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GATE MECHANICAL Engineering Masterpiece

2015

2nd
Edition



Gate Mock Test CD
General Aptitude
Technical Section
Engineering Mathematics

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- × Covers past 8-10 years questions of GATE exams.
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Covers Numerical Answer Type Questions

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PREFACE

With an aim to provide the best possible material to the students to prepare for the GATE-2015, GATE Masterpiece is a one of its kind for the preparation of Electrical Engineering Exams and a result of many years of research. The book has been thoroughly revised and updated for GATE 2015.

The key idea, which allows this book to deal with a wide range of content related to the Electrical Engineering Exams along with covering each and every topic, is based on the current syllabus introduced by IIT for GATE-2015. Covering 100% topics of the syllabus for Electrical Engineering Exams, the content of this book includes an extended and thoroughly revised version of a collection of exhaustive theory, past year questions, practice problems and Mock Tests. It also covers 'Simple MCQs,' 'Linked Answer type MCQs' and 'Common Data based MCQs' questions in good numbers.

In writing this book, we have assumed that readers are well acquainted with the very basic concepts of Electric Circuits & Fields, Analog and Digital, Electrical Machines, Power Systems etc. Drafted in compliance with current GATE syllabus by qualified and experienced professionals, this book has questions of previous 8-10 years of GATE examinations. Having 100-150 questions in each chapter with detailed solutions, this book is helpful in practicing and preparing for the exams in an effective manner within the shortest span of time.

Structured approach, Introduction of Concepts in Simple Terms, Fundamental Principles in Context of Simple Application and Accuracy were our main objectives that we aimed while writing this book. In order to make sure that the students get well prepared for the exams, we have divided into following sections:

Students who read this book will gain a basic understanding of principles, problems and solutions, including an introduction to the current format of GATE exam.

The book covers all the test areas of the GATE examination, viz.

1. General Aptitude - Covering Verbal Ability and Numerical Ability
2. Engineering Mathematics
3. Technical Section

SUPPLEMENTS: MOCK GATE CD which contains 4 Mock Tests designed exactly on the latest pattern of GATE exam.

ABOUT THE AUTHOR

Deepak Pathak is presently working as assistant professor in Mechanical Engineering Department at Faculty of Engineering and Technology, Agra College, Agra. He received his B.E (Mechanical Engineering) degree from Hindustan College of Science and Technology, Mathura in 2002 and obtained M.Tech (Production Engineering) from Lingayas University, Faridabad in 2014. He has more than ten years of teaching experience.

Finally, Special thanks go to Disha Publication which has given its best possible effort to prepare such a book, thoroughly checked the solutions, so as to eliminate any possibility of error.

However, some errors may have crept in, so feedbacks from the readers regarding the same are highly appreciated.



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Syllabus for Mechanical Engineering (ME)

SECTION I : GENERAL APTITUDE(GA)

Verbal Ability: _____
English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Numerical Ability: _____
Numerical computation, numerical estimation, numerical reasoning and data interpretation.

SECTION II : ENGINEERING MATHEMATICS

Linear Algebra: _____
Matrix Algebra, Systems of linear equations, Eigen values and eigen vectors.

Calculus: _____
Functions of single variable, Limit, continuity and differentiability, Mean value theorems, Evaluation of definite and improper integrals, Partial derivatives, Total derivative, Maxima and minima, Gradient, Divergence and Curl, Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

Differential equations: _____
First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Cauchy's and Euler's equations, Initial and boundary value problems, Laplace transforms, Solutions of one dimensional heat and wave equations and Laplace equation.

Complex variables: _____
Analytic functions, Cauchy's integral theorem, Taylor and Laurent series.

Probability and Statistics: _____
Definitions of probability and sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Poisson, Normal and Binomial distributions.

Numerical Methods: _____
Numerical solutions of linear and non-linear algebraic equations Integration by trapezoidal and Simpson's rule, single and multi-step methods for differential equations.

SECTION III : TECHNICAL SECTION

Engineering Mechanics: _____
Free body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion, including impulse and momentum (linear and angular) and energy formulations; impact.

Strength of Materials : _____
Stress and strain, stress-strain relationship and elastic constants, Mohr's circle for plane stress and plane strain, thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; strain energy methods; thermal stresses.

Theory of Machines: _____
Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of slider-crank mechanism; gear trains; flywheels.

Vibrations: _____
Free and forced vibration of single degree of freedom systems; effect of damping; vibration isolation; resonance, critical speeds of shafts.

Design: _____
Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints, shafts, spur gears, rolling and sliding contact bearings, brakes and clutches.

Fluid Mechanics: _____
Fluid properties; fluid statics, manometry, buoyancy; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; viscous flow of incompressible fluids; boundary layer; elementary turbulent flow; flow through pipes, head losses in pipes, bends etc.

Heat-Transfer: _____

Modes of heat transfer; one dimensional heat conduction, resistance concept, electrical analogy, unsteady heat conduction, fins; dimensionless parameters in free and forced convective heat transfer, various correlations for heat transfer in flow over flat plates and through pipes; thermal boundary layer; effect of turbulence; radiative heat transfer, black and grey surfaces, shape factors, network analysis; heat exchanger performance, LMTD and NTU methods.

Thermodynamics: _____

Zeroth, First and Second laws of thermodynamics; thermodynamic system and processes; Carnot cycle. Irreversibility and availability; behaviour of ideal and real gases, properties of pure substances, calculation of work and heat in ideal processes; analysis of thermodynamic cycles related to energy conversion.

Applications : _____

Power Engineering: Steam Tables, Rankine, Brayton cycles with regeneration and reheat.

I.C. Engines: air-standard Otto, Diesel cycles.

Refrigeration and air-conditioning: Vapour refrigeration cycle, heat pumps, gas refrigeration, Reverse Brayton cycle; moist air: psychrometric chart, basic psychrometric processes.

Turbomachinery: Pelton-wheel, Francis and Kaplan turbines - impulse and reaction principles, velocity diagrams.

Engineering Materials : _____

Structure and properties of engineering materials, heat treatment, stress-strain diagrams for engineering materials.

Metal Casting : _____

Design of patterns, moulds and cores; solidification and cooling; riser and gating design, design considerations.

Forming: _____

Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy.

Joining: _____

Physics of welding, brazing and soldering; adhesive bonding; design considerations in welding.

Machining and Machine Tool Operations: _____

Mechanics of machining, single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, principles of design of jigs and fixtures

Metrology and Inspection : _____

Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

Computer Integrated Manufacturing : _____

Basic concepts of CAD/CAM and their integration tools.

Production Planning and Control: _____

Forecasting models, aggregate production planning, scheduling, materials requirement planning.

Inventory Control : _____

Deterministic and probabilistic models; safety stock inventory control systems.

Operations Research: _____

Linear programming, simplex and duplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

TOPIC WISE NUMBER OF QUESTIONS ANALYSIS

GATE Papers (Mechanical Engineering)

Subject	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
General Aptitude No. of Questions							10	10	10	10
Engg Mathematics No. of Questions	15	12	12	15	10	7	10	10	10	9
TECHNICAL SECTION										
Engineering Mechanics No. of Questions	6	2	2	3	2	0	4	4	1	6
Strength Of Materials No. of Questions	8	7	7	12	4	3	9	7	5	4
Theory Of Machines No. of Questions	8	12	7	4	6	9	4	4	5	3
Machine Design No. of Questions	3	4	9	7	3	2	0	0	5	4
Fluid Mechanics No. of Questions	6	10	9	4	4	9	3	3	4	6
Heat Transfer No. of Questions	6	4	6	5	5	1	3	4	6	5
Thermodynamics No. of Questions	11	7	7	11	7	6	10	4	6	6
Applications No. of Questions	3	2	2	2	1	1	1	4	0	1
Manufacturing & Industrial Engg No. of Questions	24	25	24	22	18	17	15	15	13	11

SECTION -1: GENERAL APTITUDE

PART-A : VERBAL ABILITY

1

English Grammar

Articles - Kinds, Usage & Common Errors in their uses

An article is a word that is added to a noun to indicate – the type of reference being made by the noun. It's a kind of adjective which gives some information about a noun.

The word 'a' (becomes 'an' when the word that follows begins with a vowels - a, e, i, o, u) is called the 'indefinite article' because the noun it combines with is indefinite or general. The word 'the' is called the 'definite article' as it indicates some specific thing

- I went by *a* car.
- I went by *the* car.

The above two sentences differ since in the first sentence I went by just any car while the second sentence refers to a particular car and not just any car.

We use 'A':

1. When a word begins with consonant sound
 - a book, a cat, a chair
2. When a word begins with a vowel but has a consonant sound
 - a university, a one parent family, a European
3. With words that have the sense of one
 - The culprit could not speak a word before the judge.
4. With abbreviations said as words.
 - a NATO general a FIFA official
5. We use 'a' not 'one' when we mean 'any one of a particular type of thing.'
 - I really need a cup of tea. (not ... one cup of tea)
 - You can never find a mosquito in this house. (not ... one mosquito)
6. With number and quantity expressions such as:
 - two times *a* year, *a* quarter of a litre, *a* day or so.
 - ₹ 100 *a* kg. (we can also say '....' for one kg.)
 - *a* little sugar, *a* huge number of people, *a* few artistes]
7. Rather than 'one' in the pattern *a* *of* with possessives, as in
 - He's a friend of mine.
 - That's a relative of my friend.
8. With exclamatory expressions
 - What a wonderful car!, what a good boy he is!
9. With a person's name who may be unknown to the person addressed.
 - A peter wants to speak to you on the 'phone'.

We use 'An':

1. When, the noun you are referring to begins with a vowel (a, e, i, o, u)
 - an orange, an egg, an idea, an umbrella, an Italian.

2. When the word begins with a silent letter 'h'.
 - an hour, an honest man, an honour, an heir (= a person who inherits money etc., when someone dies)
3. With abbreviations said as individual letters that begins with A, E, F, H, I, L, M, N, O, R, S or X:
 - **an** MLA, **an** FBI agent, **an** MP, **an** x-ray, **an** MA. However, the abbreviations said as words are exceptions.
 - **a** NATO general, **a** FIFA officials

We use, 'The':

1. When we say that someone or something is 'unique' – that there is only one or only one of its kind – (we also use zero article, i.e., no article, but not a/an):
 - Cricket has become the international sports.
 - Sydney is the capital city of New South Wales.
2. When we refer to a person's job title, or their particular position.
 - Bob has been appointed the director of the company. Sometimes 'the' is omitted which is called 'zero article'.
3. Before a superlative adjective (the largest, the cheapest, the most beautiful, etc.) when the superlative adjective is followed by a noun or defining phrase:
 - He is the best player in the team at the moment.
 - His comment was the most awkward in the meeting. However, often 'The' is left out, particularly in an informal style, when there is no noun or defining phrase after the superlative adjective.
 - Mr X: Why did you plan to go to Manali?
 - Mr. Y: It was (the) coldest.
4. When we know that there is only one of a particular thing.
 - the earth, the sun, the world, the international market, the film industry, the south pole, the nuclear family.
5. When refer to the things in a general way:
 - the environment, the climate, the human race, the wind, the future, the weather, the atmosphere, the ocean, the sea. However, if we describe them for a particular instance, we use a/an and not 'the', compare.
 - I could hear the wind whistling through the trees in the forest.
 - There was a cold wind blowing from the East.
 - What do you plan for the future?
 - She dreamt of a future where she could spend more time with him.

6. When we expect the listener or reader identifies the thing or person we are referring to, on the other hand, *a/an* is used when we don't. Compare the following pairs of sentences.
- Wilson bought a house in Lincon Street last month and
 - Wilson bought the house in Lincon Street last month (= the house we have previously known)
 - A minister has been expelled from the house and
 - The minister has been expelled from the house (= the minister we have previously known)
 - There's a train coming and
 - The train is coming. (= it's the train we are talking about)
 - There is a man on the door and
 - There is the man on the door. (= You know which man I am talking about)
7. When it is clear from the situation which person or thing we are referring to.
- What do you think of the carpet? (= the carpet is lying before us)
 - How did you prepare the broth? It tastes good (= the broth I am just eating)
 - The plants are blooming now that it's spring. (= the plants here in the garden)
8. When we repeat something about something:
- Bob ordered a cake and an apple pie but the cake was found to be stale. In the sentence, we say a 'cake' when we first mention it and 'the cake' after that, when the listener knows which cake we are talking about.
 - There was a severe fire in a building in Connaught place yesterday. The building was totally destroyed.
- Here again, we say 'a building' when we first talk about it. We use 'the building' when we mention it again because the listener will know which building we are talking about.
9. With the names of:
- Religious books
 - the Bible, the Vedas, the Ramcharitmanas, the Kuran.
 - Mountains, Islands, Oceans, Rivers
 - the Himalayas, the Pacific, the Ganges, the Bay of Bengal, the Arabian Sea, the Indian Ocean
 - Religious groups
 - the Hindus, the Sikhs, the Mohammedans, the Parsees
 - Names of law enforcing agencies
 - the CBI, the FBI, the ISI, the Navy, the Air Force.
 - Press, clubs, foundations etc.
 - the PTI, the Rotary Club, the NCC.
 - Nationalists
 - the Indians, the Americans, the Chinese, the Norwegian
 - Historical events, empires or dynasties.
 - the Tughlak Dynasty, the Second World War, the Non-cooperation Movement, the Mughal Period, the Chinese Revolution.
 - Trains, aeroplanes, ships
 - The Sub-way train, the Rajdhani, the Lufthansa Cargo, the Kingfisher, the Air India.

- Ordinals
 - She was the first to come to the party
- Comparatives
 - He is the smarter of the two brothers.
- Adjectives with plural nations indicating a whole class of persons:
 - The poor are not always despondent.
 However, 'the poor men are not always despondent' is wrong.
- Common noun as a substitute for the possessive adjective:
 - Bob stared at Rick in the face. (Rick's face)
- Noun defined by adjectives or adverbial phrases or clauses:
 - He proved himself to be **the dark horse** of this election.
(he was not well known but won unexpectedly)
 - She was runner-up and got **the red ribbon**.
(= she came second-place)
- Adjectives and common nouns in the singular form expressing an abstract idea:
 - Nobody knows about **the future**. (= futurity)
 - The man in him prevented him from running away from the accident spot. (= manly feelings)

NOUN: COUNTABLE AND UNCOUNTABLE, GENDER AND CASES

A noun is a word that can be used to refer to a person, place, thing, quality or action. It can be a subject or an object of a verb. They can be modified by an adjective and can take an article or determiner.

Nouns can be categorized as *countable* or *uncountable*. Here are some nouns which are normally uncountable, though in many other languages they may be countable:

- Apart from going to work, there's lots of housework to do for Kiran.
- She wore her jewellery and get ready for the party.

Some more nouns like this:

furniture, homework, information, luggage, money, news, scenery, transport, weather, work accommodation, assistance evidence, fun, harm, health, housing, advice, applause, baggage, equipment leisure, litter, luck, machinery, money, mud, music, nonsense, parking, pay, permission, photography, poetry, pollution, produce, progress, publicity, safety, rubbish, research, shipping, sightseeing, violence, undercover, sunshine.

Some common errors in use of nouns:

- Nouns which take a plural verb:**
 - Her all *belongings* were scattered in all over the place.
 - She sent him her sincere *congratulations* on his marriage.
 - She saves half of all her *earnings* every month.
 - He lives on the *outskirts* of Mumbai. (= outlying areas of a city or town)
- Other nouns like these include:**

clothes, goods, particulars, premises (= building), riches, savings, stairs, surroundings, thanks.

- (iii) The nouns *police, people, cattle, staff, artillery* always have a plural verb. The noun *whereabouts* can be used either a singular or plural verb.
- (iv) Some nouns always end in –s looking as if they are plural but when we use them as the subject, they take a singular verb.
- The news of Princess Diana was greatly exaggerated.
- (v) **Other words which confuse include:**
- She doesn't have a *means* of control over the company she inherited.
 - *Politics* is not his cup of tea. He is better off in acting.
 - *Statistics* was always her worst subject.
- Some more words: economics, linguistics, mathematics, phonetics, physics, gymnastics, athletics, diabetes, measles, rabies etc. are singular but seem to be plural.
- (vi) **Nouns used as singular and plural but with different meanings**
- Fish (collectively): There are not many fish in this pond.
 - Fishes (separate fishes): Barry cooked all the four fishes for dinner.
 - Cloths (kinds or pieces of cloth, not made up into garments) – she cut all cloths into pieces.
 - Clothes (garments): I sent all the clothes to laundry.

Pronouns – common errors in their use

A pronoun is a word that takes the place of a noun. Pronouns are used to avoid repetitive use of the same noun within a sentence or narrative. The following is an example without the use of pronouns:

- We invited *Kapoors* to our party because we like *Kapoors*.
The sentence would sound better if a pronoun were introduced
- We invited *Kapoors* to our party because we like *them*.

Problems with Interrogative pronouns usage

Interrogative pronouns are the most troublesome area for students. The most common errors the students make with their usage are **who** and **whom**. **Who** is used for the subjective case while **whom** for the objective case.

In Questions: Subjective:

- Whom frightened the baby? (incorrect)
- Who frightened the baby? (correct)

In Questions: Objective:

- Who did the dog scare? (incorrect)
- Whom did the dog scare? (correct)

Now, use the pronoun 'who' in a question when it takes the place of the subject and use 'whom' when it takes the place of object.

Use of pronoun in Dependent Clause

If you want to avoid errors in choosing the correct pronoun, first identify the clause, then determine the function of pronoun in the respective clause. If it acts as the subject, use, **who (whoever)**, if it acts as the object, use **whom (whomever)**.

- **Subjective:** I saw who scared the dog.
Here the pronoun is taking the place of the subject. **Who** is used.
- **Objective:** I saw the man whom the dog scared.
Here the pronoun is taking the place of the object. **Whom** is used.

Important Tips to Remember

(1) Singular pronouns with singular antecedents and plural pronouns with plural antecedents.

Singular

- The man finished *their* work quickly... (incorrect)
- The man finished *his* work quickly... (correct)

Plural

- The men finished *their* work quickly. (correct)
- The men finished *his* work quickly. (incorrect)

(2) Collective Noun Antecedents

Students often use a collective noun antecedent when the group members are considered a unit. Here are the examples:

- The construction crew started their project last year.
(incorrect)
 - The construction crew, started its project last year. (correct)
- However, when the group members are taken individually, the plural pronoun is used.
- The construction crew, some of them not happy with working conditions, gathered *its* tools. (incorrect)
 - The construction crew, some of them not happy with working conditions, gathered *their* tools. (correct)

(3) Gender Errors in Pronouns

He and **his** were traditionally used to refer to both sexes when the antecedent was unknown. Now, in modern times, it is felt that this usage is unfair to women, so one male pronoun is avoided.

- Each person has to face *his* fear of wild animals in the jungle. (Singular)
- All persons have to face *their* fear of wild animals in the jungle. (plural)
- Each person has to face *his or her* fear of wild animals in the jungle (he or she)

(4) When two nouns are joined with 'as well as' then pronoun is used in agreement with the first subject.

- *Peter* as well as his friends *is* going on picnic.
- The *students* as well as their teacher *were* present in the function.

(5) When two nouns are joined with 'with' then the pronoun is used in agreement with the noun before 'with'.

- The *boy* with *his* classmates
- The *boys* with *their* teacher

You can notice that in both sentences the usage of 'his' and 'their' is in agreement with number and gender of the second noun.

(6) When a subject is made up of two or more items joined by 'eitheror' or 'neither.... nor', a singular verb is used if the last item is singular and a plural verb if it is plural. However, in informal English, sometimes a plural verb is used.

- Either *your brother* or *you* have eaten *your* lunch.
- Either *the teachers* or the *principal is* (or *are*) is blame for the poor results.
- Neither the prime minister nor his spokespersons are to address the press.

A Quick Review

- They went to Paris and **enjoyed** (incorrect)
- They went to Paris and **enjoyed themselves** (correct)
- You should **avail** of this opportunity (incorrect)
- You should **avail, yourself** of this opportunity (correct)
- You and Bob have wasted **their** time. (incorrect)
- You and Bob have wasted **your** time (correct)
- Marbella and myself went to the pictures (incorrect)
- Marbella and I went to the pictures. (correct)
- I, you and he will go to the pictures tomorrow. (incorrect)
- You, he and I will go to the pictures tomorrow. (correct)
- It is me. (incorrect)
- It is I. (correct)
- Let him and I do the talking. (incorrect)
- Let him and me do the talking. (correct)
- After seeing his father in the bar, he tried to hide behind the table. (incorrect)
- After seeing his father in the bar, he tried to hide himself behind the table. (correct)
- Peter resigned to the will of God. (incorrect)
- Peter resigned himself to the will of God. (correct)

(Please note that after verbs like absent, avail, apply, enjoy, hide etc. reflexive pronoun is used after them)

- They have visited neither of these three Churches. (incorrect)
- They have visited none of these three Churches. (correct)
- Between you and I, he is not reliable. (incorrect)
- Between you and me, he is not reliable. (correct)
- He scored better than me in the exams. (incorrect)
- He scored better than I (did) in the exams. (correct)
- We all did not accept his offer. (incorrect)
- None of us accepted his offer. (correct)
- These two brothers always help one another. (incorrect)
- These two brothers always help each other. (correct)
- The four sisters help each other with chores. (incorrect)
- The four sisters help one another with chores. (correct)
- One must keep his word. (incorrect)
- One must keep one's word. (correct)
- None of us know the truth. (incorrect)
- None of us knows the truth (correct)
- Except he, all went to the circus. (incorrect)
- Except him, all went to the circus. (correct)
- It is All India Radio. (incorrect)
- This is All India Radio. (correct)

Prepositions - Important Inferences and Common Errors in 'their' usages.

A preposition is a word which usually precedes a noun or pronoun and shows its relation to some other word in the sentence.

- The man *on* the platform was staring *at* Gina.
- They came *after* dinner.
- The cat is sitting *under* the table.

In the first example 'on' and 'at' are two prepositions, which are before the definite nouns 'platform' and 'Gina'. They help establish the relationship between 'the man' and 'the platform' and 'stare' and 'Gina'.

Remember

A preposition may also be used at the end of a sentence:

- Who were you talking to?
- This is the house I used to live in.

Preposition can also govern other parts of speech that are used as nouns.

- She left India *for good*.
- *In short*, we don't want to do anything with them.
- *From here* you can go to Istanbul by air.

Position of Prepositions

Prepositions of place

At is used about a place we think of as a point rather than an area.

We also use *at* about an event wherever there is a group of people.

- I arrived *at* Howrah station at 5.
- I last met her *at* her sister's birthday.
- They were waiting *at* the far end of the room.
- There were a number of people *at* the conference.

On is used when we talk about a position touching a flat surface, or on something we consider as a line such as a road or river.

- There's a cockroach *on* the floor.
- They have bought a villa *on* the beach.

In is used when we talk about a position within a larger area, or when it is within a larger space.

- He works at Connaught place *in* Delhi.
- Bob looked again *in* the drawer and found the punching machine.

Prepositions of Direction

To, towards, across, for, against, along, up, down, into etc. are called prepositions of direction.

To is used to denote destination

- I am going *to* railway station.

Towards indicates direction.

- He was last seen going *towards* the hotel.

For denotes destination.

- He is leaving *for* Canada tomorrow.

Against refers to 'opposite', 'pressing on', 'in contravention of'.

- It was very difficult to run *against* such strong winds.
- There used to be a lamppost *against* the wall here.
- You cannot go *against* the law of the land.

Across denotes 'on the opposite side of', 'from one side to another', 'both sides', 'through'

- The man who came to see you yesterday lives *across* the road.
- This metro station is being built *across* the river.
- She put the scarf *across* her neck.
- The cattle were going *across* the field.

'*Come across*' is used when we mean 'to find' or 'encounter'

- She *came across* this man when she was working in US and then they got married.

Up denotes top and *down* is used to mean 'descending'.

- The child climbed *up* the stairs by himself.
- The child could not climb *down* the stairs.

Prepositions of Time

At, on, for, before, after, since, within, till, by, during, from are some examples of prepositions of time.

'At' denotes time or hour.

- I'll be there *at* 2 = 30.
- They started for outing *at* down.
- The accident occurred *at* daybreak.

'On' is used to denote 'day' and 'date'.

- She'll be here *on* Saturday.
- This road will be opened for public on 15th August.

'For' is used to denote 'period of time'.

- I had been waiting *for* the train for two hours.
- What are you waiting *for*?

'Since' is used to refer to 'a point of time'

- She has been living in UK *since* 2003.
- He has been living in this village *since* birth.

'After' and 'before' are used with the 'period of time' or 'point of time' in past tense.

- Our exams will be over *before* Christmas.
- She will get married *after* she completes her graduation.
- He will return the loan to me *after* 2 years.

Some useful Prepositions after verbs

Abstain from: Having been advised by the doctor, he vowed to abstain from alcohol.

In accordance with: Everything has been done in accordance with your request.

Learn about: We learnt about o-zone when were in school.

Know about: Now everybody knows about black holes.

Think of: What do you think of my new suit? (ask for an opinion)

Think about: Your job is think about safety and nothing else. (concentrating on something)

Accuse of: He was accused of spousal abuse.

Acquaint with: You should acquaint yourself with new gadgets.

Acquit of: He has been acquitted of all charges.

Apprised of: Has the management been apprised of the strike?

Ashamed of: You should be ashamed of these poor results.

Clamp on: The dictator clamped a curfew on the town.

Conducive to: the working conditions are not conducive to productivity.

Confer on: The university conferred a degree on him.

Cope with: She cannot cope with the new environment.

Detrimental to: This kind of lifestyle is really detrimental to his health.

Debar from: He was debarred from school for his bad behaviour.

Desist from: If you do not desist from your activities, you may be behind bars.

Encroach on: He has encroached on the public property by building a concrete wall.

Embroil in: Please do not embroil me in this controversy.

Fed up with: He is fed up with her constant tauntings.

Focus on: Now all the players have to focus on the game, other issues will be sorted out later.

Give in: Finally, I had to give in to the temptation.

Good at: She's is very good at dancing.

Indulge in: Sometimes you have to indulge in the children.

Absolve from: He has been absolved from all charges.

Replete with: His condition is replete with misery.

Look at: He was looking at all pros and cons.

Square with: I paid him ₹ 10,000 and squared with him.

Put out: She put out the lights and went to sleep.

Sue for: you can be sued for contempt of court.

Side with: He sided with the ruling party.

Take up: She has taken up the matter with higher-ups.

Conjunctions – Their usages and Errors in their uses

A conjunction is a part of speech which is used to correct words, phrases, clauses, and sentences. They are such as, and, because, or, if, but, for and when.

Here are some important conjunctions and their uses:

Not only..... but also

- He is not only the director but also the producer of this movie.
Either..... or
- Either the teachers or the principal is (or are) to blame for the mishap.
Neither..... nor
- Neither the prime minister nor the ministers are responsible for economic slowdown.
Both..... and
- He can both speak and write French.
- He's lived in both Mumbai and Chennai.
- Both he and his sister are going to get married this winter.

Scarcely/hardly when

- He had scarcely left when the rain started.
- He had scarcely sat down when the phone rang.

Though/Although

- Though/Although Mahesh failed to score a goal himself, he helped Rajesh to score.
- He has bought a house, though/although he has yet to make the payment.

Both 'though and 'although' may be used but 'though' is less formal. No sooner had/did than.

- No sooner had he entered the room than the light went out.
- No sooner did he pick up the newspaper to read than his father called out.
Lestshould
- He turned away from the door lest the boss see him.
- He worried lest he should fall short of family's expectations.

(Please not that lest is negative, hence cannot be followed by *not*. It is followed by *should*).

Other than

- He was familiar with no one other than the watchman.
- He doesn't like milk, but other than that he'll drink just anything.

So.....as (in negative sense)

- She did not collect so many flowers as her sister did.
- You cannot drive so far as you want. There's not enough gas.

as.....as

- The kids want to stay with their grandparents as much as she does.

• The elderly woman cannot walk as fast as she used to
Such.....as

- Such lodging as you provided was hardly worthy of living.
- There is no such thing as magic.

Like.....(pronoun/noun)

- No one else can sing such a difficult song like he can.
- You are just talking like a child.

If (used when talking about something that might happen or might have happened or be true)

- We'll all go to the pictures if father gives the money.
- If you didn't apologize, you'd feel guilty.
- If you had come earlier, I would have accompanied you.
- If mother were here, she would know what to cook.

Whether or not (used when talking about a choice)

- I am not sure whether to believe him or not.
- I am taking the kids along, whether you like it or not.
- She doesn't know whether to stay or leave.

Reason that ('the reason for something' is used and not 'the reason because 'something happens')

- I'd like to know the reason why they refused to follow the orders.
- The reason I telephoned was to ask about her health.

Because (used when you are giving reason for something.

- We didn't go out because the weather was so dull.
- Why can't she go to the cinema? Because she's not old enough.

In order to do something (used for the purpose of doing something)

- Bob is working very hard on his maths in order to improve his grades.

Until (used to denote when something happens until a particular time, it continues and then stops at that time).

- Your driving licence is valid until 2018.
- I waited until mother finished cooking.

Till (In spoken English 'till' is preferred to 'until')

- He didn't start drinking till he was 30.
- This market opens till 9'O' clock on all days.

As long as (used to talk about one thing that can happen or be true only if another thing happens or true).

- You can stay with us as long as you desire.
- They tried to stay awake for as long as they could.

Verb Agreement – Rules, Syntax of Subject

Verb agreement works on two basic rules:

Rule 1: When the subject is singular, verb is singular.

- **She likes** mangoes.

(Here the subject is singular, so the verb is also singular).

- Bob plays cricket.
- Mr. Jim goes to office.

('you' always take a plural subject).

Rule 2: When the subject is plural, the verb is also plural.

- They play cricket in this field every day.

(Here the subject is plural i.e., 'they' so the verb 'play' and not 'plays' is used)

Basically, the number and person of any finite verb is in correspondence with the number and person of the subject.

Errors 'in' Subject Verb Agreement

Now let's discuss the different conditions in which subject agrees with verb.

If two singular nouns are joined with *and*, then the verb is plural.

- Marbella and her husband have gone to Paris.
- A computer and a printer have been sold in the junk market.

If two singular nouns are joined with '*and*' but preceded by *each/ every* etc. then it takes a singular verb.

- Each boy and each girl has to join the NCC.
- Every worker and every executive has to be in the office in time.

If two singular nouns are joined with '*and*' but denote something about the same person, thing or expression, then singular verb is used.

- Bread and butter is not something that you take in dinner.
- Rice and rajma sells at 30 rupees per plate.

Other examples are – horse and carriage, hammer and sickle, crown and glory etc.

When two nouns or pronouns are joined with – with, alongwith, together with, accompanied by, led by, guided by, governed by, controlled by, as well as, in addition to, besides, like, unlike etc. then the verb is according to the noun or pronoun shown in the first case.

- She was *accompanied by* her mother.
- The council was *led by* the minister.
- She is clever *as well as* beautiful.
- He hurt his arm *as well as* breaking his leg.
- *In addition to* cooking the food, she has to clean the floors.
- *Besides* myself, the only Indian people there were Sachin and his wife.
- Her hair is blonde *like* her mother.
- *Unlike* her mother, she doesn't go to market every Sunday.

When two subjects are joined by '*not only..... but also*', '*either or*', '*neither....nor*', then the verb always follows its nearest subject.

- He is not only an actor but also a dramatist.
- He's the kind of person you either love or hate.
- Neither she nor her mother is planning to go Italy.

When subjects are joined with '*not....but*' or '*not*', then the verb follows the subject which is not with the subject 'not'.

- Not the principal but *the teachers are* to blame.
- The *principal* not the teachers *is* to blame.

When in a sentence, '*each of*', '*either of*', '*neither of*', '*everyone of*', '*one of*', etc. are used, the noun or pronoun is always plurals, but the verb remains singular.

- Each of the students has to take part in this program.
- One of them has been arrested by the police.
- The teacher asked the students if everyone of them has brought books.

When the subject of a sentence is '*everybody*', '*somebody*', '*nobody*', '*anybody*', '*no one*', '*everyone*', '*anyone*', '*everything*', '*something*', '*nothing*', '*anything*', etc. then the verb is always singular.

- Everybody knows that the sun rises in the east.
- Someone among his friends has broken this window pane.

When the subject of a sentence is 'many', 'both', 'few', 'a few', etc. then the verb is plurals.

- *Both* Marbella's parents *are* working with External Affairs.
 - *Many* were trapped in the debris but *a few* have survived.
- After 'both of', 'a few of', 'few of', 'many of', etc. the noun or pronoun is plural which is also followed by a plural verb.
- *Many of* tourists at Taj *are* English.
 - *A great many* workers *have* gone on strike.

However, after 'many a...' both the noun and verb are singular.

- *Many a* parent has gone through this awful situation.
- Nouns in plural that represent an amount, a fraction, or an element of time are taken as singular and so take singular verb.
- *Thirty minutes* is not enough to finish this test.

Some words that end in -s and seem to represent a single thing but they take plural verb.

- *The scissors* *have* to be brought from the market.
- *My trousers* are too short to fit.
- *The spectacles* *have* been broken by the child.

Words 'like', 'fleet', 'crowd', 'army', 'jury', 'committee' always take singular verbs.

- *The committee* *has* not decided on his proposal yet.
- *The crowd* is increasing in the city day-by-day.

TENSES AND ERRORS IN THEIR USAGE

The tense is the form of a verb that shows the time, continuance or completion of an action that is expressed by the verb. 'He is' is in the present tense, 'He was' is past tense and 'He will be' is future tense.

When 'a permanent state' or 'work at present' is expressed.

- He lives in Mumbai. (Presently living)
- His father works in a government department (Presently working)

To express a present habit.

- He goes for a walk everyday.
- She takes a bath before breakfast.
- He smokes after dinner.

(All these activities are a habit with are a daily routine).

When the verb in principal clause is in past tense, the verb of the subordinate clause is also in the past tense.

- He went for a walk after he had taken his dinner.

When the subordinate clause is in reporting speech, any tense can be used.

- She said, "I won't stay at this place any more".

When a universal truth or habitual truth is expressed, the tense in subordinate clause is not necessarily changed.

- The teacher *said* that sun *rises* in the East.
- He *said* that he *gets up* at 5 everyday.

If a comparison is made by using 'than', then in subordinate clause, any tense may be used.

- She liked the commerce better than she liked the science.

When there is an expression of past time (yesterday, two days ago, last night, etc.), the present perfect tense is not used.

- I *wrote* to you *yesterday* about your mother's ill-health.

When the statement is conditional, the subordinate clause beginning with 'if' may be in present or past tense but not in future.

- If you *ask*, I'll accompany you to the movies.

When a sentence has expressions such as 'suppose that', 'It is high time', 'as if, it is time, etc', a future or the present tense is not used.

- *It is high time* that you *called* his bluff.

When a statement refers to two past actions, the action that finishes first is in past perfect and that finishes later should be in simple past.

- They *told* him they *had not met* him before.
- We *heard* that a fire *has broken out* in the neighbouring house.

When a part of the sentence is with 'as if' or 'as though', past tense and plural form of the verb is used.

- He behaved *as if* he *were* the owner of the house.
- It looks *as though* everyone else has gone to bed.

Words like 'often', 'generally', 'usually', 'whenever', 'whichever', etc. are used in simple present tense.

- This type of furniture is generally found in junk market.
- I often go to meet him.
- He usually goes for a walk after dinner.

Some Important Tips:

→ Please note that except I, we and you, all nouns and pronouns fall into the category of third person.

→ Conditional clauses may be put in three categories.

1. Main clause - future, "if" present (likely or probable)
 - He *will* help you if you *ask* him.
2. Main clause - conditional, "if" ... past (unlikely, imaginary)
 - He *would* help you if your asked him.
3. Main clause - conditional, perfect "if" ... past perfect (Impossible)
 - He *would have helped* you if you had asked him.

GERUND AND INFINITIVE - Usage and Errors in their uses

Gerund is a noun in the form of present participle of a verb, for example 'Fishing is my best pastime. While 'infinitive' is the basic form of a verb which is used with 'to', for example - I want to meet you: In this sentence, 'to meet' is an infinitive.

Usage of Gerund

Gerund acts as a subject when an action is being considered in general sense.

- Swimming is a sport.
- Climbing mountains is a sport, too
- Riding is pleasanter than walking.
- I hate telling lies.

Verbs such as enjoy, excuse, suggest, help, avoid, dread, prevent, risk, recollect, stop, detest, finish, mind, dislike, deny, no use, no good, resent, delay, postpone, defer, forgive, pardon, etc. are followed by the gerund.

- They enjoyed watching TV all day.
- Will you excuse us coming late.
- Will you stop talking so loudly.
- Would you mind moving a bit.
- It's no use asking them for a ticket.

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