answer and plan to return to it later, put a query mark and attempt it later. Having allocated the time and the order of answering the questions, stick to the plan.
- Even if you find the paper tough, don't panic. Keep on trying and eventually you will find answers to some of the questions. **Remember if the paper is tough it is tough for everybody and the effect would be the same on all the students taking the examination.**

- Stay for the whole exam. Even if you think you've done all you can, stay to the end. Relax, let your mind wander. You'll be surprised what comes back to you in a relaxed state that helps you improve answers or answer a question you were stuck on earlier. Give yourself that chance. While revising only make changes you are certain of.
- Ignore what others are doing, what questions they are working on, and when they are leaving. Focus on your own work and your own pacing.
- Read each question very, very carefully. Not reading a question properly results in many silly errors.
- Budget your time wisely. Spend time on each question or section according to how much it counts toward the mark. If an essay counts for 25% of a two-hour exam, you should spend no more than half an hour on it. Stick to a strict allocation initially, then return to unfinished items if you have time left over.
- Do not talk or look at other students.

### Arriving late

You would normally be allowed, by most examination regulations, to enter any room up to half-an-hour late. *If you do arrive late*, do not allow yourself to be panicked. Stick to a revised and shortened time budget with the aim of attempting *all* the questions you have been asked to complete.

### Confronting problems during examination

We are very much familiar with the stress that takes over students as an examination approaches, but have the students been offered an appropriate strategy to harness that negative energy and turn into something productive?

Our quantitative data provides the sort of depth that led to distillation of all the key areas that affect the students' performance. With these insights, it has become the need of the hour to find the real ingredients of academic success and give students the tools to re-shape their attitude for peak performance. Let's have a look at the common obstacles students' experience.

## Memory Block

Memory Block is one of the common problems students experience during the exam. How often have you felt pressure mounting with the clock ticking away while you were trying to extract a familiar concept or idea from the tip of the tongue? Often, students fail to recollect the answer to a question they have studied during their preparation. The best approach to memory blocks is prevention. Nothing can work like regular practice and revision. Memory blocks seem to thrive in an uptight environment. Take a calm and deep breath while you relax yourself. Consider again the matter you were trying to recall. If you fail to recollect, without wasting any time leave that question and pass on to the next.

Another way of retrieving an answer is to utilize mental association. Try to recall facts and concepts associated with the question from the past lectures. A relevant subject may spark a helpful association. Jot them down immediately to avoid further stumbling blocks. However, try to avoid procrastinating or studying a night before your exam that can maximize the risk of memory block.

## Panic Attacks

Negative thoughts tend to dominate the minds of the young people during exams. A student with inadequate preparation or pressure from parents and society to excel in an exam is more prone to get such attacks. While inadequate preparation can lower one's confidence level, huge expectations can bring down the moral of a candidate.

Thoughts like 'I am going to fail'; 'there's no point writing the examination' can contribute to the intensity of a panic attack. The symptoms can be accelerated heartbeat, an increase in breathing rate, sweating and shaking of the limbs. Most candidates panic due to lack of confidence. If they are thoroughly prepared, the sight of questions they are not sure of can be a real horror. The immediate solution is to calm down and have control over your mind. One strategy is thought stopping. The moment you start panicking, start visualizing the word S.T.O.P. Let the word flash a couple of times to regain focus and re-establish your confidence. The stronger you control over what is happening in your mind, the lesser chances that panic will set in.

Let me explain with a case study - A student was appearing for an online exam during which his mouse suddenly stopped working. Instead of panicking, he asked the invigilator to replace it and meanwhile he started solving the questions on pen and paper to avoid any chaos towards the end and utilize the time to its fullest. In such a situation, usually we see students panicking but this student rather adopted a calm approach and successfully utilized the time and did not lose his focus. The student secured a single digit rank in JEE2018.

### Time Management

Of all the odious things about writing exams, time management is one of the major problems faced by students. That feeling when your hand is probably crippled and cannot possibly write one single more word or the feeling that you just need 5 more minutes to complete the paper but the time's already out. This is an experience mostly faced by students who know most of the answers asked in the paper but fail to complete it due to paucity of time. Limited time frame often acts as a hurdle. In such cases, what you need to do is to opt for an effective strategy and divide time according to the priorities. Some students spent much time on less weightage questions as compared to questions of more weightage. Avoid that and maintain a balance. Frequent practice before exams can not only help clear your concepts but also help increase your speed.

### After the exam

Once your examination is over and you are out of the hall, avoid discussing the examination question with other candidates. They must have handled the question in a different manner and their opinions may create unnecessary tension. Relax for a while and engage in some other activity. You can then start preparing for your next examination paper.

And yes never be overconfident about your performance in one examination. Many students become overconfident and neglect their preparation for other examinations.

Couple of years back one of our students became over-confident after appearing in IIT Mains exams and he took his preparation for other exams very lightly with a casual attitude. Whereas other students who did equally well in IIT Mains realized that there was a lot of difference in the pattern of IIT Mains and other examinations. So he started utilizing the gap with double efforts and got used to the pattern of regional exams.

After one month the results were like this -

The first one got 3500+ rank in IIT Mains and average rank in AIEEE. In both the exams he could not get the college and branch of his choice.

The second one got 3500 + rank in IIT Mains but he got a very good rank in AIEEE. He took B-Tech (Computer Science) in one of the best regional colleges.

So the moral of the story is never take any exam as easy or lightly. In a competitive exam, it is very difficult to predict anything. So do not let your preparation let loose till the time the results are out.

And last but not the least is to stay positive and never let negative thoughts influence you at all. If you don't pass the examination with the performance you were hoping for then also there is an opportunity to learn from the experience by:

- looking at your learning techniques
- thinking again about your choice of course or subject
- checking over how well you prepared yourself
- examining your exam taking skill and
- reviewing how you manage yourself and your time.



Many people dream of success. To me success can only be achieved through repeated failure and introspection. In fact, success represents 1% of your work which results from 99% that is called failure

- Soichiro Honda

# TIPS & TECHNIQUES ON "HOW TO ATTEMPT A PAPER?"



Normally a student ends up scoring fewer marks than his or her maximum potential when he/she tries to attempt a question paper without a strategic plan. This shows that apart from the subject knowledge what is equally important is the strategy to write the exam. Remember that in competitive exams even one mark can make the difference between success and failure. So we have to keep in mind that **success and failure in competitive exams is just one mark away**. In this chapter, we will learn how we can use different techniques for attempting question papers to improve our score.

## How to Solve an Objective Type Paper Faster?

### Strategy 1: Linear approach to attempting paper

This is the most simple and straightforward approach to attempt a paper. In this approach you attempt a paper as it comes, which means you start from question 1 and go to question 200 in a fixed sequence. A slightly modified and better form of this approach is that you spend an initial 5 minutes to decide the sequence in which you would like to answer the question paper. For example, if after browsing you find that Physics is easiest followed by Biology and then Chemistry so you attempt the paper in that sequence but once you start with one subject you attempt it sequentially and completely. The disadvantages of this approach are -

- Since all the subjects have individual cut-offs, over-performing in one subject and under performing in another subject is not the right approach. While solving through this approach you may land up in a situation where you may not be able to attempt one section of the paper at all.

- Since you are attempting the questions in a sequential manner there is a possibility that you may not be able to reach the last question. So you may end up leaving some questions which are easy and you could have attempted if you would have read it.

### **Strategy 2: Divide Time between different sections**

In this approach you spend 5 minutes to browse the paper and then decide the sequence in which you would attempt the paper and also allocate time to different sections of the paper and follow it subsequently.

### **Strategy 3: Jayasuriya Approach to attempt a paper**

Jayasuriya, the Sri Lankan Cricket Captain changed the way one day cricket is played. Initially the playing strategy used to be to play safe in the initial 15 overs so that you do not lose wickets but Jayasuriya played with a different strategy to take advantage of field restrictions in the initial 15 overs. He adopted an offensive approach with the objective to score maximum runs in the first 15 overs. In Jayasuriya approach you spend 15% of total time (i.e. approximately 25 minutes in case of NEET) to run through the entire paper. During this time you find out memory based or direct questions and solve them immediately. So by the end of this time

- You have seen the entire paper
- Solved all easy/direct questions of all the subjects
- Clearly decided the sequence in which you would like to attempt the paper

This approach is based on the objective that you should not miss even a single easy question from the paper. So in steps one you find all easy questions and attempt them. After this step you attempt the balance paper in the second round.

### **Strategy 4: Three Round Approach to solve a paper**

This approach is based on the examiner's mind of the paper. So before we understand this approach in detail let us understand

how an examiner does make a paper. Normally questions in any competitive exams can be categorized into following types

**Easy:** Approximately 25% questions are easy

**Average:** Approximately 60% questions are average

**Difficult:** Approximately 15% questions are difficult

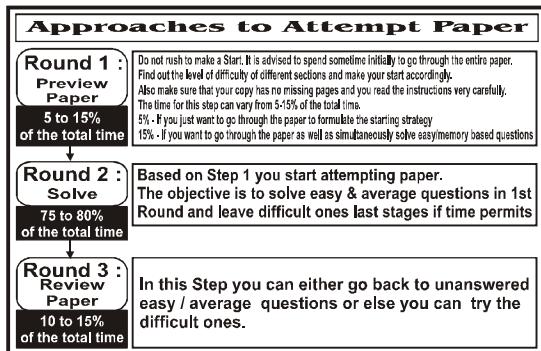
In this approach we attempt the paper in 3 rounds

- First round is for easy questions and should ideally be of 15 % of the total time
- Second round is for average questions and should ideally be of 70 % of the total time
- Third round is for difficult questions and should ideally be of 15 % of the total time

Remember what percentage of easy and average questions you are able to solve decides whether you will get selected or not whereas what percentage of difficult questions you are able to attempt decides what merit or rank you will get or in other words **easy and average questions ensure selection whereas the difficult questions make the merit (i.e. rank)** so you should focus on careful selection of the easy and average questions and avoid difficult questions in the first and second round. Come back to them once you have completed the entire paper.

**While starting the second round it is recommended that you attempt the paper in reverse order.** That is instead of going back to question 1 again you start from question 200. The reason for this is that you have just read question 200 and it is fresh in your memory so you would take less time to solve question 200 *vis-a viz* question 1 which you had read in the beginning of the paper. After completing second round you have two options

Either you can move to difficult questions as suggested above or you can move to easy and average questions attempted in the first two rounds and attempt some of the questions you had left initially. But, in this approach the disadvantage is that you have to shift from one section to another many times which does not work for many students.



*So do the easy questions first. Skip the difficult ones and go back to them later. Plan to make three passes through the questions: first for the easy ones, second for those you have to think and work hard to answer, and a third round for the difficult ones. Your goal is to make certain you answer all the easy ones first and get those marks. Getting stuck on hard ones early in the exam not only wastes time, but builds frustration that blocks the free flow of recall. The confidence building that occurs as you get several questions correct will relax you and help your recall for the more difficult questions later.*

### Strategy 5 : My recommended strategy

- Spend 5-10 minutes to browse the paper and then decide the sequence. Read the instructions and the marking scheme very carefully
- Allocate time to different sections of the paper. Remember, it is very important to make good start
- While allocating the time keep 10-15% for recap or revisiting the paper
- While solving a section focus on easy and average questions. If a question looks tricky or you get stuck in a question, leave the question and move ahead
- If you want to come back to any particular question in the last round mark it as TA (Try Again)
- After completing all sections you will have 10-15% of the time. You can use it to revisit TA questions

### How to finalize which strategy to use?

To know this, one should practice a lot of model test papers in the stipulated time under artificially created exam conditions. After attempting model test papers one should come out with the following things.

- (A) The sequence of subjects which suits you most. I used to follow first Chemistry, then Biology and lastly Physics.
- (B) Time to be allocated to different sections.
- (C) What kind of silly mistakes you make, try to remove them.  
The common one is poor eye contact leading to not reading the question or its choices completely or correctly, filling wrong circles, skipping the questions unknowingly and making simple calculations wrong.

### Marking of questions while attempting paper

Have you ever thought about how much time it takes to mark an answer in the response sheet. Most of the time we do not think about it because we think that it is too small a thing to think about. But you would be surprised to know that normally the time taken to mark a response varies between 6 to 7 seconds per question.

So if you attempt 180 questions in a paper -

The total time consumed to mark the responses is

$$= 6 \times 180 = 18 \text{ Minutes}$$

Isn't that a significant time. Before coming to how we can mark responses faster let us find out the methods adopted by students to mark the response. Most of the students adopt any of the following two methods to mark the responses

**Method 1 :** Mark the responses simultaneously. So in this method you solve question 1 and then mark it on the response sheet and so on.

Advantage is that you do not face a situation where you have solved the questions in the paper but you can not mark all responses because of scarcity of time. But the disadvantage is that **every time you mark a response there is a shift in the thinking mode of mind from solving a question to marking and darkening a circle.** In this method a student wastes a lot of time moving from question booklet to response sheet and back.

**Method 2:** Solve the questions first and then mark responses in the end. The disadvantage is that at times you get so busy in solving questions that you do not realize that the time is over and in the end you are not able to mark the complete responses.

But the advantage is that you save on time and moreover the concentration is also higher because you do not switch between solving and marking.

**Recommended Approach:** If you are following our recommended strategy, mark the responses after every section and when you are revisiting the paper in the last round you can mark on the response sheet after every question.

While marking the answers in the response sheet many students repeat in their mind 2 ka D, means that answers to question 2 is D. This helps in ensuring that you don't forget the answer.

Here is a case study to highlight the importance of exam giving strategy.

## CASE STUDY

Two students, "A" and "B" appeared for the IIT JEE Exam in the same year. According to teachers, A is an intelligent student and Mathematics is his favorite subject while B is a good student but not as intelligent as A. A is, therefore, expected to score a rank within 500 whereas B is expected to be within the rank of 4000. In the IIT JEE exam, A started with solving the questions of Mathematics which he is good at.



But that particular year, the questions of mathematics appeared to be more difficult than the previous years. Despite being a Pro in the subject, finding the solutions for maths consumed a lot of A's time and left little time for him to solve the problems of other two subjects i.e. Physics and Chemistry. On the other hand, B paid equal attention while attempting all the three subjects, giving each equal focus and time. She solved the easy questions at first and then moved to the difficult ones. "B", therefore, adopted a strategy as contrary to "A", who went on attempting the paper without much analysis and without using a strategy. Post

exam when the teachers asked both A and B regarding their performance in the exam, "A" replied that his exam was okayish and that the paper was tough. On the other hand, "B" replied that her exam was good and that the paper was OK. When the result was finally declared, it was seen that A, who was expected to be within 500 rank scored somewhere near the rank 3000 whereas B who was expected to be within the rank of 4000 ended up being within 999 rank. This clearly demonstrates that solving a paper within a limited time period is not solely a game of knowledge or expertise in a subject but also that of a strategy and equal attention to areas beyond one's interest. You cannot know how difficult Maths will be or how tricky chemistry will be. All that is permanent is change. So do not have expectations for the paper. Don't be adamant on sticking to your own strategy, like 40 minutes Chemistry, 50 minutes Maths and the rest Physics. This might just not work. Be ready for surprises. Try to keep it flexible.

**Paper Attempt Strategy by NEET Toppers :** Given below is the strategy I found common with many NEET Toppers.



- Start with Biology and finish the entire Biology in 50 minutes.
- Second subject is Chemistry. Time allocated is 50 minutes. Start with Organic and Inorganic Chemistry followed by Physical.
- Give Physics maximum time. Time allocated is 60-65 minutes as questions require calculation.
- Leave 15 minutes for revision, recap or visiting any question.

### Method of elimination to solve questions faster

Remember there are two ways of finding the correct option

- By solving the problem
- By process of elimination

It has been observed that most of the students ignore the second method and always try to solve the problem. Remember that there are certain problems, which have been designed in a way that their correct answer can be found quickly by working on choices rather than trying to solve the problem. Sometimes in case of confusing

problems you can reduce the options to 2 or 3 which can be followed by intelligent guessing.

## And what about guessing?

### Should you guess or not?

The answer to this question is that you should do intelligent guessing. Intelligent guessing means guessing the answer of a question you are not completely sure but have some idea about. You should use intelligent guessing on questions which you are not completely sure but have some idea and can eliminate one or two choices as obviously wrong answers. In case there is no negative marking then it doesn't make sense to leave any of the questions. However, you should check the marking system to see if incorrect answers are penalised. If penalties apply then be cautious while guessing. When there is no penalty for wrong answers, attempt all the questions. But do not start guessing till you finish the entire question paper.

Remember if you can eliminate a single answer - one you are reasonably certain cannot be right - your chances of being correct are 33 percent. And, if you can get down to a choice between two answers, it's just like flipping a coin: 50-50. In the long run, you will guess as many rights as wrong. Even if there is a penalty for guessing, I would probably pick one answer if I had managed to increase my chances of getting the right one to 50-50.

If you have absolutely no idea what the answer is and there is no scoring penalty for guessing, then you can use following techniques for guessing effectively:

1. If one answer is substantially longer, it could be the right answer.
2. If there are two exact opposites, the answer could be one of the two.
3. Statements that are ardent and use definitive words, such as "always," "never," "all," "must," "every time," and "none," are usually false.
4. Statements that have language, such as "usually," "most often," "likely," "probably," "could," "might," "should," and "rarely," are usually true.

5. Since it is easier to write true statements than to create plausible false ones, longer statements are more likely to be true than false, and true is the best last-ditch guess.
6. If two answers sound alike, choose one of them.
7. If two numbers differ only by a decimal point (and the others aren't close), choose one of them (Example: 2.3, 40, 1.5, 6, 15; I'd go for either 1.5 or 15).
8. Don't go against your first impulse unless you are *sure* you were wrong.
9. When you don't know the right answer, look for the wrong one to eliminate options
10. Read every answer (unless you are wildly guessing at the last minute and there's no penalty).
11. If you're supposed to read a long passage and then answer questions about it, read the questions *first*. That will tell you what you're looking for and *affect the way you read the passage*. If dates are asked for, circle all dates in the passage as you read. If you're looking for facts rather than conclusions, it will, again, change the way you read the passage.

**“Remember, a guess is a guess.”**

### Some More Tips for Objective Tests

- Sometimes you know a question but you are not able to attempt it or you get stuck. It is recommended that you should mark these questions differently. It has been seen that at times you can solve these questions very quickly. So it is recommended that you should mark them differently so that you can easily identify them.
- **Never see options before solving the questions.** Some students find it helpful to read the question and try to recall the answer from memory before looking at each of the four responses. Generally what most of the students do is read and understand the question and then look at the options immediately. At times what happens is that 2 or 3 options are very close to each other and hence most of the students get confused in those 2 to 3 options. So it is recommended that you should think of an answer in your mind and then look at the options. This tip is extremely useful especially in conceptual or

memory based questions (for e.g questions of Biology). So next time whenever you face such a situation just try to recall the answer on your own and then look at the options. But make sure that you look at all the options before finalising your response to the question.

- **Should you ever change your answers?** That is always a difficult decision. Always trust your instincts – you are most likely to be right with your first choice. Only change an answer if you can convince yourself that your initial choice is definitely wrong and you are confident of an alternative.
- **Once you are sure you have the right answer, don't spend time re-considering.**
- **Do not allow yourself to get stuck on a stubborn problem.** Return to it later. A change of question can often enable you to gain a fresh perspective on the previous question.
- **Underline key words in the questions** to ensure you have read them properly. Particularly be on the lookout for *not* and double negatives in objective tests.
- **Read the directions twice,** underline key words like always, never, sometimes, or usually, before you tackle the question.
- **Save time by answering each question as you read it.** Pass over those which are difficult or of which you are unsure. Return to them later if you have time.
- **Preview the whole test before beginning to answer any questions.** Make sure your copy has no missing or duplicate pages. Read the directions carefully.
- As you read through the possible responses, mark off the ones you know are wrong. This will save time if you have to come back to the question later.

### How to attempt a Subjective Paper?

Objective Test is like one day cricket whereas Subjective Test is like a Test Match. For you to score a century in a test match you should have patience, clear approach & mind & absolute clarity of fundamentals. So, subjective exams demand an entirely different approach.

While attempting a subjective paper a student is advised to follow following steps:

### ***Settle and compose yourself***

- Lay out your equipment, at least two pens, ruler, pencil and other permitted equipment.

### ***Read right through the paper (5 minutes)***

- Check instructions very carefully.
- Underline key words in questions.
- Choose your best questions, using a symbol system
- Analyse the question very carefully, For e.g try to find out whether it is a 'What' or 'How' type question or a 'Why' type.

### ***Plan your time***

- Divide time according to marks per question.
- Write down finishing time for each question.
- If possible, plan in 10 minutes checking time at the end.

### ***Plan your answers***

- Brief notes on main ideas and important details.
- Convert questions into diagrams.
- Outline all answers at the beginning (if doubtful of remembering); or one at a time or a few answers together.
- Leave space after each question.
- Ignore other candidates' writing speed and spare paper collecting – it is irrelevant to your performance.

### ***Prioritise***

- Answer your best question first.
- Try to stick to the time allowed for each question: marks for two half-questions are worth more than one.
- Stick to what the questions are asking. (Read underlining Keywords below)

### ***At the end of the exam***

- If you are short of time, avoid calculations
- If there is time left, check your answers.
- Minimise your post-mortems.

***Underlining key words in questions***

Answering an exam question correctly depends upon understanding it clearly in the first place. An important technique is to underline, after careful consideration, the most important words, phrases or data in the question. This technique has several advantages:

- It ensures you read the question properly and note exactly what it is asking. It is very easy in your anxiety to misread a question and get started.
- It draws your attention to the approach that examiners want you to take, i.e. the type of question it is.
- It provides you with the key words to start a brief outline answer plan.

*Remember that simply worded questions are not always the easiest to attempt. Sometimes questions which require careful reading can be easier for you to answer once you have clearly understood them.*

**Choosing the questions you will answer**

Read the question paper quickly but carefully so that you can fully comprehend each question. Use some simple symbol systems to indicate your reaction to each question, once you have carefully read it and decided exactly what it is asking. Classify questions into following Categories A1, A2 and A3.

**Category A1:**

1. Questions from topics that you are strong in, and you can clearly understand the question and its parts.
2. Questions containing concepts similar to those you have attempted earlier, and one which you will be able to solve easily.
3. Questions in which you are confident of solving a few sub-parts. While attempting such a question leaves space to attempt the other sub-parts as per their classification . In the end when you have finished attempting all parts make sure that you have not left any blank page and if you have then put a cross (X) and write “please omit”.

**Category A2:**

1. Questions from a topic that you are not so strong in, but can comprehend and feel that you can solve it.

2. Questions from a topic of your strength but you are not able to comprehend clearly at the first reading but nevertheless you are confident that once you get down to solving it, your chances of solving it are very high.

### Category A3 :

1. You are able to understand certain parts of the question and feel that only when you start solving new vistas will open up, that you cannot see now.
2. Questions which you do not comprehend at all. But if time permits you would like to give it a try, and may eventually write a few steps or even succeed in solving it.

### Alternate ways of choosing the questions you will answer

- Use a simple star system (up to 3 or 5 stars \*\*\* ) next to each question: Choose the questions with the highest star rating.
- Use the EASY/DIFFICULT and KNOW/UNDERSTAND symbols
- Give the questions scores out of 10 to indicate your confidence in answering them.
- Number the questions in the order you will answer them, choosing your best question first; then second best, third best and so on.

Start solving questions in the priority to optimise your marks. Even if you spend your initial 10-15 minutes doing this exercise, it does not matter for it will be highly rewarding. Remember it is extremely important to make a good start.

**Read the given below case study for your better understanding.**

Two students, "A" and "B" appeared at the board examination in the same year. A was an intelligent student who covered up the entire syllabus during his board exam preparation. On the other hand, B was an average performing student in school. During board exam preparation, he prepared well but possibly not as well prepared as A. But B was the smarter one.



During their board papers, A started solving the question papers from the very beginning which began with one mark questions and eventually moved on to the last section which carried 5 marks for each question. Here, B adopted a different approach and began with the last section first i.e. with questions carrying 5 marks each and moved to the first section i.e. the one mark question towards the end. As a result, "B" was able to devote more time and attention to the larger section and had very few chances to commit silly mistakes in the high weightage question. On the contrary, due to paucity of time "A" had to solve the five marks questions in a hurry increasing his chances of error as he had already given much time on the less weightage questions. When the result was announced, it appeared that despite being an intelligent student "A" scored less than "B". The reason was his failure in adopting a strategy as compared to B and, therefore, fewer chances to minimize his error. This demonstrates the fact that only good preparation or being intelligent is not entirely responsible for one's success but at the same time he/she has to be smart and use an efficient strategy during exam where maximum output could be expected within a limited time frame.

### Plan your answers

It is advised to outline all your answers in one working spell at the beginning of the exam. Alternatively, you can plan one answer at a time or two or three together before commencing to write out your full answers. The advantage of planning all your answers at the beginning is that it enables you to record a considerable amount of information whilst it is fresh in your mind; it removes the anxiety that you will forget it by the time you come to answer a later question. It also gives you notes to fall back on if you run out of time. In an emergency, you could refer the examiner to them, if they are readable and comprehensible. You can also add to these notes during the course of the exam when you think of other points you have remembered: answering one question often throws up associations with another topic or question. **This has to be implemented specially A2 and A3 category questions.**

### If you are running out of time

Divide whatever time that remains between questions. Examiners share a wide measure of agreement that it is easier to gain five marks in the last questions than an extra five in the question you were last working on. For this reason, two half answered questions usually gain more marks than one more completely answered question.

Remember in Board Exams there is step by step marking. Usually the weightage for the conceptual part is more (60 to 70% of the total marks of the question). So if the time is less (20 minutes left and still to attempt 3 questions) and the calculations in the question you are doing are long than it is advised that the student should focus more on the conceptual part of the other question. By adopting this technique the student can score more marks.

With 10 minutes left and one answer to complete, you may revert to an emergency technique. Use brief notes to answer a descriptive question. Minimise the amount of calculation shown in mathematically based problem solving subjects. Provided these brief outlines are readable and comprehensible to the examiner, they can gain marks.

Alternatively, if you have written readable notes of skeleton outlines at the beginning of the examination, you can refer the examiner to them as your time elapses. If you do this, cross out the work you do not wish the examiner to read (a good principle at the end of an examination).

### Visualization of the problem

Try to convert the question into a diagram. Try to follow the following steps when solving subjective problems. These steps would specially be useful in Physics Paper.

**Step 1.** Convert the problem in the form of a diagram.

**Step 2.** Check the problem again to see if what is asked in the question is clearly represented in the diagram.

**Step 3.** Check if the diagram makes sense. If the diagram looks absurd, there is some problem in your understanding of the question.

**Step 4.** Understand the question now by going through the diagram instead of the question. If you find that this is not possible, then your representation is wrong. You should be able to explain what is required by interpreting the diagram.

**Step 5.** Make modifications in the diagram till you are clear that the diagram is a faithful representation of the problem.

**Step 6.** Do not proceed to the next step till you are confident about the diagram.

A few other essential points to keep in mind.

1. **Start every new question from a fresh page.**
2. In case space left for doing a question proves to be insufficient then do as much as you can in the given space and write 'continued on page...' and continue the question on that page number. Please do not forget to write the page numbers if the answer sheet is not numbered.
3. In case you are unable to complete a question, do not cross it unless you have done it on some other page. Since there is step marking, the correct steps are likely to fetch some marks.
4. Do not skip steps in between. Try to **give a solution as detailed as possible**. Many students who even know the correct answer and solution to the questions, don't solve them completely by showing all the steps resulting in them being awarded just 2 to 2.5 marks only out of 5 marks. On the other hand, the students who solve the questions keeping all these points in their mind, get 4 to 5 marks out of 5 marks. It is therefore important that while doing a problem (during the practice) care should be taken to solve it not just for the sake of getting the answer but for understanding the application of a concept.
5. Leaving spaces after each answer will enable you to add to it, if you recall more information.

6. **Highlight important points** or important steps in your solution.
7. If a question has been attempted incorrectly at the beginning and correctly solved subsequently, strike out the incorrect part of the solution but only after solving the question correctly. This reminds me of one of my very good students, during the IIT Mains examination he completed his Physics paper 10 minutes before the scheduled time. While revising he found out that he had committed a silly mistake in question number 4 which was of 10 marks. Without thinking much he immediately struck off question 4 and started on a fresh page but by the time he could have completed the first step, the time was over and a copy was taken from him. The net result he must have got 0 marks in question 4 but if he would not have struck off old attempt of question 4 he would have got 5 marks as his mistake was after a few steps. So always remember that when you are in the last stages of your paper you should cancel your first attempt only after you have finished attempting the question in the second try.
8. Be as neat as possible.
9. Even if at first sight you find the paper tough, do not stop trying and you will eventually find answers to some questions.

*Remember that it is through practice that you can derive the maximum benefit from your strategic plan. So from now onwards whenever you are attempting a test paper, whether on your own or at the examination centre try out different plans and find out which one works best for you.*



NEVER,  
NEVER,  
NEVER,  
NEVER,  
NEVER,  
NEVER,  
NEVER,  
**NEVER GIVE UP**

# HOW TO LEARN PHY / CHEM / MATHS / BIO BETTER & FASTER?



Now we know how to make a plan, how to concentrate, how to make notes, how to prepare for exams and many other effective study techniques. But how do we apply these techniques to learn better & faster or in other words.

***How do we use them to solve Physics problems ?***

***How do we apply them in remembering Biology?***

These are some of the questions I face almost at the end of every seminar. The following chapter is an answer to all those questions. In this chapter we will learn application of some of the study techniques which we learnt in preceding chapters. In order to make the story short and interesting I have divided subjects/topics into two broad categories

- Subjects/Topics involving numerical and problem solving for e.g Physics, Physical Chemistry/Maths and others
- Subjects/Topics involving memorizing of information/facts for e.g Biology, Inorganic Chemistry and others.

For sake of convenience I have taken here examples of Physics and Biology.

## **How to Master Physics?**

### **How to Master topics involving problem solving?**

It's important to recognize that physics is a **problem-solving** discipline. Your physics teacher will stress on major concepts and principles with the objective that the student should be able to apply these principles to understand and solve problems. You should focus on this fact, that in physics, **you are expected to solve problems**. So, make problem-solving part of each study session. The more you work out problems and test yourself, the better your physics will get. Devote your time to learning how to

do each problem rather than in obtaining the numerical answer given in the solutions manual. Even if you do not have homework problems to do, try working out at least five new problems every time you study.

## Effective Participation for a Physics Class

It's important that you should be well prepared for class in order to use its potential. To prepare for the class, you should do the following:

### Prior to each class:

1. Check the course outline or reading assignment to see what will be covered. Prepare by briefly previewing the sections of the textbook that apply to the subjects to be covered. This preview will improve your ability to follow the class, for you will have seen the new terminology and will recognize keywords that will help integrate the classes into an overall picture.
2. Read the introduction and the summary of the relevant chapter and look at the section headings and subheadings. Try to formulate questions in your mind about the topics to be covered. This question-formulating helps you manipulate and therefore better understand the material.
3. Examine the drawings and pictures. Try to determine what principles they illustrate.
4. Make notes of new words, new units of measure, statements of general laws, and other new concepts.
5. Right before the beginning of class, check your notes from the last class. Reading your notes will prepare you to listen to the new physics class as part of an integrated course and will help you to see the broad application of concepts.

### During class:

1. Take good notes. It's helpful to make a set of abbreviations and use them consistently in taking notes. Keep a list of them for later reference. Leave ample margins for later comments and for questions or write on only one side so that you can use the opposite side for comments and questions.

2. When you copy drawings, completeness is worth more than careful artwork. You should not only copy what is on the board but also record important points that the teacher makes orally about the diagram.
3. If you get behind in your note-taking, leave a space in your notes and go on. You can fill in your notes later with the help of a classmate or your textbook.
4. Ask questions. Don't be embarrassed to ask your teacher questions. Many teachers depend on feedback from students to help them set a proper pace for the class. And of course it can happen that the teacher does not explain a step she takes, or even makes a mistake when writing something on the board.
5. **Listen to the questions asked by students in the class.** Even if you are not able to understand the relevance of the question asked by one of your friends, write it down for later reference (after class). Pay special attention to the questions of the students whom you think are more intelligent than you. They might have an insight which your mind can't think of immediately.

#### After class:

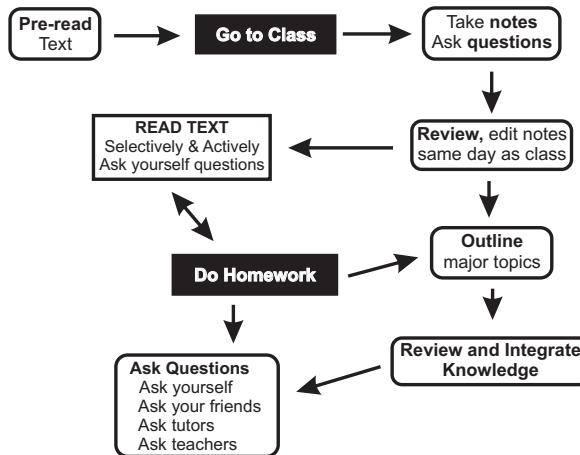
1. After class as soon as possible, review and edit your notes. You need not rewrite them. Rather, you should look for important ideas and relationships among major topics. Summarize these in the margin or on the opposite side if you've taken notes only on one side, and at this time you may want to add an outline to your notes. Also, this would be a good time to integrate notes from your textbook into your lecture notes; then you will have one set of integrated notes to study by.
2. As you review your notes, certain questions may come to mind. Leave space for recording questions, and then either ask the teacher or even better, try to answer these questions for yourself with your friends and with the help of the text.
3. Read actively with questions in mind. A passive approach to reading physics wastes your time. Read with a pencil and paper beside the book to jot down questions and notes. If you find that you are not reading actively, once again take a look at the problems and the lecture notes. Read to learn, not to cover

material. When looking for relationships among topics, you may note that in many instances a specific problem is first analyzed in great detail, then the setting of the problem is generalized into results. When such generalizations are made, you should refer back to the case that was previously cited and make sure that you understand how the general theory applies to the specific problem. Then see if you can think of other problems to which that general principle applies.

4. **Stop periodically and pointedly recall the material that you have read.** It is a good idea to repeat material aloud and especially to add notes from the textbook into the margins of your class notes.
5. During your reading you will notice sections, equations, or ideas that apply directly to assigned problems. After you have read such a section, stop and analyze its application to a problem. **The interplay of reading and problem solving is part of the cycle of question → answer → question. It helps you gain insights that are not possible by reading alone, even careful reading alone.** Passive reading is simply following the chain of thought in the text. Active reading also involves exploring the possibilities of what is being read. By actively combining the questions that are inherent in problem solving with your reading, you enhance both your concentration while reading and your ability to recall and to apply the material.
6. The true test for determining if you know your material, is to do a problem you have never done or seen before. So when preparing for a physics exam, look for new problems. With each problem, ask yourself what kind of problem is this, and how are you going to do it? Then, do lots and lots of problems.
7. Use small review cards for learning terminology and for testing yourself on concepts. Put a difficult term or concept on one side and the meaning on the other. Carry these cards wherever you go and review them at odd moments - you won't even feel like you're studying.
8. To make physics more fun, keep relating it to your everyday life. Look for situations or occurrences that illustrate what you are learning. For example, what causes hairs to repel one another on a dry winter day? How does your engine use fuel to produce motion?

9. **Form a Physics study group** to talk aloud and test yourself on your new learned knowledge. Explaining physics to others is an excellent way to reinforce new concepts. Study groups also help students to do better by increasing their motivation and confidence.
10. **Research has shown that we remember 90% of what we say and do.** So practice, practice and practice (do, do, do) physics and explain it to others (say, say, say).
11. **Physics is cumulative; one topic builds on another - so don't fall behind.** Attend every class if you can. Keep up with the material. If you need help, get it immediately.
12. Don't be satisfied with simple recognition of a principle. Aim for actual knowledge that you will be able to recall and to use in a test situation. Try to look at all the possible ways that a principle can be applied. **Remember the best students are testing themselves continuously throughout the learning process.** In addition, make up your own difficult practice tests and practice working out all types of problems.

## Weekly Flow Chart for Studying Physics



### ***General outline of how to approach a physics problem:***

It's important to remember a couple of things about physicists and physics professors:

“A physicist seeks those problems that can be modeled or represented by a picture or diagram. Almost any problem you encounter in a physics paper can be described with a drawing. Such a drawing often contains or suggests the solution to the problem.”

- 1. Read the problem.** Look up the meanings of any terms that you do not know. Answer for yourself the question, “What’s this about?” Make sure you understand what is being asked, what the question is. It is very helpful if you re-express the problem in your own words or if you tell yourself (or a friend) what the problem is about.
- 2. Make a drawing of the problem.** A good drawing include the following:
  - a. Give a title that identifies the quantity you are seeking in the problem or that describes the problem.
  - b. Label the drawing, including the parameters or variables on which the solution depends and that are given in the problem. Write down the given values of these parameters on the drawing.
  - c. Label any unknown parameters that must be calculated along the way or obtained from the text in order to find the desired solution.
  - d. Always give the units of measure for all quantities in the problem. If the drawing is a graph, be sure to give both the units and the scale of the axes.
  - e. Include on the drawing information that is assumed and not given in the problem (such as  $g$ , the value of the acceleration due to gravity), and whether air resistance and friction are neglected.
- 3. Establish a general principle** that relates the given parameters to the quantity that you are seeking. Usually your picture will suggest the correct techniques and formulas. At times it may be necessary to obtain further information from your textbook or notes before the proper formulas can be chosen. It often happens that further information is needed when the problem has a solution that must be calculated indirectly from the given information. If further information is needed or if intermediate quantities must be computed, it is here that they are often identified.

Sometimes the problem statement will give you more information than is needed to answer the question. Sometimes it will give you less information than is needed, and ask you not for an answer but for a list of the unknown information required to find an answer. Sometimes the problem will be a short narrative from which you need to extract relevant information. Students often find such problems exasperating, but in fact they develop an important problem-solving skill called **building a mathematical model**. Problems that arise in the world outside of your textbook usually come with more or less data present than needed to solve the problem. The ability to recognize which data are needed and which are irrelevant is an important practical skill.

4. **Draw a second picture** that identifies the coordinate system and origin that will be used in relating the data to the equations. In some situations this second picture may be a graph, free body diagram, or vector diagram rather than a picture of a physical situation.

When working out a problem, try to visualize what it is asking you to do. Draw it out and/or set up a chart, then identify the variables and set up the equation. Remember setting up the problem is the most important thing you can do. Next, solve your equation for the unknown, and substitute your numbers into the problem, to see if it checks out.

5. **Criticize your solution:** Ask yourself, “Does it make sense?” Compare your solution to any available examples or to previous problems you have done. Often you can check yourself by doing an approximate calculation. Many times a calculation error will result in an answer that is obviously wrong. Be sure to check the units of your solution to see that they are appropriate. This examination will develop your physical intuition about the correctness of solutions, and this intuition will be very valuable for later problems and on exams.

*An important thing to remember in working physics problems is that by showing all of your work you can much more easily locate and correct mistakes. You will also find it easier to revise the problems when you prepare for exams if you show all your work.*

## Effective Test Preparation

Effective examination preparation involves an interaction among homework problems, the classes, your notes and the text. Review actively, including self-tests in which you create your own problems which involve a combination of principles. You need to be sure that you can work problems without referring to your notes or to the textbook. Practice doing problems using both the concrete and the formal approaches, to see which you are more comfortable with. Preparing for an exam in physics has two parts. You must make sure that you **know how to work problems** given a list of formulae, and you must **ensure that you can reproduce the formulae**. These tasks are rather separate.

The first step in ensuring that **you can work problems** is by practicing problems right from the beginning of preparation. As you go along you should make sure that you have mastered each type of problem. You should review assigned problems that you got wrong and get help with those where you do not understand what you did wrong. You should know how to work all the assigned problems correctly soon after the marked problems are returned.

In preparing for the exam you should go back over the assignments and make sure you still understand them. Then work a few other problems from the book with the book closed. It is OK to verify the details of a formula, but not to look for what the appropriate formula is.

At the same time you should be organizing your **mastery of the formulae**. Outlines are the best way to do this since the formulae form a logical pattern. It is best to organize the outline so that you can use it for “guess/check” learning. To do this make an outline of labels of formulae (Acceleration due to a given force, Energy conservation, etc.) and place the formulae themselves on the right-hand side of the page where they may be covered up. Then repeatedly go down the outline attempting to reproduce the formulae and working on those you cannot write down. Eventually you will know them all, usually faster than you will using any other method. Remember that most formulae need not be memorized: use units, qualitative arguments, linearity, to aid your reconstruction of the formulae. The less you have to memorize, the more confidence you will have in the examination hall.

To understand and retain data or formulas, you should see the underlying principles and connecting themes. It is almost inevitable that you will sometimes forget a formula, and an understanding of the underlying principle can help you generate the formula for yourself.

As you read an exam problem, place a check mark beside the given data and underline the unknown quantity to be found. This will help you prepare a strategy and help you avoid answering a question that is similar to but different from the one that is asked.

*Remember learning physics is kind of like learning to play a musical instrument or sports. To do it well requires much effort and daily practice. To paraphrase an ancient Greek philosopher, who was a tutor to a king, “there are no royal roads to physics”—everyone has to struggle with it.*

## How to Master Biology?

## How to Master topics involving Facts and Theory?

There is no single “best” way to study. Each individual must find the best method for them. In order to study effectively each person needs to find the strategy that best meets his/her learning style. So, it is important to know your learning style and use it to your advantage and work on your weaknesses while taking advantage of your strengths. The following is a compilation of many of the techniques used by successful students to study Biology.

### 1. Preview material to be presented prior to attending the lecture.

- Read and highlight important sections of the reading (note: highlighting is like note taking, highlight only enough to remind yourself of the key information presented).
- If time is short - preview the material briefly to identify key terms and concepts. This can be done in several ways:
  - Read the chapter summary.
  - Read the section headings and bold type.
  - Inspect the figures and read figure headings

**2. Take good lecture notes**

- Don't try to write everything that is said, just note enough to remind yourself what was discussed (your notes should be clear to you but not necessarily to anyone else).
- Note all figures presented in lecture for later review.

**3. Rewrite your lecture notes** as soon as possible after the lecture (note: this should be an active process - do not simply re-copy your notes, think about what you are writing and write it in your own words). Always ask the “W” questions - why? what? when? where? (w)how?

- Read through the text (or reread) and fill in the gaps in your lecture notes (some students like to take a separate set of notes from their reading and then combine their lecture and text notes).
- Convert your notes into flashcards for review
- Make up questions from your notes - this will help you to actively think about the material and may help you to predict what kinds of questions may be on the test.

**4. Draw out flow diagrams of complex processes or relationships.**

- This can be a simple or very complex “map” to help you visualize relationships (note: if you learn the relationships and the general concepts it is often possible to reason out the details, however, learning the details alone often is not helpful in learning the concepts).
- Study all diagrams and charts. They condense a lot of valuable information. Cover up and see if you can visualize them.
- Draw simple anatomical pictures illustrating structures and relationships - these do not need to be artwork but should be clear to you. **Make a table comparing and contrasting different processes. Describe in your own words the similarities and differences between the different concepts you are learning.**

- Draw concept maps to help you recall and revise faster. Concept mapping is an activity that helps you reorganize the information in a way that conforms to your mental “landscape.” Better than rewriting your notes, it helps you to discern the patterns and relationships between concepts. Research supports the effectiveness of this strategy in helping students learn complex material.
5. **Put proper closure on each lecture.** Within 24 hours of each lecture - the sooner the better - (1) ask yourself what the lecture was about without using your notes, and (2) write your answer in the form of a concept map. This is the best time to spot points of confusion or discrepancies between text and notes, which you should write down and follow-up on. It is very important to spend time in this fashion if you are serious about succeeding in biology.
  6. **Review what you have studied with a study group.** Study groups should not replace individual study but are frequently the best way to review what you have learned. Whenever possible explain aloud to another person what you are learning. Work with a classmate and explain terminology and concepts to each other.
  7. **Develop your own personal examples/analogy**s for better understanding material
  8. **Write a summary of each concept** you have learned or in other words try to express in your own language whatever you have learned. Remember expressing in your own terms is very important. Compare your summary with the original chapter summary and find out if you have missed any point.
  9. **Review and analyze your mistakes on your tests** - what are the correct answers, why did you miss the questions, how can you improve your studying and test performance?

### Steps in Making a Concept Map

A concept map is a diagram that depicts the interrelationships between a series of concepts (ideas). Preparing a concept map can be a valuable way to pull together your ideas and enhance your understanding of a topic.

Start each map at the center of the top of the page with the most general concept, which will generally be the chief topic of a particular lecture. Below it, place the second-most general concept(s), etc.

- Circle these two concepts and link them with a solid line.
- Label the line with a linking phrase (words or phrases that explain the link between concepts)
- Work your way down the page, adding increasingly specific concepts and looking for cross-links, which should be drawn with dashed lines.
- Add details (examples). Circle the concepts, leave examples uncircled
- Do a second version of the map with the goal being to add formerly unnoticed cross-links and to organize the map so that it flows as logically and as clearly as possible.

Always note that each concept should only appear once in a given map. Redundancy of concepts usually indicates that you missed an important conceptual relationship. Concept maps should NOT resemble flow charts or chronologically based outlines of the lecture. They should not be sentences with some words diagrammed. An important goal is to accurately relate as many concepts as possible using cross-links. Maps with long strings of concepts or with several isolated and unlinked branches indicate misunderstanding of the goal of concept mapping.

### Other Guidelines

- Know and understand all your terminology. This is one of the keys to success in any field. In biology it is extremely helpful to begin by studying your Latin and Greek roots. This is the basis for many seemingly difficult terms. Study these roots. Make 3" x 5" flashcards to help you memorize them and later do the same with your terminology.
- If biology is your most difficult subject, then always study it before all other subjects. You must study biology when you are most alert and fresh. Make sure to take 5 or 10 minute breaks every 20 to 40 minutes in order to clear your mind.

- Write up summary sheets of biology terminology and concepts and review often. The more you review the more you'll remember. Also, visually picture the terms in your mind's eye. Visualizing is a powerful technique for remembering terms. Break words into small chunks and picture each chunk until you can recall it. Then put the chunks together. Remember that the knowledge of roots can be extremely helpful.
- Use of mnemonics memory techniques may be fun as well as beneficial. For example, if you need to remember the 12 cranial nerves you can take the first letter of each nerve and make up a sentence where each word begins with the first letter of each nerve.
- Don't be a hermit. Once you have studied a good bit on your own, get together with a few others who are interested in understanding biology in order to bounce questions off each other, compare concept maps, explain concepts to each other and to be able to answer your colleagues' questions regarding those same explanations.
- Don't miss the forest for the trees. Concentrate on the concepts, not on the minor details. You will not be asked to recall picky details or to memorize tables (like the genetic code). You will be asked to apply broad concepts to solve specific problems. Remember it is our feeling the questions like names of scientists, year of invention and other questions which simply require memorisation have reduced over a period of time.
- Memorization is important, but understanding is much more important.
- The material in many units is not readily "cram-able". For example, genetics has many problems that simply take time to work through. Cramming this material is usually a waste of time.

### Step 1:

In the first step you should skim the chapter, noting the main topics, words in bold print, all tables diagrams and summary charts.

This step is best done before the lecture.

## Step 2:

This step is called learning intellectually. In this step the focus is on understanding the meaning and definition of the key words. The second step requires reading in more detail, studying each area and not proceeding until each concept is understood. This step should be done immediately after the class.

before Class

### Step 3:

This step is called learning by rote. The focus in this step is to memorize the scientific names of the new terms learned in the unit.

This step should be done with in 24 hours after the class

**Step 3** **& their Meaning**  
each concept is understood. **immediately after Class**

This step should be done immediately after the class.

### Step 3:

**Words & Write them  
on the left Margin**

#### **Step 4:**

The focus in step 4 is remember the words along with their meaning. This might require writing down terms and definitions and important concepts. Talking to yourself as you read. Explaining what you have read aloud and make up your own examples to better understand what you have read. Rereading the material aloud, especially in your own words helps clarify the information. Hearing yourself makes a lot of difference. This step should be done with in 24 hours after the class

Recall Link or Association & with other concepts

```

graph TD
    KW2[Key Word 2] --> KW3[Key Word 3]
    KW2 --> KW5[Key Word 5]
    KW3 --> KW4[Key Word 4]
    KW4 --> KW5
  
```

**Step 5:** The focus is on understanding word with other words in a way to develop concept and periodic review. This step takes 72 hours.

Recall Link or Association & with other concepts

```

graph TD
    KW2[Key Word 2] --> KW3[Key Word 3]
    KW2 --> KW5[Key Word 5]
    KW3 --> KW4[Key Word 4]
    KW4 --> KW5
  
```

and the relation of the whole concept or keywords. An ideal to this step is to make mindmaps and revise them orally.

understands word with other way to develop concept periodically. This step 72 hours

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re read. Reread  
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e with in 24 hour

Their meaning. This might involve definitions and images you read. Examine them aloud and make up your own words to understand what you have heard. Repeat them aloud, especially in your mind. Hearing yourself say the information. Hearing yourself repeat it. This step should be done

## 5 steps to Revise/Remember/Recall/Reproduce Biology faster

In Biology the basic terminology, its scientific meaning, its root and definition is very important. Usually most of the students do not focus on meaning and try to learn it mechanically by continuous repetition. Ideally the methodology to study Biology can be divided into following steps.

To summarise, words and symbols of Biology have specific meanings. Each time you come to a new term or concept, cover up the text and see if you can express the idea aloud in your own words. Write down all the words you do not know. Emphasize words in bold type.

Whenever possible write

out the definitions in your own words. Strive for understanding the definitions so that you can easily state them in your own words; you are more likely to remember them that way. By saying it out loud and writing it, you are more likely to recall it later, when needed.

**Note :** Regular repetition of any of the above steps or of all of the above five steps might be required to transform concepts from short term memory to long term memory. So repeat each step as many times as necessary until you are confident about the concept and its application. **Remember mastery can take minutes or hours or days.**

### LEARN BIOLOGY THROUGH FLASH CARDS

- Read and understand the theory
- Underline keywords & Concepts
- Write key words on Flash Cards
- Learn through key words by revising repetitively
- After remembering key words, try to recall links between keywords
- Keep on revising as where you get an opportunity.



**“A dream written down with a date becomes a Goal.  
A goal broken down into steps becomes a Plan.  
A plan backed by Action makes your dreams come true.”**

- Greg Reid

## BEYOND MARKS

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Our educational climate focuses primarily on numbers and letters, rankings and standings. It is designed in a way that marks tend to have become the goal and education, the by-product. Conventional wisdom tells us that students should get high marks in school to get into a good college, and then get high marks in college to get offered a good job leading to a successful career. We are conditioned to see results through numbers. We forget that the quest is actually for education as a means to a useful life. But it's time to think for different results. It is time we think for a system that puts the value and benefit of the learner first.

Competitive exams like JEE/NEET are just a small part of your life. Even though JEE/NEET preparation seems to be a long journey with lots of learning and emotions associated with it, this should not consume all your energy. It doesn't matter if you have cracked JEE/NEET or not, if you've invested your time on learning something out of the journey then you have succeeded. **The journey of your two or more years of preparation is in itself an achievement.** And you should take pride in your journey. It is pretty obvious that you may get bogged down at times, seeing the immense competition around you. Failing to do your best in a test may add more to your woes, but this is exactly when you need to stand strong. All the students go through this phase but their patience and belief in themselves are what propels them to success in life.

Ever heard of the term "***Wabi-sabi***"? It represents a comprehensive Japanese worldview based on accepting and embracing transience and imperfection. The truth is not everybody can be the topper. **Becoming over-competitive or expecting too much from yourself can be counter-productive.** Try to give your best but at the same time remember if you fail then this is not the end of the world. An exam cannot decide your faith. Who failed the IIT entrance exam, did he/she not do well? Who did not become a doctor,

did he/she not find another path for? Where did these stories of success get told? We see them around us every day, as they smile at us as we meet them at socials, as we engage with them at work. **To live a life with love and care is success.**

John Lennon, the extraordinary musician and member of the Beatles, said, *When I was five old, my mother always told me that happiness was key to life. When I went to school, they asked me what I wanted to be when I grew up. I wrote down 'happy'.*

**'They told me I didn't understand the assignment, and I told them they didn't understand life.'**

Remember, a competent small businessman can be happier and more successful than an incompetent and disinterested MBA graduate. If not JEE/NEET, then there are 10 other things where you can be successful. **Pursue something that gives you peace and satisfaction at the end of the day.** As Bill Gates rightly said, *'don't compare yourself with anyone in this world...if you do so, you are insulting yourself.'*

Some students make a huge deal out of exams. Few even commit suicide if they fail to meet the expectation of their parents or teachers. I know failure can be a devastating experience for a student, especially when they were not expecting to fail their exams. They lose their self-esteem and keep self-loathing. This is because all our life we keep considering failure as the end. We think that there's no room to come back to learn and try again. Did you not know that failure was only a learning moment? Even success has many faces and your failure can be a step towards your success.

### Failures are the pillars of success



The story of Vijay Wardhan justifies every word of this phrase. He secured 104th rank in UPSC Civil Services exam in 2018 and failed in more than 35 exams before hitting the bull's eye. After completing his engineering in electronics and communication, it took him 6 years and numerous failed attempts to ultimately succeed in life. In these many

years, Vijay attempted more than 35 government exams including UPPSC, Haryana PCS, Punjab PCS, SSC CGL, LIC, NABARD,

ISRO, Haryana Excise Inspector, RRB NTPC, RBI Grade B. In most of these exams he cleared the prelims but was unable to crack the main exam or interview.

The list of failures may crack any person and force them to give up on their dreams. But Vijay epitomised the adage - what does not break you, makes you stronger. He continued to strive for his dreams and finally his dedication paid off. His story is a story of courage, determination and never die attitude. In today's world, with high competition, it is stories like these that show the beacon to the many who give up after failing. He truly epitomizes that failures are the first steps to success.

Exam failure is one of the many hurdles you will have to surpass in your life, and there are always possibilities to learn and rise above failure. There are thousands of other career options and whenever anything like this happens in life, believe in the power of the universe. Maybe the universe has got bigger plans for you. Maybe your destiny is somewhere else. If you are not good at one thing, there will be ten others things that you'll be good at. All you have to do is believe in yourself and stop comparing yourself to anyone else. Let me tell you another inspiring story of turning failures or say adversity into an opportunity.

## Turn Adversity into an Opportunity

One day a farmer's donkey fell down into a well. The animal cried piteously for hours as the farmer tried to figure out what to do. Finally, he decided the animal was old and the well needed to be covered up anyway; it just wasn't worth it to retrieve the donkey. Instead of leaving the donkey to starve and die with pain, he decided to bury him alive. He invited all his neighbours to come over and help him. They all grabbed a shovel and began to shovel dirt or mud into the well.

At first, the donkey realized what was happening and brayed (cried) terribly. Then, to everyone's amazement, he quieted down.



A few shovel loads later, the farmer feeling pity finally looked down the well and was astonished at what they saw. With every shovel of dirt that hit his back, the donkey was doing something amazing. He would shake it off and take a step up. As the farmer's neighbours continued to shovel dirt or mud on top of the animal, he would shake it off again and take another step up. Very soon, to everyone's amazement the donkey stepped up over the edge of the well and walked off.

Similarly, life is going to shovel all kinds of dirt on you. The trick to getting out from your problem is to shake it off and take a step. Every adversity can be turned into a stepping stone if you never give up, rather shake off your problems and stand on them. What happens to you isn't nearly as important as how you react to it. So, learn from your problems and learn to take a stand for yourself. This is the best way to turn your adversity into an opportunity without overstraining yourself in scholastic achievements at the cost of physical and mental health.

छिप छिप अश्रु बहाने वालो।

माती व्यर्थ बहाने वाले।

**कुछ सपनों के मर जाने से जीवन नहीं मरा करता हैं।**

खोता कुछ भी नहीं यहाँ पर

केवल जिल्द बदलती पोथी।

जैसे रात उतार चाँदनी

पहने सुबह धूप की धोती

वस्त्र बदलकर आनो वालो।

**चन्द खिलौनों के खाने से बचपन नहीं मरा करता है।**

लाखों बार गगरियाँ फूटी

शिकन न आई पनघट पर

लाखों बार किशितयाँ डूबी  
चहल पहल वो ही है तट पर  
तम की उमर बढ़ाने वालों  
लौं की आयु घटाने वालों  
लाख करे पतझर कोशिश पर उपवन नहीं मरा करता है।  
लूट लिया माली ने उपवन  
लुटी न लेकिन गन्ध फूल कीए  
तूफानों तक ने छेड़ा पर  
खिड़की बन्द न हुई धूल कीए  
नफरत गले लगाने वालों।  
सब पर धूल उड़ाने वालों।  
कुछ मुखड़ों की नाराजी से दर्पन नहीं मरा करता है।



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**When you lose, don't lose the  
lesson.”**

- Dalai Lama



## ROLE OF PARENTS

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Parents involvement in your child's education is absolutely essential to his or her eventual success. Surprisingly enough, the results of every study done in the last two decades about what affects a child's success in school concludes that only one factor overwhelmingly affects it every time i.e. **parental involvement**. It doesn't matter much what is the size of the school, the number of science labs, the size of the library or how many great teachers there are? None of the factors is as significant as the effect parents can have on children. Here, we have tried to divide the role of parents in 2 headings:

- What should parents do?
- What parents should not do?

### What Should Parents Do?

#### *Ensure good Family Environment*

Children who get a favourable atmosphere at home for studies perform better than students who are brought up under an uncongenial family atmosphere. To study one needs to concentrate and to concentrate one needs peace of mind. Peace does not necessarily come from staying in a big house situated far away from noise pollution but it comes from the relationship and understanding among people staying in the house, particularly parents.

#### *Regular Monitoring*

To assess a child's progress in studies and to know its areas of strengths and weaknesses, parents need to monitor the child's work regularly. Monitoring does not in any way imply that you or the tutor complete the homework for the child.

### ***Appreciate and Encourage***

Encouragement not only adds to the child's capability to perform well but also boosts his confidence. Appreciation and encouragement for the work done is liked by most of us. But parents fail to do so when they find their children falling short of the required percentage of marks which is necessary to face the competition. Some parents even feel that too much encouragement will make the child complacent.

### ***Follow a Patient Approach***

We want to understand our child, its progress, its growth, its intelligence level, but how? One word that explains and helps you in understanding your child is patience, i.e., interact with the child regularly but with patience. Mostly we fail to exercise patience while dealing with the child.

### ***Encourage Reading***

Reading is necessary to make study interesting. It is a common feature that when it comes to story books, children generally get engrossed in them for hours but reading textbooks make them fidgety. What is the reason? Firstly, the textbooks are generally read under pressure from parents, teachers or fear of exams. Contrarily, the child reads comics or stories without any fear, worry or pressure. Rather it derives pleasure from such readings. Secondly, it is because for long they have been used to cramming, often without understanding the meaning. The value of understanding a lesson, finding relationships between concepts are not stressed. They are in a hurry to cram so that they are able to spurt it out at the exam since this gets them marks.

### ***Make time for leisure activities***

There is a famous adage that says, '*All work and no play make Jack a dull boy*'. It is important to remember this and ensure that every child has an equal proportion of work and entertainment (sports, arts, music etc.) as part of their schedule. Spending the entire day in front of the books can be detrimental to the mental and emotional health of a child. Therefore, to boost study-time concentration encourage children to continue with their leisure activities and help them maintain a healthy relation with their books.

## What parents should not do?

### ***Creating Wrong Impression***

Often, from the very beginning, a wrong impression about studies is created in the child's mind. The child is pressurized to prepare for tough competition for admission. He or she is nagged for taking studies seriously by being regular in attendance, completing homework, and getting good scores. There is nothing wrong if this message is conveyed in an intelligent way that does not create fear about studies in the child's mind but in most of the cases the approach goes wrong. "If you don't study, you'll fail and your whole life will be spoiled. What will you do? Who will give you a job?" When we talk about education, school or study, we become very serious and generally talk in an angry mood. Gradually, the fear about school and study is instilled in the young minds. While this fear might encourage few students to work harder, it discourages a majority of students who require patience, motivating and encouraging environment to do well in studies.

### ***Criticism by Parents***

It goes without saying that mostly parents adopt a negative approach towards their school-going children. They often criticise them and rarely appreciate them even when the children deserve appreciation. This not only results in discouragement but also develops disliking for studies and the school. "You don't pay attention to your study. You are always watching TV, remain out of the house and roam with your friends throughout the day." This kind of nagging and criticism gives an impression that you do not hold your child in good esteem. Slowly and slowly the child feels that parents always think against him and do not love him.

*The problem is we as parents fail to judge the level at which our child operates on. Most of the time we ignore a child's capacity to learn, we fail to appreciate his efforts and resort to frequent criticism.*

### ***Unhealthy Comparison***

Comparing your child with other children and telling it that so and so is better, is a sure way of sowing the seeds of disliking, disregard and rebellious feelings in a child's mind. The child gets sick of listening to your praise for other children. It causes displeasure and dissatisfaction, particularly if the child is criticized in the presence of a guest, relative or a friend. This affects the child's interest in study. Comparison never helps. On the contrary, it may make the child adamant or jealous. The child may tend to think too much about how to beat the competitor, forgetting about its own performance. Beyond a limit, it can even create mental problems.

### ***Lack of Appreciation***

A child is to be accepted as he or she is and not as what it ought to be. In this sense, when parents fail to appreciate and encourage the child, it results in a setback to the child's spirit to study.

### ***Failure to satisfy Curiosity***

It kills a child's interest in studies, if parents fail to answer its innumerable questions. A child is full of endless energy. He wants to know more and more. His thirst to know more increases as he grows. One should never throttle the child's curiosity nor discourage him to talk. It is sometimes really difficult for parents to attend to the child's questions particularly when they are tired after a whole day's work. One should have a sympathetic attitude to a child's inquisitiveness even in such situations.

### ***Other things which parents should take care of :***

- Be on the lookout for common signs of stress such as trouble sleeping, emotional mood changes, loss of appetite, skin ailments, and stomach upsets.
- Be patient, controlled and calm in the run-up to exams. Anxiety is catching.
- **Adopt a realistic attitude towards your children's abilities.** Don't expect too much, but be positive and emphasise academic success rather than failures.

- Make sure there is a place available at home where the student can work alone.
- Make it clear that your son or daughter is valued for reasons entirely unconnected with academic progress.
- Praise commitment as well as success and try to put the exams in perspective: they are not the be-all and end-all. Show interest in their achievements outside school work.
- Avoid offering rewards such as money, clothes or cars. Young people may feel they are being manipulated, and it might stop them developing an interest in the subject for its own sake.



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**“Talent hits a target no one  
else can hit,  
Genius hits a target no one  
else can see.”**



## FREQUENTLY ASKED QUESTIONS

### Is IQ an important factor in success?

IQ or intelligence is a factor, though a minor one. In my opinion IQ acts as a threshold. You just need to have a basic minimum level of IQ to succeed. Interestingly, in a survey it was found out that the average level of IQ of IIT students was 110, compared to the average level of IQ of the general population which was 100+. So, there was very little difference between the IQ level of brightest students (IIT Students) and the general public. This implies that the basic determinant of success therefore is not IQ, but other factors.

In the last 3 years after interacting with a lot of students I realized that the vast majority of students who set off on a course of study are quite capable of successfully completing it. **Practical life circumstances, false beliefs and negative attitudes coupled with poor study techniques may cause the problems and not the lack of ability or IQ.**

### How do some students do well even without studying hard?

I have seen a lot of students who have worked very hard but inefficiently and who's performance in examination has been a surprise and disappointment both to themselves and their teachers, families and friends. At the same time, I have also met students who are able to achieve some time satisfactorily and sometimes excellent results without hard work. The basic differentiating factor is the study techniques. **Hard work should bring achievement but only when coupled with efficient and appropriate study techniques.** And that is what this book is all about.

### 4 Different States of Mind

There are four basic states of mind and each has a different brain wave pattern. An understanding of different brain wave patterns can help us in managing studies more effectively.

**Beta waves** are indicative of the state of mind we normally associate with being awake and functioning in our lives-communicating with others; walking or driving or otherwise moving about with purpose, analyzing, planning, and performing daily tasks.

This is the state in which we spend most of our lives. In this state we “get through” the day and accumulate achievements and a lot of stress. Our attention is constantly changing from one matter to another and back again. Our energy and focus is very fragmented as we try to deal with the thousands of things competing for our attention.

This state is vital if we are to function in our complex world, but it is not a good state to be in when trying to concentrate on our studies. Yet it is the state of mind that most people are in when they sit down to do school work - and they do not try to change that state.

**Theta waves** are most evident when we are just about to drop off to sleep. They are also common in certain kinds of deep meditation.

**Delta waves** are the “slowest” of the brain waves. These waves are what a scanner would pick up when you are in a very deep sleep. And believe it or not, what happens during your sleeping state has important implications for how you plan your studying and how much you should study at one time

Finally, **Alpha waves** show up when you are fully awake, but in a very relaxed state - almost what could be called “alert meditation.” There is very little stress in this state. The links between the various parts of your brain are clearest in this state, and your higher brain has its greatest access to other areas.

In this state of mind, you will experience the fastest understanding of information and the kind of inspiration that comes with letting your imagination help you connect things that never got connected before (realizing for the first time how similar the patterns of mathematics, music, and chess are, for example). There is also, in this state, the greatest likelihood that the information will find its way into long-term memory. Obviously, the state of mind that has a lot of alpha waves is where you want to be for optimum study performance.

When it comes to studying, it is important to get your brain on the right “wave length.” Trying to study when you are in the everyday state of mind (typical of that dominated by beta waves) is very

inefficient. You are fighting with many more enemies than just your textbooks.

## The Two-Sided Brain

The left side has responsibility for –

- logical reasoning and analysis
- things that occur in sequences
- numbers and mathematical ability
- language and verbal skills
- linear thinking

The right side has responsibility for –

- creativity
- intuition
- imagination and daydreaming
- random, unordered thinking, or in other words thinking out of box, crossing the traditional boundaries and thinking something new

**Note :** Engineers and lawyers are “left-brained” people, while artists and poets are “right-brained.”

But most of us have our left side brain to be dominant and this is due to too much emphasis of our education system on concrete empirical values and proofs which makes the left side dominant. This is the reason why most of us are poor in creativity.

## How to Relax?

One of the most common problems during studies is severe anxiety or nervousness. The result of the exam can totally change your future and so the very process of preparing for them can be a stressful experience. Delay in preparation schedule, inability to solve problems or even a few hours of waste of time can lead to anxiety and create stress which can adversely affect your studies, so it is very important to learn how to manage stress or anxiety.

## Even famous people do it

I still remember a video clipping of a famous singer that I saw on TV years ago. The camera had been following him around while he went to rehearsal, got made-up and talked with his manager.

The scene I remember most was the shot of him as he waited backstage for his name to be announced. Now, remember, this was a man who had been doing stage shows for decades. You could hear the audience- it was exciting to be in his presence. It was friendly. And he looked nervous, horrified, petrified, regretful that he'd ever entered show business and extremely vulnerable. (Presuming he remembered he was being filmed, this was the *controlled* panic.)

But when the announcer called his name and the roar of applause began, he was transformed. He walked with a determined gait to the stage, the lights hit him, he smiled and took the microphone, the band began and he never looked back. His famous voice filled the auditorium, and the audience went wild. If he could face such regular panic attacks and still pass the test, why shouldn't you?

Remember that a certain level of anxiety is also good and must for you to have a faster learning. Remember a certain level of anxiety can enable you to be more alert, attentive and to concentrate more fully. It can sharpen your exam performance; make you feel more full of energy; cause you to work at the most effective speed and be more attentive to detail. **So achieving optimum arousal (anxiety) is the key to success. But the moment the anxiety level becomes higher and it starts disabling it is the time to take immediate corrective measures.**

It is a natural human reaction to worry at times during your studies. It is also natural to express an emotional reaction to the ups and downs of tackling tasks: angry or frustrated at one time, exhilarated at another. The ideas in this book are intended to help you avoid becoming locked into a state of anxiety, where your interaction with exams, tests and course deadlines (the potential 'stressors') results in an unhelpful stress reaction in you. This is the type of anxiety state which feels disabling.

Before we learn how to handle stress and anxiety, let us understand what are the signs and symptoms of stress?

- Your heart beats at an accelerated rate
- Your breathing rate increases
- Your body sweats
- Your mind becomes agitated and you feel restless

- Your stomach feels queasy. In other words, you feel butterflies in your stomach

You can control these problems by training your mind and body to relax on command. In relaxation you are really training to control the functions of your mind.

**Relaxation Techniques:** You can relax while sitting on a chair, lying on a bed or stretched out on a comfortable spot. To relax, focus on your breathing first, close your eyes and listen to the sound as air flows in and out. As you breathe your belly should be moving in and out. Next start counting one to ten, on your inhalations and saying to yourself “relax” in your mind. Continue this process until you feel quiet and your mind is focused and undisturbed by fleeting thoughts. The idea behind counting is to shut your mind from other thoughts and not to be disturbed.

**Palming:** Close your eyes and keep your open palm pressed against your eyes. Hold this position for 5-10 minutes every day. You will feel the heat being transferred to your eyes . Do this exercise regularly every day or pressing a folded cloth to your mouth, blow air into the cloth so that it becomes warm. Press the cloth against your eyes.

Whenever you are tense or anxious, close your eyes and take a deep breath. Slowly breath out. Do this about ten times and watch the difference. This should calm your nerves and reduce your anxiety.

### Other Methods for Reducing Anxiety

- **Self-Assertion** - Do a realistic review of the situation, and decide on a course of action and carry it out; assert yourself, take charge of your life.
- **Sleep habits** - In order to get more time to study several students sacrifice their normal sleep. Occasional loss of sleep may not affect your thinking but loss of sleep over a longer period can create stress. Do not carry your problems and anxieties to bed. They will leave you mentally sluggish the next morning. Cultivate methods that enable you to get enough good sleep.
- **Relaxation** - Practice physical and mental relaxation exercises

- **Quiet time** - Cultivate and then use a “quiet time” to review your situation, to compose yourself, and to prepare for a project or situation for the day.
- **Friends** - Talk to one or two friends a day, for support and encouragement, to renew your self-confidence and morale.
- **Consultation** - Help yourself by seeking consultation with peers, instructors, or professional counsellors.

**Practice to relax every day:** The more you practice, the better you will be able to relax. Practice to relax for five minutes at the beginning. Plan to have at least 3 relaxation periods each day each for five minutes. On very busy days, do not be tempted to do away with the practice totally. It is more important to relax on these busy days.

*Remember, anxiety affects people of all abilities. Among the students I have met who are most anxious about their examinations are large numbers who have gained very good marks.*

### The Right Time to Study

No definite part of the day can be said to be the ideal time for studying. Some may be mentally alert in the mornings, while others may prefer evenings or night . Research, however, shows that mental output is higher in the morning than in the evening or at night. Your mind will be fresh after a good eight hour sleep . So the morning hours are the most valuable and best time for serious work. Do not fritter away your morning hours. Organize your work like ironing and laying out your clothes for the next day, the night before. Keep together your books, files and papers required for work, in order, the previous night, This way you start your day with a flying start and will not end up wasting your morning time.

In addition to your regular scheduled sessions, it is good to make use of odd moments for other purposes. Every subject includes a certain amount of rote learning like formulas, vocabulary, laws etc. Write down these on small cards or on a small note-pad.

They can be learnt while waiting for others, for a bus or in the canteen. It is useful to carry a textbook to glance at while traveling in a bus or waiting for someone. These are useful supplements and help to keep your brain ‘set’ for information relating to your subject.

## Where to study

You may think that the physical condition of work such as the room furniture, lighting and ventilation are relatively unimportant. They do help you to concentrate better and work effectively. Research shows that students who habitually work in libraries do better than those who do not. The sight of others working simultaneously gives encouragement to work harder. Your behavior is disciplined and distraction from other sources are minimal. Keep following things in mind while planning where to study

- Does your study area receive adequate light? Incorrect placement of the light source, excessive and insufficient light can cause eye strain.
- Does your study area receive adequate ventilation? Lack of circulating air can make you sleepy. In a room where there is inadequate circulation, the concentration of carbon dioxide increases. As a result, the brain does not receive a sufficient supply of oxygen and one tends to feel sleepy. Inadequate oxygen also causes poor concentration.
- Does your study area offer space and comfort? You need a clear desk for writing and a comfortable chair for reading. Don't get too comfortable. While studying, sit in an upright position. Do not slouch over your books while reading or writing. It would be ideal to have a small shelf within arm's reach, from your study table.
- Is there a lot of clutter on your study table? Keep your workspace neat. In addition, keep relevant stationery, such as paper and pen, at hand so that you don't have to get up every five minutes to look for something. Ensure that you have sufficient space while writing.
- Are there too many distractions? Loud music, the blaring TV and people talking loudly can distract you. Control the noise level around your study area. Do friends distract you easily? Learn to say 'no' to your friends. However, if you cannot say 'no' easily, you can try hiding from them. Remember, hiding is not a permanent solution and is not recommended as a normal practice. Don't answer phone calls while studying, most calls can wait.

## Importance of Note-Making

Where do you record and flesh out new ideas? NOTES!

Note making is an underrated skill. Note making isn't just important for college students; it's a valuable life skill. There's a science of note-making that can seriously help or hinder you as you look to capture your learning and cement it. If you are able to take good notes, you will be more effective in pursuing your goals. There's a correlation between making notes and creative thinking.

The history of Note-Making goes as far as 1979. Tony Buzan was the person who invented the concept of Mind Mapping. With using images and patterns he developed the main idea up to a successful invention. So now it has become most popular among most of the academic students. Though there are a lot of styles of note taking, here are a few important ones.

### The Cornell system

The Cornell system is a system for taking, organizing and reviewing notes devised by Prof. Walter Pauk of Cornell University in the 1950s.

Cornell Notes is a system of making and using notes that promotes active learning. Before the lecture or reading, set up your notebook pages with a vertical line dividing the pages roughly  $\frac{1}{4}$  left and  $\frac{3}{4}$  right. Also, leave a little space at the bottom. The idea is to divide the page into three sections.

**The Note-taking column:** The wider right side is used to make notes, draw graphs and record the important information from the lecture or reading.

**The Cue-column:** The left column or the cue column is used to write keywords that relate to the information recorded on the note-taking or the right column. You can revisit the notes and add in certain 'cues'- the keywords that will help you remember the major points. This makes the whole reviewing and exam preparation process easier.

**The summary Section:** When reviewing the notes, a brief summary of every page should be written into the section at the bottom.

Your first practice session after making the notes should be as soon as possible. If you wait too long, you will find that you can't remember much of the information in the right column. If you remember the information accurately, then give a checkmark under the question or keyword on the left. Otherwise, give an "X."

## Flash cards

Flash cards are a superb way to help to memorize important points from your reading. They are a way of testing yourself. You can write pretty much any information you need to remember. The reason they work so well is because you end up repeatedly quizzing yourself.

You can also make your own flash cards by using a plain piece of small paper. Keep quizzing yourself unless you are confidently able to correctly answer all the questions in random order. Remember that repetition is the mother of skill.

## Leitner system

It is a popular method of learning using flashcards. Formulated by the German science journalist Sebastian Leitner in the 1970s, it involves placing flash cards with correctly answered questions into later boxes and incorrectly answered flashcards into earlier boxes.

Take three boxes: The first box contains note cards that you consult once a day; you consult the second box once a week; and you consult the third box once a month. When you are familiar with a card, you move it to the next box. When unfamiliar, you bring the flashcard to a more frequently consulted box. The Leitner System prioritises notes that you have difficulty recalling, and deprioritises notes that you know well.

## Advantage of Notes

1. Notes aid your memory. When you read over notes a day after making them, then a week later, and then a month later, you are far more likely to remember the concepts that you initially encountered. It aids in improving the retention.
2. Making notes allows reducing the information into manageable size. When you're studying for exams a lot of material has to be covered. The key points should be extracted from lecture notes and textbooks.

3. Notes boast your understanding. You need to ‘do’ something with the information you receive and by making notes you construct a mental representation of the ideas you’re grappling with.

Notes increase concentration power. Making notes while attending the class or while self-studying helps you concentrate better.

4. Notes help in revising the contents faster. Research says that with help of personalised notes you can revise a topic three times faster than revising directly from the book.

### **Key Concepts / Key Words : Nature of Memory Recall**

Get ready for a small exercise.

Describe any book you have read, or any place you have visited, or any film or TV program you have watched. Close your eyes and do it for about 2 minutes.

People do not tell word-for-word for what happened. What they remember is main features, outlines, main incidents of film. These are key words of key concepts.

You remember things as key words and key concepts rather than word-for-word details and word-for-word descriptions. This is the very nature of your memory.

Use the following guidelines while drawing or writing a mind map.

- Use a keyword or key phrase at the centre.
- Then draw lines from the centre
- On each line, write key words in CAPITAL letters. Use of capital letters helps in revision and memory.
- Use only one word per line. This makes it easy to make connections.
- Let ideas flow. Do not try to “think” hard. Just write down whatever comes to your mind. The aim is to write everything that your mind thinks about the central idea. Since your mind thinks faster than you can write, you should not pause or stop momentarily. Just keep writing or drawing.

Mind maps use only key words and key concepts while linear notes use complete sentences and paragraphs. The key words and key concepts use only 20% of the words. So, if you use linear notes, you waste time in writing those 80% additional words, and more importantly, you waste time in reading those 80% additional words every time you revise. In linear notes, you waste time searching for the key words because they are mixed up with non-key words.

The mind map has the following additional advantages :

- Mind map clearly shows the central idea of the lesson.
- The relative importance of any idea is clearly shown: the ideas nearer to the centre are more important.
- The links or connections between key ideas are clearly shown.
- The nature of the structure makes it easy to add new information without scratching or writing in small letters.
- Each mind map looks different from others- it helps memory.

When you use mind map notes, you do not have to worry about the problems usually associated with linear notes such as: order, sequence, emphasis of ideas, beginning, ending, organization etc. These problems are simply eliminated in the mind map technique.

**Exercise :** Spend 15 minutes and prepare your own mind map notes for this book.

### How much to sleep

Sleep is essential. During sleep, your body recuperates (repairs itself). You also dream while sleeping. Many scientists say that it is during dreams that the whole day's memory is recognized in the brain.

The time a person requires to sleep varies. Some people require more than 8 to 10 hours of sleep while others may need just 5 or 6 hours. Sleeping between 4 to 10 hours is normal. Most people sleep between 6 to 8 hours a day.

While too little sleep may make you feel restless, too much sleep can make you feel lazy. If you sleep well, you will feel energized on waking up and ready for a new day.

You can do the following to get good sleep:

- Keep your room quiet and dark. If you do not have a separate room, you may not be able to do this. At least, you can request the other members of your family to try to be quiet.
- Eat less of sugar, salt, fats (oils and ghee), difficult-to-digest foods, especially at night.
- Take time to slow down. If you are doing something very active and suddenly you go to bed, you may not get sleep. So spend the last hour or so doing relatively non stressful activities.
- Try to go to bed at the same time every night.

***How do you know that the amount of sleep that you got is sufficient?***

If after eight hour of sleep, you still feel drowsy, this means that you need more sleep. Once you have understood the exact amount of sleep that you need, ensure that you get it – at any cost. The cost of lack of sleep, outweighs any possible benefits (such as more time to study etc). If your answer to any one of the following is a yes, you may be suffering from lack of complete sleep.

1. Feel drowsy during the day.
2. When you are bored, you got to sleep
3. Feel tired most of the time
4. Cannot concentrate most of the time
5. Feel anxious most of the time
6. Don't feel alert
7. Low energy levels during the day.

Remember we had discussed before that sleep is a necessary ingredient for almost all mental faculties including:

1. Memory
2. Creativity
3. Problem solving skills
4. Retention

### Sleep during day time

Sleeping for a little while (half an hour to over one hour) during day time is of great value. An afternoon nap means two fresh mornings in 24 hours. After you have studied for 5-6 hours, the brain is swimming with facts, a nap of 30-45 minutes is required to

recharge the brain. For example, you can sleep when you come back from school. This will make you fresh again. So, you can study more efficiently in the evening and night.

Try it for sometime and if you like it, continue.

### You Master a New Skill in Steps & Jumps

As you learn some new skill like riding a bicycle or a car or writing good essays, you master it in steps and jumps. There is no improvement for some time (a few days in case of learning to ride a bicycle). Then suddenly, there is a large jump in learning. It shows that a certain amount of work or effort on your part must be done before a jump in learning can happen. Again for sometime, there is no learning, no improvement. Then after sometime, again, there is a sudden jump in learning.

This shows that you do not accomplish similar amounts of learning everyday even though you spend the same amount of time every day. So even if your learning progress is slow, keep studying day after day without getting discouraged. Finally, you will see a jump in your learning.

### Importance of Group Study

Once upon a time, there lived a farmer who grew high quality award winning corn. Each year he would enter in the state farmer's fair and won a gold award, for his exceptionally good corn. The farmer's high quality corn was praised all around in the state. The success story of his exceptional corn reached the ears of a journalist, and he wanted to interview the farmer. While he was learning about the agriculture proofs of the farmer, he discovered that the farmer shared his best quality seeds with his neighbours.

"How can you afford to share your best corn seeds with your neighbours, when some of them compete with you in the agriculture fair?" asked the curious reporter.

"Why wouldn't I sir?" asked the farmer.



"Didn't you know that the wind picks up pollen from the ripening corn and swirls from field to field? If my neighbours grow inferior quality corn, cross pollination would eventually degrade the quality of my corn too. If I am to grow high quality corn, I must help my neighbours grow good corn too."

The farmer's answer made the reporter realize how aware the old farmer was about connections in life.

Similarly, learning in a group can be much faster and effective. The environment and the companion you choose leave an effect on you and it can help you grow if chosen wisely. So **try to form a group of your classmates who have the same goals as you and are determined to achieve it.** Choose companions who are willing to help one another in studies. Share your knowledge and tricks with them and benefit yourselves from the learning of your classmates.

The power of a good group is immense because the goodness of each student usually reciprocates. When two good people become a part of a group they are not counted as 2 rather  $1+1$  sums up as 11. If you are in the shade of good companions, it will send you a lot of positive energy and good vibes. There will be much excitement and efficiency when you discuss a subject or topic.

### **Group Study Techniques**

Some of the study techniques you can adopt in group learning are by using revision cards with a partner. Draw a diagram, make up a spider or patterned note card(s) or construct some linear key word notes. Revise the card(s) for 15 or 20 minutes (at most). Re-check that you understand and can recall all of the card(s) contents.

Teach your partner about the topic, allowing – and encouraging – questions about the topic. When a point is unclear, stop and explain it. Work through the topic until you have both completed it to your satisfaction or have agreed to meet again to continue.

### **Sharing topics with a partner**

You can use one of your friends to revise with, by dividing up topics, revising them individually, and then meeting to discuss them. What happened in the discussion was that fresh questions and issues arose which led to both further revision and further enquiry. It worked for both of them.

### Using your partner to fire questions

Work for a set period in your work room, e.g. 1/2 to 1 hour. Then ask your cooperative partner to fire questions at you about the topic. It will obviously help if the partner had some knowledge about the topic or a clear indication of what to ask. However, what you are seeking from this exercise is to keep flexible and alert to surprise questions and fresh angles are a bonus from this method.

### Group learning can accelerate your learning because -

- Groups not only make many more suggestions than individuals, but also are quicker to reject incorrect suggestions.
- They reject the incorrect ideas, which escape the notice of individuals, working alone.
- Since by nature people are quicker to see flaws in others, group study proves more useful than individual study. It gives you a fresh point of view. Remember explaining a point to someone else makes it clearer to you and at times also gives you a fresh point of view.

### The disadvantages of group discussion and working in a group:

- Discussions very easily degenerate into trivial talk and gossip. This is more likely to happen when the participants are close friends.

### Caution:

- For students involved in group learning there is a word of caution also. In a group, sometimes one of the students solves a problem and the others think that they also know it without solving it. Such practice can be harmful for a serious aspirant.
- Group study does not rule out the need of individual study.
- In fact, group study is most successful when individuals come fully prepared for group discussions.

### By choosing 1 or 2 persons:

1. Form a group
2. Selected members should be as serious as you are about success in JEE/NEET

3. Subject in charge: Distribute work chapter-wise (or topic-wise) to remember in the group whilst allocating work for yourself
4. After you have done your individual revision, fix a day and time to revise certain chapters of the subject you are to revise in your group
5. An appointed person explains the topic
6. Any other person in the group repeats what was explained. You will discover points one tends to forget. You will benefit by the way others answer a question
7. Repeat all the points together as a group
8. Jot down the summaries of the answer separately on a small sheet of paper
9. Back home write out full answers according to a summary guideline made in the group discussions
10. The member who explains a particular topic:
  - prepare the summaries
  - Xerox these summaries making copies for others

### **How to benefit from your classmates' hard work**

I have seen classmates competing against one another. Obviously, if you view your classmates as your competitors, you will not help them and they will not help you. For example, you will not tell them about this book. The net result is that you do not benefit from the intelligence, innovativeness, or smartness of your classmates.

So, I suggest that you should talk to a few students whom you like most and who share the same goal and objectives as you do. You can decide to go for a walk together during lunch time. You can all discuss issues such as which is the best book, which is the best coaching, who is a good teacher. You can also discuss some specific subject related questions. You can all experiment and share the results and the knowledge. If you can all cooperate, the chances of success in competitions will increase for all of you. Thus all of you will be benefited.

### **I don't know where my time goes**

I have problems like a sudden desire to sharpen every pencil in the house, an unheard of urge to clean your room, an offer to do your sister's homework. Anything in other words, to avoid your own work. If you find yourself doing anything but your work, either take

a break then and there or pull yourself together and get down to work. Self –discipline, too, is a learned habit that gets easier with practice. Remember, what you are seeking to achieve is not just time – but quality time.

The next step to overhaul your current routine is to identify that routine, in detail. My suggestion is to chart in 15 minute increments, how you spend every minute of every day right now. While a day or a two might be sufficient for some of you, I recommended you chart your activities for an entire week, including the weekend. This is especially important if like many people, you have huge pockets of time that seemingly disappear, but, in reality, are devoted to things like “resting” after you wake up, putting on makeup or shaving, reading the paper, waiting for transportation or driving to and from school or work, etc. Could you use an extra hour or two a day either for studying or for fun ? Make better use of such “dead” time and you may well find all the time you need.

### **How do you feel on the day of the exam? Why do you think you feel this way?**

When you are faced with a difficult situation, it is only natural that you feel stressed. In fact, some amount of stress might even be beneficial - it spurs you to perform better. For example, runners, athletes, and yes, soldiers too use stress to perform beyond their natural physical and mental limits.

However, problems arise when stress becomes unmanageable. Unfortunately, that usually happens on the day of the exam! Your mind might cease to think clearly and goes blank. Ultimately, you end up making careless mistakes, or forgetting information.

Here are a few things you can do to keep stress in control on the day of the exam.

- Do not think about the exam results, on the exam itself. Try to think pleasant thoughts about things you like such as your pet, chocolates, sweets, sports, or pleasant environments.
- As far as possible, try not to discuss the exam with others. This helps to keep exam anxiety under control.
- Ensure you breathe properly and take long deep breaths. This helps your oxygen intake and relieves stress. During such exercises, clear all thoughts out of your mind and concentrate on your breathing.

- If you like to pray, you might like to close your eyes and say a short prayer. This might give you extra self-confidence and peace of mind.

### How to be a winner and a champion?

Everyone loves to be a champion. But not everyone knows how to be one. In every endeavor we all say we'll be **THE NUMBER 1**. But when asked how, we start looking here and there.

Most achievers will answer, "Luck has very little to do with it." Being Number 1 takes much more than luck. It takes inspiration, persistence, and faith. Luck is a "nice-to-have."

According to Tom Hopkins the 4 P's to be a champion are :

1. **Pre-plan:** Set goals. Devise strategies. Set your course of action, with specific tasks and corresponding deadlines. The only way you can reach what for you is the Number 1 position is to have a clear picture of that top slot and whatever path leads to it.

Your plans must be realistic, though - achievable. Put your goals in writing to add commitment. Some planning takes a little time. It's all right. A good plan is the first step up the ladder to Number 1.

2. **Practice:** Now, with a good scheme in hand, your next step is to work on it. How? Practice, practice and practice. No one becomes a champion swimmer overnight. Not even ten overnights! It takes months of serious training, dedicated practice.

And what did Tom Hopkins say? "Practice doesn't make perfect. Perfect practice makes perfect." In other words, there's no sense practicing something that doesn't work or that doesn't lead you to success.

3. **Perfect:** This is something that goes beyond practice. This P is shooting for perfection. Some call it fine-tuning. After you've practiced long and hard to learn, understand, and rationalize the techniques and skill. After you've done it a hundred, a thousand times after you've acquired "muscle memory" and you can actually do it with your eyes closed. It's the time to cross the line to perfection. Do not stop practicing until the motion becomes flawless. Until you can do it flawlessly, every time.

Imagine the magicians who get away with card tricks using sleight-of-hand. They start learning a trick in slow motion, and practice until they can perform it faster and smoother. And when they can do it flawlessly with their eyes closed, every time, they move on to perfecting the move until they become confident enough to...

4. **Perform:** This is the test. The moment that will tell you that you have succeeded. Everything you planned, practiced, and perfected, will find fulfillment during the performance. Show your mastery - your skill. Let other people marvel at your speciality. Make them appreciate your effort and excellence in the task you have chosen.

### **What are the critical success factors for cracking entrance examinations?**

The entrance examinations are not just about grueling work and burning midnight oil. One needs to prepare in a structured manner. Consistency in preparation is the key to success. It is better to study an average of 2 hours daily rather than put in bursts of work followed by weeks of layoff. The trick is to be able to balance this along with the other activities like school studies etc.

The exam is not about working hard but working smart. Most entrance examinations are objective in nature. This means that the bottom line is getting the correct answer, not how you get the answer. You could work systematically and arrive at the correct answer in a minute. However, you should also work smartly by elimination and substitution of answer choices and arrive at answer within a matter of a few seconds.

There is always something common about the people who finally make it to the hallowed corridors of the IIT/AIIMS. Not the least, is the belief in oneself. Half the battle is won if one believes in one's success. This strong self-belief followed by sustained motivation over a period of 8-10 months and coupled with a structured preparatory schedule is the key to success.

- Well laid plan
- Absolute clarity of fundamentals
- Make subject-wise action plan
- Focus on quality then on quantity

- Cultivate self discipline and consistency
- Level up your speed and strike rate
- Work hard and make frequent revisions
- Evaluate yourself through a series of test
- Be optimistic and get free from any tension and above all
- The attitude to succeed at any cost.

### **Amazing power of superconscious mind**

The beauty of your superconscious mind lies in the application toward your goals.

You have it. I have it. Everyone you know has it. What is it? It's this infinite, universal, subconscious and powerful gift we're blessed with.

Most experts call it the "super-subconscious mind," (higher level of thinking) although whatever you choose to call it, it is as available to you at this very instant as it has been to anyone, anywhere!

The origin of all creativity comes from the superconscious mind. The superconscious mind was used by all of the great inventors, writers, artists, business people, scientists and composers on a regular basis.

Michaelangelo was known to have said that he would see his completed sculpture in the block of marble before he began chiseling away at it. He simply needed to chip around his vision.

The beauty of your superconscious mind lies in the application toward your goals. When you are striving and working toward a goal of your own choosing, your superconscious mind will provide you the continuous flow of ideas and positive energy to help you move closer to your goal. KEY POINT: Your superconscious mind functions best when you have a confident and calm mindset. Your subconscious mind automatically and continually solves every problem on the way to your goal as long as your goal is clear, concise and you believe in it fully.

**NOTE:** *When you get a hunch or an inspiration about the direction of your goal you must act on it immediately. This is when your superconscious mind is speaking to you, based on the time-dated material you entered at an earlier time. You see, when you adopt an attitude of calmness and confidence about your goals everything that happens to you can only bring you closer to your goal, your dream!*

*The truth is, “You become what you think about.” Emerson wrote, “A person becomes what he thinks about most of the time.” KEY POINT: Successful people think and talk about what they want. Unsuccessful people talk about what they don’t want. The superconscious mind is so powerful that it is working all the time and you will get what you think about most of the time!!*

*“Whether you think you can do something or think you can’t, you’re right!”*

### **When does one start preparation?**

The earlier one starts the preparation the better are his chances. The ideal time to start is within one month of completing one's board examination. However, even one year of concentrated effort can help students achieve success – however, student's commitment needs to be high in this case.

If you are attending school as well as preparing for Competitive Exam, and if you have 2 years with you, then you must devote 2 to 3 hours every working day for studies and 10 to 12 hours on school holidays and weekends. Whereas if you start preparing in Class XII you should spend 3 to 5 hours everyday preparing for Competitive Exams.

### **Is coaching necessary ?**

For success in Competitive Exams, 80% of the contribution is from the student's effort, 10% is from the strategy of how to derive maximum out of the knowledge the student has and 10% is from guidance. Here the important thing to note is that however strategy & guidance contribute only 20% but are very important because it is this 20% which decides & defines how the balance 80% of time & energy is going to be spent. In case proper guidance is available to a student at home or at school, there will be no need for coaching; however, in absence of that coaching is advisable.

### **My future will be ruined if I fail/don't get good marks**

Examinations are an important way in which professional colleges select students. Success in them does open doors to particular jobs and careers. Lack of success will mean certain jobs and careers are not immediately open to you, at least at the level of entry you originally intended. Some may be closed altogether. However, happiness, wealth, peace of mind, rich experience of life, meaningful

status in the eyes of others, a worthwhile career, a useful job and an inner sense of purpose and self belief as a human being, do not depend upon examination results.

## Myths Surrounding Competitive Exam Preparation!

### 1. Study Hours: success is directly proportional to the number of hours a student slog

Hard work has no significance if you lack proper planning. It is a myth that you should study for 14 to 18 hours a day to score good marks. The duration of study doesn't matter if you do not study efficiently. Few students can slog for 14-18 hours a day but if they do not have an effective plan, the timing wouldn't matter. It is vital to understand how much you have studied rather than how long you have studied. No doubt, you've to put in some hours regularly to increase production, but after an extent of increasing those hours, productivity gets so low that you end up with much less than you expect. When the mind hits the saturation point, it stops being in the best condition.

### 2. Framing of Exam Questions: They can ask you question on anything

Often you've a prescribed syllabus and even competitive exams abide by it. The only thing that changes is their way of presentation. It is obvious that competitive exams won't ask the routine questions. So it's better to accept than to expect. The concept remains unaltered; it's just a little tricky that changes the entire equation of solving the paper. Every year, the same questions are prepared in ways that the questions appear new. Read quality and start thinking from the examiner point of view and stop panicking when an exam is confined to a prescribed syllabus.

### 3. Subject Importance: I have mastered the concepts well, I can be sure of a good rank

In the end, what matters most is the performance on the final day. No matter how much mastery you've done in a subject, pay equal importance to other subjects and think and plan your exam strategy accordingly. Don't be overconfident. Condition yourself to perform well in the most adverse conditions. You

might be intelligent and hard-working, but you still need to prove it on the final day with your smartness and critical thinking.

#### 4. Solving more Question Banks or practice papers means better command on the subject

Had that been the case, repeaters would have constituted at least 80% of the top rankers. But that is not the case. Basic concepts, close observation and some level of application is all that is needed. Whatever number of questions you solve, solve them yourself without cheating. You could just not master the concept but also develop a great analytical skill, an indispensable aspect for solving the tricky questions in the exam.

#### 5. I am a school/Class Topper and have got 98% marks in Board hence my selection is sureshot.

Don't get overconfident by just being a school topper. Image there are 20 L Schools in India so you are just one of them. Competitive exams are altogether a different game so never overestimate yourself and underestimate your competitors.



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**“Tell Me and I Forget,  
Teach Me and I Remember,  
Involve Me and I Learn.”**

- Benjamin Franklin



## VALUE FOR SUCCESS

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### Attitude

The foundation of success, regardless of your chosen field, is attitude. If attitude is such a critical factor for success, shouldn't we all, analyze our attitude towards our preparation and studies and ask how our attitude will affect our dreams and then goals. Let us understand the importance of attitude with help of a story.

"There was a man who used to sell balloons. He had all colours of balloons, including red, yellow, blue, and green. Whenever business was down, he would release some helium-filled balloon into air to attract children and when the children saw it in the air they would get attracted and buy them. One day, he felt as if someone was pulling his jacket. He turned around and saw a little girl who asked, "If you release a red balloon, would that also fly?" Moved by the girl's concern, the man replied with a smile, "It's not the colour of the balloon, it is what is inside that makes it go up."

The same thing applies to our lives. It is what is inside that counts. Remember the difference between a topper and an average student is not much in terms of knowledge but more in terms of mental preparation, in terms of attitude, in terms of killing instinct. Remember a burning desire is the starting point of all accomplishments.

### How to Build Positive Attitude ?

Think only positive thoughts, speak only positive words. Every time you start to think or say something negative, stop. Change your sentences into the positive. Pessimists complain about their problems; optimists think of solutions. Advise, rather than criticize. Encourage, inspire, motivate- yourself and others.

Talk health, happiness and prosperity to every person you meet. Look at the sunny side of everything. Think only of the best, work only for the best, and expect only the best. Forget the mistakes of the past and focus on the greater achievements of the future. Give everyone a smile. In other words, to develop a positive attitude, feed your mind with positive thoughts. Read or listen to something positive at the beginning of the day. After sleep you are relaxed and your mind is not preoccupied so if we give a fresh mind a positive direction in the beginning of the day, it sets the tone for the entire day.

These are just a few of the many ways you can jump start an overall feeling of happiness and contentment. Remember that your emotions are dictated by your perception of the world around you. And your reactions are a product of choice - you can “choose” to be happy, angry or sad. As Ecrivain Lesage said “I am happy and content because I think I am.” And always remember “It is nothing but your attitude which defines your altitude “

### Goals and Dreams

After attitude the second important factor is to define our goals. Do you dream to get among top 100 students in JEE Advanced or you dream to get selected in any Engineering college with any rank. Remember our dreams will set us into action. As somebody has rightly said

***“if you can perceive it, your mind can believe it, only then  
you can achieve it “***

To realize our dreams, the dreams should be realistic; keeping in mind one’s interest and strengths and limitations too. Before we go further I would like to highlight that most of the students confuse between dreams and goals.

Dreams are just desires or wishes. Desires are weak because they do not have direction or deadlines and that is what differentiates a dream from a goal. Goals are dreams with a deadline and an action plan. So what is important is not big dreams but well defined goals to realize the dreams. We have to set up goals and have some action plan to achieve what we dream and work accordingly. To achieve our goals some of the things we have to constantly remember are.

## Focus on the Goals

“An ancient Indian sage was teaching his students the art of archery. He put a wooden bird as the target and asked them to aim at the eye of the bird. The first student was asked to describe what he saw. He said, “I see the trees, the branches, the leaves, the sky, the bird and its eye”. The sage asked this student to wait. Then he asked the second student the same question and he replied, “I only see the eye of the bird.” The sage said, “Very good, then shot,” The arrow went straight and hit the eye of the bird.”

**Learning :** *Unless we focus on our goals we can not achieve them.*

## Patience, Perseverance and Time

It takes strength of will to make a dream come true; and it takes persistence to overcome the challenges and obstacles that are sure to block your way.

Disappointments, accidents, illnesses, lay-offs, break-ups, catastrophes, and deaths are natural occurrences in human existence. How we deal with them decides whether we will win or lose the battle.

We can look at them as misfortunes, bad luck, punishments, or pain that other people inflict on us - and be desolate, dwelling on the unhappiness that they bring. Or we can look at them as minor setbacks that simply slow us down from pursuing our goals and our dreams. But what if we choose to consider these misfortunes as opportunities, instead? We can do that, right?

It's just a matter of perspective. If we can look at a lay-off as a chance to find a more fulfilling job, or a break-up as having the time to finish college, or maybe inability to solve a question as the opportunity to learn new ways of solving questions then the misfortune will not be as disconcerting.

I believe that **a man is not measured by how tall he stands but by how many times he stood up when life made him buckle to the ground.** Life will make us break our pace and stumble some time or another. We can stay crumpled in the middle of the



road, grieving, or we can use the pause to contemplate on the path, calibrate our compass, and build strength to avoid stumbling again. It's our choice.

## Never Give Up

It was a couple of months after I first started out being a full-time freelance writer when I found the courage to query a print magazine - the first time I submitted an unsolicited manuscript. I studied the magazine's guidelines carefully and I was certain they were going to accept my article for their "Personal Experiences" department. Two months passed before I heard from them. They sent me a short and courteous explanation why they couldn't use my article. I was devastated - it was my very first rejection letter.

I wanted to stop writing, thinking myself crazy for having decided to pursue a writing career in the first place.

Then my friend reminded me of something I had totally forgotten. He said, "**You only lose when you quit trying.**" As I buried the rejection letter deep under my files, I felt the spark of determination burn in my blood. I won't be a loser. I won't quit writing.

I re-studied the craft and I re-explored the market. I became determined to be more competent in writing my articles, in marketing my skills, and in interacting with the publishing world. In short, that rejection letter was the adversity that I needed to make me more determined to succeed.

**Learning :** *Adversities are inevitable. We can quit and lose - or we can keep trying and win.*

Sometimes, patience, perseverance and time are the simplest ingredients to achieving your personal success. If you really think about it, most great achievements weren't born until lots of time, enormous patience (with yourself) and unwavering perseverance prevail. So, ..let's now talk about a few people whose simplified formula for success: "P.P.T.", (Patience, Perseverance and Time) has produced excellent results.



### Story of McDonald's and KFC

Every 5 hours somewhere in the world a new “McDonald’s” fast food franchise is opening. Can you imagine a business which opened its door in 1955 is still so strong today? Well, its founder Ray Kroc, sure did. Kroc, was no inventor. But he knew a great idea when he saw one. After all, Kroc’s entire life thrived on discovering just the right idea that would live on well after the man himself. From a paper cup salesman, to real estate broker, piano player, and finally, milkshake mixer salesman, he always had an incredible amount of faith in himself!! Finally! At the young age of 52 his biggest idea (McDonald’s) was about to emerge. However, Kroc had to muster enough courage in his new idea to once again mortgage his home and borrow lots of money to get it going. Oh! He wasn’t a picture of health either. He’d been plagued by years of arthritis, diabetes, lost his bladder and most of his thyroid gland. But, he never lost the courage to persevere and believe in himself. In fact, Ray Kroc was known to say: “the best is ahead of me”, according to those who knew him. The “McDonald’s” brand name is the 2nd most recognizable name in the world, next to “Coca Cola.” Not bad for a 52 year old with health problems, huge debts, and tons of dogged determination!



Ray Kroc was a simple man with a simple plan to achieve huge success. His formula is:

1. Never give up.
2. Always persevere.
3. Don't forget

The founder of “KFC” (Kentucky Fried Chicken) Colonel Sanders was told no 1009 times before he sold his first piece of chicken. Sanders would drive from town to town, restaurant to restaurant, often sleeping in his car, living off his chicken and believing his “secret recipe” would one day pay off. Eventually his persistence and belief in himself paid off big time! Not bad for a 65 year old. Though Sanders never let the public in on his recipe, he did discuss his recipe for his success:



1. Never quit.
2. Always believe in yourself.
3. Be patient.
4. Be positive.

As you can see, the common traits between Ray Kroc and Colonel Sanders are simple and direct - **Perseverance, Patience, Time and Belief.**

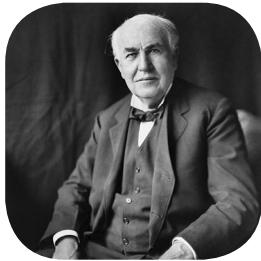
Whatever it is you're trying to achieve in your precious and valuable life, we are convinced these traits must be present. Especially, belief! If you don't believe you won't achieve.

Successful accomplishment of goals would lead to success, but in order to reach and achieve the set goals you might have to face different types of obstacles. One has to overcome the set backs in the process and bounce back with more determination which would make a difference.

All success stories are stories of great failures. The only difference is that every time they failed, they bounced back. This is called failing forward, rather than backward. You learn and move forward. Learn from your failure and keep going.

### **Story of Thomas Edison and Wilma Rudolph**

In 1914, **Thomas Edison**, at age 67, lost his factory, which was worth a few million dollars, to fire. It had very little insurance. No longer a young man, Edison watched his lifetime effort go up in smoke and said, "There is great value in disaster. All our mistakes are burnt up. Thank God we can start anew." In spite of disaster, three weeks later, he invented the phonograph. What an attitude!



But here again the principle trait to overcome the obstacles would be your attitude, strong determination and positive thinking. To drive home the point further let me solve the story of a famous athlete Wilma.

**Wilma Rudolph** was born into a poor home in Tennessee. At age



four, she had double pneumonia which left her paralyzed with polio. She had to wear a brace and the doctor said she would never be able to walk. But her mother encouraged her and made Wilma believe that with God-given ability, persistence and faith she could do anything she wanted.

Wilma said, "I want to be the fastest woman on the earth." At the age of nine, against the advice of the doctors, she removed the brace and took the first step the doctors had said she never would. At the age of 13, she entered her first race and came way, way last. But she still kept on trying and with every failure she doubled her effort.

At the age of 15 she went to State University where she met a coach by the name of Temple. She told him, "I want to be the fastest woman on the earth." Temple said, "With your spirit nobody can stop you and besides, I will help you."

The day came and she was at the Olympics and at the Olympics you are matched with the best of the best. Wilma was matched against a woman named Jutta who had never been beaten., The first event was the 100-meter race. Wilma beat Jutta and won her first gold medal. The third event was the 400-meter relay and she was racing against Jutta one more time. In the relay, the fastest person always runs the last lap and they both were the last ones in their teams. The first three people ran and changed to baton easily. When it came to Wilma's turn, she dropped the baton. But Wilma saw Jutta shoot up at the other end; she picked the baton, ran like a machine, beat Jutta a third time and won her third gold medal.

**The rest is all history. A paralytic woman became the fastest woman on this earth at the 1960 Olympics.**

In the end I would like to share the secret of success with the help of a short story.

## Secret to Success

A young boy asked Socrates the secret to success. Socrates asked the boy to meet him tomorrow morning in front of the river. Next morning when Socrates met the boy he asked him to go inside the river. When the water got up to their neck. Socrates took the boy by surprise and pushed his head into the water. The boy struggled to get out but Socrates was strong and kept him there until the boy started turning blue.



Socrates pulled his head out of the water and the first thing the young man did was to gasp and take a deep breath of air. Socrates asked, "What did you want the most when you were there?" The boy replied, "Air." Socrates said, "That is the secret to success. When you want success as badly as you wanted the air, then you will get it." There is no other secret.

**Learning :** *There are no shortcuts to success. Success is not something which you will find lying on the road. Success demands a lot of sacrifice ,discipline and hard work. As Henry Ford has rightly said “the harder you work the luckier you get”.*

# The Different Strokes

(A comparison between CBSE Boards and competitive examinations)

**The same syllabus, same students, the same hard work, but different results !!!**

It had been intriguing, all the time, for all the students. But as soon as we understand, “how it is that same syllabus is being asked differently in different exams”, our efforts will be different for different exams and results will be uniformly BRIGHT (Good). In other words, there is absolutely no difference in the **concepts** involved in the questions asked in the various board and competitive examinations. The difference comes in the way that is asked in these exams. Wherein the boards, they check the conceptual clarity of a student, in the competitions, it is the application of the concepts which is stressed upon. Further this application skill may vary from exam to exam. For Example:

### ***Example I : Projectile Motion***

**What do they ask in CBSE ?**

- Q1** (a) What is a Projectile?  
 (b) Find out the maximum range & maximum height for a given velocity ( $u$ ) & ratios thereof.  
 (c) Find the range of a Projectile falling from a horizontal table etc.

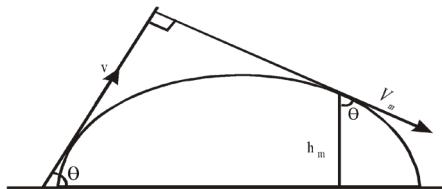
**What they ask in JEE Mains/NEET?**

- Q1** (a) What is the minimum Kinetic Energy of the projectile with initial velocity ( $u$ ) & angle of projection ( $\phi$ ), mass of the object being ( $m$ ) ?  
 (b) How much time would it take to reach a height ‘ $h$ ’ ?  
 (c) What should be its velocity at height ‘ $h$ ’ ?

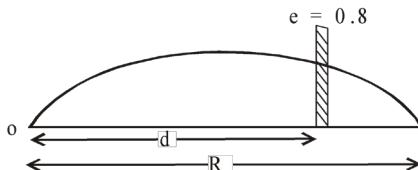
[**Hint:** Calculate from basic concepts. No direct formula used.]

**What do they ask in JEE Advance?**

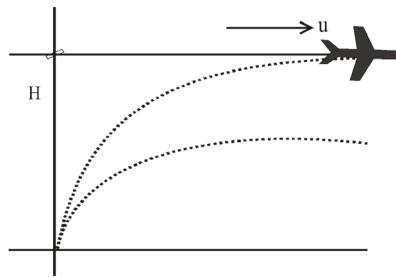
- Q1** (a) What is the height ( $h_m$ ) & velocity ( $V_m$ ) of a projectile when angle between the initial velocity and velocity at  $h_m$  is perpendicular to each other.

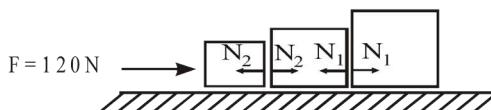
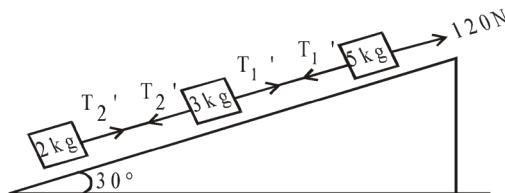
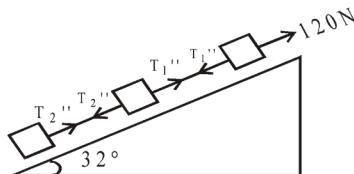


- (b) If a projectile has a range of ' $R$ ' & there is a high wall at a distance ( $d$ ) from the point of projection, at what distance will the projectile strike on the ground after being reflected from the wall with inelastic collision ( $e$  being 0.8).



- (c) What should be the minimum velocity of the projectile so that it hits a aeroplane at a height ( $H$ ) which is moving horizontally with a velocity of  $u$  .

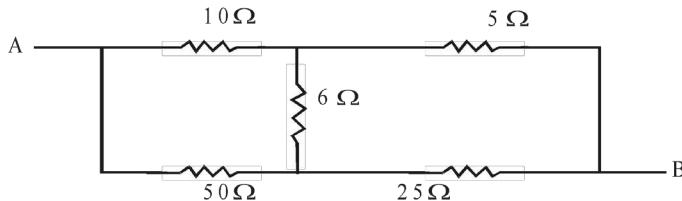


***Example II : Laws of Motion*****What do they ask in CBSE?****Q2 (a)** In the given figure find the tensions  $T_1$  &  $T_2$  ?**(b)** What are the normal reactions  $N_1$  &  $N_2$ , as shown in the figure given below ?**What they ask in JEE Mains/NEET?****Q2 (a)** Calculate the Tensions & , when the three blocks, joined with the help of a string, as shown in the figure, are moving upwards with the help of a force of 120N.**(b)** Find the ratio of Tensions & when the force of 120N is applied downwards only.**What do they ask in JEE Advance ?****Q2 (a)** Find the ratio of & at an inclined plane of angle of  $32^\circ$ , when pulled with a force of  $F=120$  N, upward.**[Hint:** Force drops in ratio of masses & independent of angle.Hence  $T_1 = 60$  N, &  $T_2 = 24$  N]

**Example III : Current Electricity**

What do they ask in CBSE?

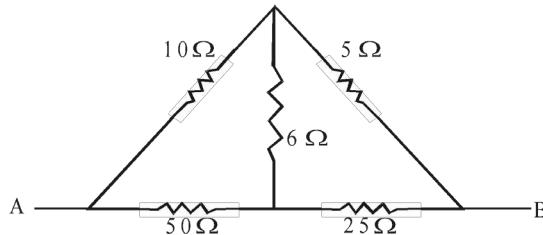
**Q3 (a)** Find out the resistance between point A & B.



[Hint: Resistance 6Ω is ineffective using Wheatstone bridge principle.]

What they ask in JEE Mains/NEET?

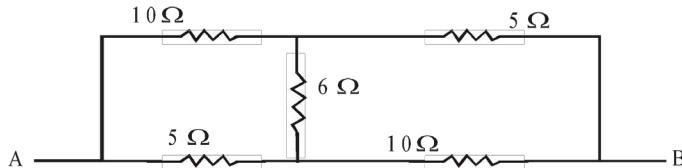
**Q3 (a)** Find the equivalent Resistance between A & B.



[Hint: Simplify using Wheatstone bridge principle.]

What do they ask in JEE Advance?

**Q3 (a)** Find the Equivalent resistance between A & B.



[Hint: Use symmetry & apply Kirchoff's law & logic]

From the above examples, we find that – syllabus is same, topic is same, but there is a level difference in asking & Calculations. Hence we can conclude that:

**CBSE** asks straight forward Questions to TEST the knowledge.  
**NEET** asks the application level questions but simple calculations.  
**JEE** asks for analytical ability & depth in the Concepts and sometimes smart calculations.

For the better understanding of the above article we can use the analogy of **VEHICLE DRIVING CAPABILITY**.

**CBSE ASKS :**What is accelerator, clutch, Brake, Steering, self-ignition & steps to use it in driving.

**NEET ASKS :**OK drive forward, left, right, backward etc. and sometimes can ask the role of clutch & hydraulic braking systems.

**JEE ASKS :**Let's take our vehicles, on the road & drive through a stretch of ten kms through traffic conditions, bad patches, & various turns. Those who reach first with reasonable time know the Driving well & the rest are rejected.

**That is Selection on the basis of application Skill.**

## Test Assessment and Analysis Sheet

Name : ..... Test Code : ..... Date & Time of test: .....

First check the question paper with answer keys to find out the marks scored. After this try to attempt on your own the questions not attempted and questions attempted but wrong. Fill in the following sheet very carefully as it will help you in analysing your performance in the test.

Summary performance Table	Section 1	Section 2	Section 3	Total
Total number of questions				
Questions Attempted				
Correct Answers				
Wrong Questions				
<b>TOTAL SCORE:</b>				
Strike rate				
(Correct Answers/ Questions attempted):				
<b>Sectional Percentage Score</b>				

(Sectional Score / Total Score )

**Speed** (Questions Attempted/Total time in minutes) :  question/minutes

(Note : To do further analysis you can also calculate your speed section wise and can hence find out the section where your speed is the slowest)

**3) Analysis of wrong questions\*** : Divide the wrong questions in 3 broad categories

Reasons for wrong questions (to be filled after you have attempted wrong questions on your own after the test)	No. of ques.
Knew the question and solved after test but did wrong because of calculation mistake (A)	
Knew the question and solved after test but did wrong because got confused and applied wrong concept (B)	
Did not knew the question and couldn't solve even after exam (C)	
<b>Total Number of questions attempted wrong</b>	

Note : If some of (A) & (B) is high then you need more practice and also read instructions more carefully whereas if (C) is very high it means the coverage of topic is not sufficient and you need to improve on it.

**4) Analysis of not attempted questions\*** : Divide the questions not attempted in 3 categories

Reasons for unattempted questions (fill after you have tried unattempted questions on your own after the test)	No. of ques.
Easy questions (A)	
Average questions (B)	
Difficult questions (C)	
<b>Total Number of ques. Not attempted</b>	

Note : If the number of easy/average questions (A + B) is very high then to improve your score you need to focus on selection of questions. In a test, you should select questions which you can solve fast and leave difficult questions. \* Table 3 & 4 can also be used for doing section wise analysis.

**5) List down your areas you need to focus upon to improve your score in next test**

1)	
2)	

After you are through with this sheet analyse it thoroughly and spend some time again on areas you need to focus and only then move on to next test. Also fill the key performance indicators in the “Test Planner”



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## NOTES

## NOTES

## NOTES

# हार नहीं होती

लहरों से डरकर नौका पार नहीं होती  
 कोशिश करने वालों की हार नहीं होती।  
 नहीं चींटी दाना लेकर चलती है  
 दीवारों पर चढ़ती, सौ बार फिसलती है।  
 मन का विश्वास रग्हैं में साहस भरता है  
 चढ़कर गिरना, गिरकर चढ़ना न अम्ररता है।  
 आखिर उसकी मेहनत बेकार नहीं होती  
 कोशिश करने वालों की हार नहीं होती।

दुबकियाँ सिंधु में गोताख्तोर लगाता है  
 जा-जाकर खाली हाथ लौट आता है।  
 मिलते न सहज ही मोती गहरे पानी में  
 मुठ्ठी उसकी खाली हर बार नहीं होती।  
 कोशिश करने वालों की हार नहीं होती।

असफलता एक चुनौती है, स्वीकार करो  
 क्या कमी रह गई देखो और सुधार करो।  
 जब तक न सफल हो, नींद चैन को त्यागो तुम  
 संघर्षों का मैदान छोड़ मत भागो तुम।  
 कुछ किए बिना ही जय-जय कार नहीं होती  
 कोशिश करने वालों की हार नहीं होती।