

Unit-1 (Introduction of T.C.)

- (i) Intro of TC
- (ii) Aspects of TC
- (iii) Forms of TC
- (iv) Importance of TC
- (v) Technical communication
- (vi) LSRW
- (vii) Linguistic Ability in TC
- (viii) Style in TC
- (ix) ABCs of Technical writing
- (x) Common style problem

* Intro of TC \Rightarrow

TC is the exchange of info that helps people interact with technology & solve complex problems. It can be considered as a medium to communicate scientific knowledge, engg. concept & other info

Difference b/w general & technical communication:-

G.C.	T.C.
(i) contains a general message.	contains a technical message.
(ii) Informal in style & approach.	Mostly formal in style & approach.
(iii) No set pattern	Follows a set both oral & written
(iv) Mostly oral	Both oral & written
(v) Not always for a specific audience.	Always for a specific audience.

(vi) No use of technical terms of graphics

Frequently involves technical terms of graphics.

Objective of TC:-

- The purpose of TC is to make info clear and concise by using simple words in order to make business more productive & consumer goods more convenient.
- It has employees understand and complete job task more successfully.
 - Provide backgrounds on which new ideas can be build without repetitions.
 - Prevent problems with the development & manufacturing of product.
 - Inform consumers how to assemble, fix or use a product.

Aspects of TC:-

(i) Subject competence:- It refers to the sender's professional knowledge, experiences & abilities

(ii) linguistic competence:- It refers to the possessor of appropriate language skill so as to present the technical facts or info in a clear manner.

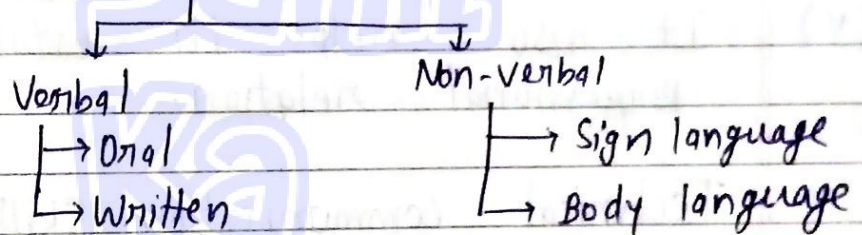
(iii) Skills competence:- It refers to the position of computers related presentation & technical skills, we live in complex technological world where new technologies & slw keep changing & so we should be

updated in that area.

(iv) Organisational competence:— It includes skills like

- (a) Ability to sequence thoughts in a sequence.
 (b) Ability to organise paragraphs according to the needs of the audience or subject.
 (c) Ability to use logical, thematic & Anomalogical ordering to provide coherence.

Forms to TC



Broadly there are 3 form of communication

- (i) Oral communication
 (ii) written "
 (iii) Electronic (Multimedia) "
- Form of oral communication
- (i) Mobilephone ~~confrence~~ conference
 (ii) Group presentation
 (iii) Telephoning conversation
 (iv) Interpersonal communication
 (v) video conference
 (vi) Meeting, Lecture etc.
- Form of written communication
- (i) Email (ii) Report (iii) Purposal (iv) Brochures
 (v) Newspaper etc.
- Form of electronic communication
- (i) Blogs (ii) Internet website (iii) Twitter (iv) facebook etc.

Importance of TC →

- (i) It helps in structuring the information that helps in quick decision making.
- (ii) It helps in outlining the ideas & design distinctly and consistently to subbodyness.
- (iii) It helps in delivering well structured and professionally generate presentation which captures the interest of the auditions.
- (iv) It also helps the listeners to retain information & the speakers to present ideas.
- (v) It also helps in establishing & sustaining professional relation.

Technical communication Skills : LSRW →

LSRW are considered to be the 4 foundational skills of language learning. These 4 skills give learner opportunities to create situation which can be used for the exchange of information.

Listening → Listening is a receptive language skills that the learner usually find the most difficult. This difficult is experienced because they get under the peer pressure of understanding every word. Listening skill can be improved on making the students listen to the sound and dictation of that specific language.

Speaking:- Language learning is considered to be a tool for communication in society. Speakers communicate with others to express their ideas so speaking is important. This skill can be improved by understanding para language such as voice quality, volume and tone and voice modulation & pronunciation etc.

Reading:- Reading is identified as an essential learning skills of language. It helps in the enhancement of all the parts of the English language such as vocabulary, spelling, grammar & writing.

Writing:- Writing provides a learners capability with physical evidence of its achievement so that he can measure his/her improvement. It helps to assimilate the text and write composition. It also helps the writer to use the language according to his desire for expression.

Linguistic Ability ⇒

It includes the ability to speak, articulate, express and convey one's thought and feelings to the outside world in one or more languages. This can be at an oral and written level. It also includes the ability to listen and to

understand other people.

4 Base ways to enhance & encourage linguistic intelligence ⇒

Teachers can ~~sp~~ ~~port~~ support their students enhancing & strengthening Ling. Intell. by :

- (i) Writing in a journal
- (ii) Encourage them to write a creative story.
- (iii) Learning new vocabulary words each week.
- (iv) In incorporating words game.
- (v) Regular reading of book, magazines, newspapers etc.

Style in TC ⇒

Style in TC reading is concise, precise, clear, direct & well organize. One has to be completely aware of ~~writi~~ writing style and must constantly try to refine it. Since writing style impact your reader respond, it should be your responsibility to be aware of it and use it to help you achieve your purpose.

The basic components of style in TC writing are :

- (i) Concise :- Sentences should be clear & simple concept, being able interpret atleast one per sentence.

- (ii) Precise :- It ensures the correct delivery of the intended message sent to your reader.
- (iii) Direct :- TC should get down to its meaning instantly.
- (iv) Well organised :- As a communicator you will need to make short that any document you create has an intentional, logical & well-organized.

~~journal~~ General

Difference b/w Academic, ~~&~~ professional writing

Academic	Professional	General Journal
→ Examination Answer	→ Technical report	→ Personal letters
→ Project Report	→ Industrial report	→ Personal email, messages
→ Lab Report	→ Project proposal	→ Notes
→ Synopsis	→ Business letters	→ Comments
→ Thesis	→ Job application	→ General articles
→ Research paper	→ Resumes	etc.
→ Classroom note	→ Electronic mailing	
→ Scientific articles	→ Notices	
etc.	→ Memos etc.	

ABCS of Technical writing ⇒

A → Accuracy
B → Brevity

C → clarity
S → Simplicity

HOW TO AVOID COMMON STYLE PROBLEM IN TECHNICAL WRITING ⇒

- (i) Don't separate the noun and verb of the sentence with lengthy phrases.
- (ii) Link old ideas to new ones.
- (iii) Avoid using complex words that are difficult to understand.

chapter - 2

Comprehension

of Technical materials / Text and information design of development

- (i) Reading of technical Text
- (ii) Interpreting technical Text
- (iii) 3 summarising technical text
- (iv) Note making
- (v) Type of technical documents
- (vi) Information on data collection
- (vii) Document design
- (viii) Factor affecting document design
- (ix) ~~Strat~~ ^{Strategy} ~~Strategy~~ for organising information
- (x) Writing on print on online Media
- (xi) Information design for print & online media

① ~~1~~ Reading of - Technical Text ⇒ Scientific & technical writing is not easily comprehensible. It can be dense and may require very close reading. Many scientific article may appeared to be difficult to comprehend because of jargons, long tables and pages of foot note.

The stages involved in reading of technical text are :-

- ① ~~1~~ - Selecting an article
 - (I) Reputability of press & journal
 - (II) The title
 - (III) The status of the author

(IV) App Affiliation of author

(V) Identifying structural elements.
Generally ~~Journal~~ article contains following part :-

(I) Abstract

(II) list of keywords & phrases

(III) Introduction

(IV) Methodology

(V) Results

(VI) Discussion

(VII) References & Bibliography

(2) Pre-reading Stages :-

It includes a quick reading of the article. For example heading, sub-heading as well as graphics should be purposefully read keeping in mind the goal for which the reading is undertaken.

(3) Re-reading Stages :-

Always read an article you are trying to understand at least twice. And make notes in the margin.

(4) Comprehending the vocabulary :-

Difficult words & phrases should be underline and reader should use a technical dictionary to look for definition &

meaning.

(5) Reflection and Criticism :-

After understanding and summarising the text, the reader should come to conclusions whether the questions have been answered or not.

(2) Interpreting Technical Text \Rightarrow

There are 5 main sections of any technical paper :-

- (i) Introduction
- (ii) Materials
- (iii) Method
- (iv) Result
- (v) Conclusion

Each section should be analysed properly in order to make conclusion about the article.

Annotation :- Which reading one should underline important information and write notes in the margins. This strategy is called Annotation.

Often student keeps parts of the scientific articles they don't understand, but this leaves get in understanding there ability to analyse the data.

(3) Summarising Technical Text: \Rightarrow

The role of ~~summary~~ ^{summary} is to present the concise & clear presentation of the main document. It is meant to inform the reader who has not read the text or seen the presentation about the what the text is. It outlines the central idea & briefly describe supporting argument that develop the idea. The reader then come to know if the text is useful and whether it should be read or not.

Readers need summaries for various reasons:—

- (i) If you ~~to~~ know about the report / article without reading the entire document.
- (ii) To establish the ~~have~~ relevant report / article.
- (iii) To get an overview before going to details.

Types of Summary:—

- (i) Informative Summary
- (ii) Descriptive Summary

(i) Informative Summary \Rightarrow There are 3 main type of informative summary

- (a) Outline Summary which shows the order & the relation b/w the parts of retain material.
- (b) Abstract present the major points of the long piece of text or an article.
- (c) Synopsis gives a general idea of an article, story, book etc.

(ii) Descriptive Summary :— It depicts the original text rather than directly presenting the information it contains.

Writing and Effective Summary ⇒

- (i) Pre-writing stage
 (ii) Writing stage
 (iii) Re-writing stage

(4) NOTE MAKING ⇒

Making notes is not a simple activity it combines several skills.

There are several note making method :—

(A) The outline Method :—

This method is one of the most popular method in which notes are written in the form of outlines by using bullet points. This method saves a lot of time for further ~~red~~ reviewing & adding because notes are taken down in a well organised and structured form.

1. Main Topic 1

- Sub topic 1

- Sub topic 2

- (a) Supporting facts 1

- (b) " facts 2

- (c) " facts 3

- (i) Details 1

- (ii) " 2

— Examples

2. Main Topic 2

- Sub topic 1

- (a) Supporting facts 1

- (i) Details 1

- (b) Supporting facts 2

- (i) Details 2

Advantages :- (i) It highlights the key point of the lecture in a logical way.

(ii) It saves time.

Disadvantages :- (i) It's not suitable for subject like chemistry and mathematics that comprise formula & chart.

(ii) It does not work well if the lecture doesn't follow a certain structure.

(B) The Connell Method :- This system taking notes is designed for high school & college level student. It is a two column method. All the lecture notes should be taken to the right of this margin.

Cue (Recall) column	Note taking column
	1. Record <u><u><u> </u></u></u>
	2. Questions <u><u><u> </u></u></u>
	3. Recite <u><u><u> </u></u></u>
	4. Reflect <u><u><u> </u></u></u>
	5. Review <u><u><u> </u></u></u>
	SUMMARY

Advantage :- (i) It summarise all the information in a systematic manner.

(ii) It helps in quick learning in a shorter time.

Disadvantage :- (i) Require sometime for reviewing & summarising the key contents.

(ii) Format needs to be prepared before beginning to take notes.

(c) Charting Method :-

It is a suitable method for note taking in case information involves a lot of facts. The information is organised in several columns.

Type of Pollution	Causes of Pollution	Controlling Pollution	Recommendation	Conclusion

Advantage:- (i) It helps in presenting the information in a well structured manner.

(ii) It is excellent for reviewing.

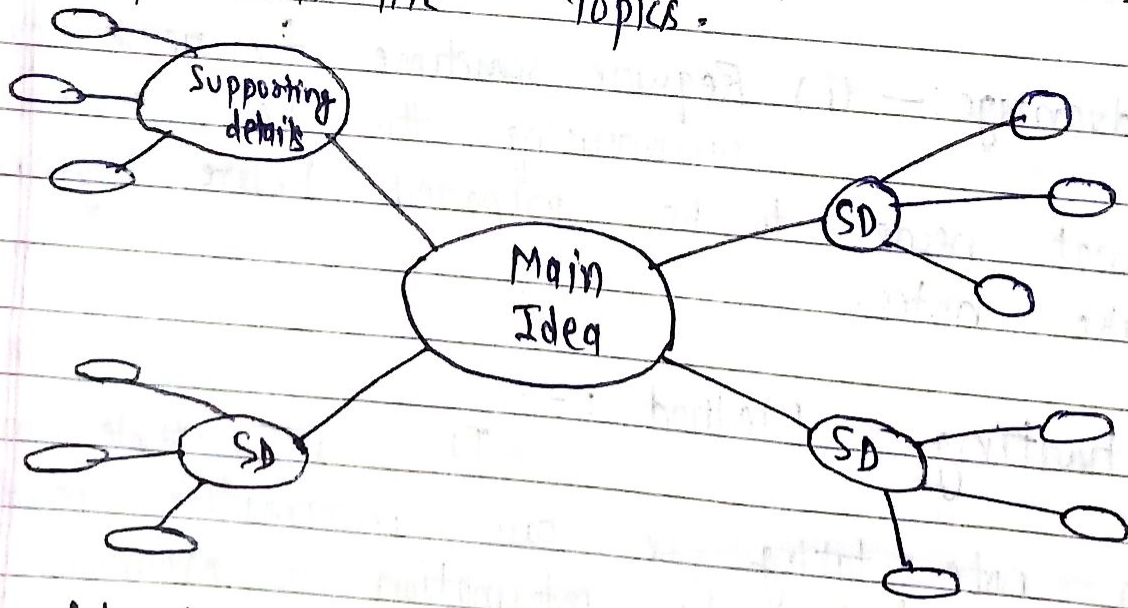
(iii) It helps in memorizing use information quickly.

Disadvantage:- (i) It is a time consuming

(ii) It doesn't work well for information that can not be easily categorized.

(D) Mapping Method =>

When the lecture contains is enormous. It helps organise notes by dividing them into branches enabling student to establish relationship b/w the topics.



Advantages:- (i) It allows easy adding of the notes.

(ii) It can be used for noting down detailed information but in the concise form.

Disadvantages:- (i) It can be confusing if the info. is wrongly placed while taking notes.

⑤ Type of Technical documents:—

Technical writing includes a wide range of document with specific needs for example, newsletters, proposals, advertisement, policies, brochures, reports, business plans etc. These are numerous type of mechanical documents. Hence, it becomes imperative to group them into 3 main categories.

(i) Traditional technical document:—

They are developed and written for an audience with a specific mechanical areas. The writer may include language of content. That an audience of experts understands.

Ex - Research paper, medical reports, repair manuals etc.

(ii) End-user document:—

It is used for electronics & other consumers products. It helps in understanding how to use technical items. ex - user manuals of computers (h/w & s/w), televisions phones, washing machine etc.

(iii) Technical Marketing communication:—

It is used for advertising, product promotion & marketing.
Ex - catlocks, adver. etc.

⑥ Information / data collection:—

Information collection method can be divided into 2 categories:—

(i) Secondary data collection method
The data which have already been collected by some agency & taken over from their and used by any other agency for their statistical work. It is a type of data that has already been published in books, newspapers, magazines, online portal etc.

(ii) Primary data collection method
The data which are originally collected by an agency for the first time for any statistical ~~work~~ investigation. It can be divided into two ~~core~~ groups:—

- (a) Quantitative research method
- (b) Quantitative research method
 - (I) Observation method
 - (II) Interview method
 - (III) Questionative method

⑦ Document Design:—

Document design concerns about the physical appearance of the document. Further more, a good document should effectively communicate as well as translate the main ideas to the audience.

Goals:-

- (i) The document must look professional and create a positive image of the product and the company.
- (ii) It should follow a logical & reasonable order.
- (iii) It must give the readers, the information they need.
- (iv) It should be designed in such a way that finding the info. is easy.
- (v) The document must convey the message clearly and accurately.

Ⓐ Factor affecting document design ⇒

- (i) Write space
- (ii) Written queues
The importance of written queues is to help the reader to find specific information quickly. These queues can be provided through the use of headings, headers & footers, icons, logos etc.
- (iii) Graphic aid
Graphs, tables, pictures etc.
- (iv) Balance
- (v) Proportion
It is about the size & placement of text as users as format elements within a document layout.
- (vi) Consistency :- It is about maintaining similar features in similar styles page after page.

9 Strategies for organising information ⇒

The organisation of information is finite as it can only be organised by LATCH. ~~LCST~~

L stands for Location

A stands for Alphabet

T stands for Time

C stands for category

H stands for Hierarchy

10 Writing for print & online media ⇒

→ Print is an author driven narrative while web content is a user driven narrative.

→ Print writing required well crafted and complete sentences. However writing in case of online media is repeat with fragmented sentences which often use the users full information carrying keywords to front.

→ print media includes televisions as well, people expect to construct his experience for them while in online media the users wait to construct their own experience by collecting content from multiple sources.

11 Information design for print & online media ⇒

There are 3 areas whereas design for digital & print media different from each other -

(i) Flexibility :- Designing for print is a static process. However designing for web is quite flexible and changes can be previewed and tested at every term.

(ii) Interaction with viewers :-

Web technology easily allows the user to click on any city or region on a map to go to a specialize page within more in depth information. On the other hand, print can amazed the reader with high impact visualization but there is no interaction with viewers.

(iii) Sensory Appeal :- Design in print reaches viewers at multiple sensory level. On the other hand web pages do not have the capability of ensuring the sense of touch.

(iv) Space & layout :- print media has a limited space while designing for web is typically free from special constraint.

(v) Colour & resolution :-

For digital design PPI (pixel per inch) & RGB (Red Green Blue) determine image quality. Designer for the web should strike a balance b/w using a high enough PPI so that images are clear and of high quality.

Unit - 3

TECHNICAL WRITING, GRAMMER & EDITING

- (a) Technical writing process
- (b) Important aspects of writing process
- (c) Forms of technical discourse
- (d) Basic grammar rules
- (e) Advance english grammar etc.
- (f) Common errors
- (g) Letter writing, email, resume, job application & minutes of meeting.
- (h) Planning, drafting & writing official notes.

(a) Technical Writing Process ⇒

TW	Creating Writing
① It is a direct, objective, precise & clearly define.	① It is narrative & descriptive in nature.
② sentence frame is simple & direct.	② sentence frames are indirect unclear & complex.
③ Figurative language is not use in TW & hence doesn't let an emotional impact on readers.	③ Figurative lan. is use in CW and hence does let an emotional impact on readers.
④ Visual aids like graphs, charts, diagrams, tables, etc are used to make the content easy to understand.	④ CW involves artistic imagination. The tone can be serious, casual funny, satirical.

(5) Research article, reports, minutes of meeting are the example of TW.

(6) Novels, poetry, play stories, fiction are the examples of CW.

Principle of TW (Tips of improve TW)

- (I) Remember your purpose.
- (II) Follow the concepts of 7 components i.e. brevity, accuracy, completeness, order, emphasis, consistency and objectivity of clarity.
- (III) Always ask questions like who, why, How, what & where before starting a new project.
- (IV) Make the content specific to its purpose & audience.
- (V) Have proper knowledge
- (VI) Use a style guide.
- (VII) Adopt appropriate writing style.
- (VIII) Follow the rules of grammar.
- (IX) Use diagram & other visual aids.

(B) Important Aspects of Writing Process

The writing process approach is about planning, revising, rearranging and deleting text before producing the final document for publishing. This process helps a writer explore his full potential. It is also helpful for those students who learning to write because it gives them a chance to analyze & discuss their own write as well as other student writing in the class.

5 steps to understand the writing process:—

(I) PLAN:—

- Identify your audience.
- Gathered the information such as bubble mapping, outlining & story boarding.
- choose a topic & create an outline.

(II) STRUCTURE

(III) WRITE

(IV) REVIEW

(V) PUBLISH

(C) Forms of Technical Discourse:—

Discourse is an extensive term used in reference to spoken and written languages in which writers try to communicate with the readers using literary devices and compositional technique (Rhetoric).

The most common modes of rhetoric are—

(i) Narration

(ii) Description

(iii) Persuasion:—

The purpose of persuasion discourse is to convince the reader to change their mode of thinking. These techniques are often used in advertisement and political ~~campaigns~~ argued writing campaign.

(v) Argumentation

(v) Exposition:—

This style of writing attempts to explain, inform or analyze an idea so that the readers know exactly what the writer means. Its purpose is to convey information about subject, method or an idea.

① Basic Grammar Rules ⇒

It is imperative for learners of English to understand the basic grammar rules which referred to the sentence, structures and parts of speech.

Guidelines for punctuation :—

(a) Capitalisation ⇒

(b) Colons :-

(c) Semi-colons :- It can be used in place of conjunction and also used to separate a list of things if there are commas within each unit.

(d) Comma :-

(e) Parenthesis :-

(f) Apostrophe :- father's

(g)

Advanced English Grammar Skills: —

(a) Compound & Complex Sentence ⇒

Two sentences which are independent to each other are called compound sentence.

eg - She is beautiful. She is intelligent.

one sen.

In which two sentences are dependent to another are called complex sentence.

eg - If you come I will give you.

(b) Infinitive & Gerund Sentence: —

The infinitive refers to ~~assess~~ ~~access~~ to an action that will take place in the future which the gerund describe the an action that has already happend or it is ~~con~~ currently happening.

Eg - To study }
To eat } → Infinitives
To write }
Studying }
Eating } → Gerund
Writing }

Common Errors: —

eg - (a) Myself i am suresh Babu -

eg - (b) I am having ~~a~~ & ~~a~~ brother & Sister

eg - (c) He don't a laptop.

eg - (d) I prefer coffee than tea.

- (a) I am Suresh Babu
 (b) I have 4 brothers & 3 sisters.
 (c) He doesn't have a laptop.
 (d) I prefer coffee to ~~tea~~ tea.

Letter writing, Email, resume, job application, minutes of meetings ⇒

(A) Letter :-

(a) Formal letter :-

Business letter, official letter, circular letter, employment letter, job application, service letter, enquiry letter, complaint letters.

(b) Informal letter :-

to friends, social letters related to Relative letter, colleagues,

(c) Social letter ⇒

Condolence letter, invitation letter, congratulation letter etc.

Business letter

Your address

Date

Inside address

Designation

Company name & address

Solutation: Dear Mr. Gupta

Subject:

Body of letter

opening para

Middle para.

concluding para.

Thanks & regards

Your sincerely

Signature

Your Name

- Designation

Enclosure

Diff b/w Resume / CV / Biodata .

	Resume	CV
(i)	It is a brief summary of one's skill and experience on one or 2 pages	It is more detailed & can stretch will bounds 2 pages
(ii)	It provides a brief of your skill & achievements & is used by fresh graduate or job seekers	It gives a complete record of one's carrier's history. It is used by professional & experienced peoples

Emails Eticetes:—

- (i) Always open your E-mail with a greeting or with proper solutation.
- (ii) If you are replying to a client enquiry you should ~~be gone~~ began with a live of thanks.
- (iii) State your purpose & write right to point at don't divert from the topic.
- (iv) Add your closing remark.
- (v) End with a appropriate closing.
- (vi) Always include your E-mail signature.
- (vii) Review and revise before sending.

Planning, drafting and writing official notes.

Noting & drafting:— Thought these are parts of daily govt. functioning which help to polish and reinforce the decision making process.

Stages to be ideally follows:—

- (i) Programs
- (ii) Organise
- (iii) Check-preference
- (iv) Discuss

Writing noting:—

- (i) Check the type of case
- (ii) Reviewing

Memo - random:—

A memo by definition is a written statement that you prepare specially for a person or committee in order to give them information about a particular matter.

Structure of a Memo ⇒

- | | |
|----------------------------|-----------------------|
| (i) Heading | (ii) Body of the memo |
| (iii) Necessary attachment | |
| (iv) Distribution list | (v) Writers initial |

To	
FROM	
Date	
Sub	<u>Body</u>

Minutes of Meeting:— It is a written or recorded documentation i.e. used to inform people of what happened during the meeting.

Points for writing MOM are:—

- (i) The name of the participants
- (ii) The name of the absenties
- (iii) Agenda
- (iv) Calendar on due date
- (v) Action on task
- (vi) Main points
- (vii) Discussions made by the participants
- (viii) Future discussion
- (ix) document such as images or attach files

Unit - 4

Advanced Technical Writing

Technical Reports

Type of technical Reports

Characteristics of technical Reports

Structure & format of Reports

Technical project proposal

Types of technical project proposal

Characteristic of technical proposal (TP)

Structure & format of TP

Technical Article

Type of Technical Article

Writing strategies.

① Technical Report:-

Whether a person is an employee in gov. or in a multinational company all almost everyone is asked to write the report at some point of time. Reports are important because in most organisation important decision making process is entirely based on these reports.

A formal document written for a particular audience to meet a particular professional need of the industry is called a report. It comprises facts related to specific situation, events such as analytical evaluation and interpretation of relevant data.

Reports provide a comprehensive data that motivate the reader to act accordingly. It communicate in ~~the~~ upward direction.

The importance of Report for any professional sector lie in the fact that the no. of business decision and research conclusion are made on based of info. presented or recommendation made in these reports. Thus the report serve several purposes which may include :-

- (i) Presentation of data
- (ii) Description of problems & suggestion
- (iii) Discussion & analysis of data
- (iv) Record of important events
- (v) Analysis of situation
- (vi) Proposing feedback, suggestion & recommendation

Q.15 Describe Technical reports, mentioning types and characteristics of technical reports in detail.

[R.T.U. 2018]

Ans. Technical Reports : Refer to Q.3.

Types of Technical Reports

Technical background report : This type of report is a technical description, to give some background of topics like

Technical Communication

wind power, environment protection, VLSI technology, etc. The other technical writings may be for the general understanding of students, teachers or a common public. Here, the target audience is not specific. Technical background report is usually meant for a specific group. While inviting proposals for hospitals, engineering institutes, technical survey, etc. The government, semi government and private organisations may give some background about the requirement. In many cases, the proposers may be nontechnical persons or persons with different specialization. Such technical description may help them in understanding the requirement of the problem or actual issue to be tackled. Such reports are usually provided on request basis and may be priced publications.

Instructions Report : When the students perform the laboratory experiments, to record the procedure, they describe it in the instruction form. For uniformity, teachers also, prepare standard instruction manual for the students. It may be typed and given in advance, so that the students can perform the practical systematically. It covers objective or aim of the experiment, instruments required to carry out the experiment, some theoretical concept necessary, procedure of actual experiment including some precautions necessary for the safety of the instruments and users. After performing the experiment the students write observation table, draw graphs, carryout some calculation, report the results and draw conclusion.

When equipments are manufactured and marketed by the manufacturer, it requires some guidelines for the user. Printed operating manual is supplied with the instrument, equipment, hardware and software, so that the users can use them properly, taking full advantage of their capability, ensuring safety of the equipment and the user.

Feasibility Study Report : When a new product is to be developed or a new technology is to be adopted for the existing product, or a model is to be changed or a new manufacturing process is proposed, feasibility study is necessary. Some experimentation may be done on the prototype, alternative technologies may be studied, various procedures may be analyzed and different revisions of models are tried. In some cases, the data of other workers and agencies may be collected. Market survey for demand and supply may be carried out. After experimentation, analysis, study or survey the final outcome is expected. The report may justify, the new product, technology, procedure, model or technique. The justification may be based on the state of art

technology and its awareness, available or trainable manpower, availability of equipment and material, infrastructure, resources, etc.

Recommendation report : When a government, semi government or a private organization, gets number of offers from different persons or agencies or organizations for a specific work, the offers are critically reviewed by the expert committee. The parties may be given the opportunity of presentation and demonstration. After this exercise the committee prepares and submits a report, to accept a particular product, procedure, technology, option or offer by a particular party. The decision may be based on the capability of the proposer and financial considerations. In a purchase committee recommendation, negotiations and discounts are also helpful.

Evaluation Report : Within the organization also, for implementation of a new policy, some committee may be appointed. Suppose, laptops are be given to all executive officers or professors, the evaluation procedure considers number of laptops required, available models, total cost involved and effect on the working efficiency may be evaluated, qualitatively and quantitatively. Report of the evaluation committee helps the management to taking the decision. Similarly, for a syllabus revision, assessment scheme, result analysis, ragging, student discipline, proposal for new courses, etc. issues committee may be formed and may give report.

Primary Research Report : It may not be related to some original work. Some experimentation may be done in house or some external facility may be used for the experimentation, some supporting survey may be carried out. The experimentation and survey work generates some data, which is analyzed to draw conclusion. The report may cover the experimentation, equipments, hardware, software, infrastructure, background of the problem and final outcome of the research.

Technical Specifications : While marketing the product, two types of manuals are used. Commercial manual describes the general details and cost aspect. The technical manual covers the detailed specifications of the product. It covers construction, materials, dimensions, size, weight, functions, operational features and special features. It may also, cover the market potential. A lot of alphanumeric data, tables, graphs, pictures are involved here. The stress is not laid on the quality of language but, facts and figures, highlighting the quality and performance characteristics of the product. It is aimed at

convincing the consumer. For smaller consumer goods, the presentation style may be simple. For major items, with high costing, the target readers may be purchase officers or marketing managers. Some better style of presentation is preferable.

Report Length Proposal : Some proposal report may be the result of years of work. Large number of people may be involved in the study and analysis. The population of samples may also, be very large. Such reports are published in a book form, by many government and semi government agencies. Many private industries and organizations can use such reports for their activities. In addition to some common features, it may include feasibility study, literature survey, qualifications of investigators and other persons involved in the process. Sometimes, this type of report may be the compilation of many other reports. The scope of the report is very wide and many details are covered here. For certain technological aspects, the government may establish some technical commission, which goes in to the details of such issues. At the end of the specified period, it comes out with the report.

Business Prospectus : To start a new business or to expand or diversify the existing business, the businessman or an entrepreneur requires support of other people. There may be private financiers, state and central governments or private and state owned or approved financial institutions, like banks etc., which may help for the said activities. The businessman or an entrepreneur has to prepare the blue print of his business plan. The business activity should be described at length, the market potential should be identified, the capacity of other manufacturers or businessmen should be reviewed, the import and export problems should be covered and total plan of fully fledged activity should be developed. The requirement of manpower, infrastructure, etc. should be studied and reported. In some cases, phase wise plan for five or ten years may be proposed. Initially profitability may not be there. By future projection, the breakeven point and state of profitability should be forecasted.

Q.10 *Discuss in detail, the characteristics of the technical reports.*

Ans. Characteristics of Technical Reports : The report may have 8-10 pages, typed or printed in proper format with proper margin and spacing. The upper size of the report is related with time, efforts and resources. If necessary, trim it as per requirement.

Content : The reports should be easy to follow, for a non technical person or a non specialist. The necessary technical

details may be covered but, over doze of technicality should be avoided.

Facts : As per the objective of the report and requirement of the target group of the agency assigning the job, the facts and figures should be covered. The necessary detailing of facts should not be sacrificed.

Sources : The technical report is the compilation of information from various sources, like publication in journals and books, technical brochures, personal and written communication with experts, site visits, surveys, etc. The sources of information should be reliable.

Documentation : As mentioned, the information compiled in the report is collected from different sources. There is a tradition of acknowledging the sources as references or other modes. This transparency will be liked by the original writers. All the information, data, opinions should be well documented.

Target Readers : Some times, the report is prepared by a committee and appointed for the purpose. So, it is ought to be specific. In other cases, it is desirable that the report aims at some specific group, so that it can meet with the expectations of that group. Too general report may not be useful to anybody.

Titles and Subtitles : The report may cover different aspects of the work. They may be given some titles or headings. In case of a detailed report, under each title, there may be a lot of content. It may be further sub divided into subtitles. The titles and subtitles help the readers in discriminating one topic or an aspect from the other and one subtopic from the other. On the writer side, it helps in proper organization of the report, with proper focusing and on user side it helps in proper understanding of the report. If somebody is interested in a specific aspect of the report, he/she can refer accordingly.

Physical Arrangement : The physical presentation of the report is concerned with typing and printing. The graphical or pictorial information may not be reproduced properly in computer or machine printing. Photo copying or scanning is advisable. A loose report or a strip binding or a spiral binding is not impressive and durable. Hard paper binding is advisable.

Graphics : In addition to description in alphanumeric form, the reports may have graphs, line diagrams, photographs, histograms, tables, pie charts, bar charts, line graphs, flow charts, block diagrams, etc. Graphics makes the report to be followed easily, more illustrative and authentic. It is an art to make the report impressive, by using graphics.

Q.6 *Enumerate the different parts in structure of technical reports.*

Ans. Technical reports have an organized format because a majority of your audience may not read the entire report in one reading. This specific format allows readers to quickly locate the information they need. Most technical reports include the parts listed below.

economical, so
research or inv
Main Body o
is covered here
problem was o
of the problem?
or combinatio

Shape : The reports may be typed or printed. The report may be in a bound form, if it is to be submitted outside.

Cover Page : Depending on the number of pages spiral binding, strip binding or hard paper binding is used. Standard A4 size, unlined, white plain papers are used. Hand written report is discouraged. The report usually starts with a cover page or the title page. The cover page covers title of the report, the name of agency or individual or group submitting the report, with complete address and contact details. It should also indicate the agency to which it is submitted. The actual date of submission along with signature of authorized signatory, with stamp and due date may be printed. Some of the government, semi government or private reports are referred by many people. They are published like a book. It is a prices publication. They may be given ISBN classification number in some cases.

Summary : After the cover page, the successive pages may cover the summary of the report. It gives some idea about the purpose and scope of the report.

Index : The index or table of contents, with page wise references is desirable. It gives clear cut idea, about the details covered in the report. If the report is very lengthy, just like a book, the index helps in referring particular part of the report. If somebody is interested in the particular process or procedure, it can be referred on specified pages. If somebody is interested only in results or conclusion, it can be referred accordingly.

Introduction : The main part of the report follows the introduction. If the report is about some research or experimentation, it is necessary to explain the actual problem. Why it was necessary to carry out the concerned research? If some disease or epidemic is not easily controllable, it may be leading to many untimely deaths and for the government, it may be creating a lot of socioeconomic and political problems, it may be necessary to carry out systematic research. In case of riots or floods or mass killing, the public opinion forces the government to appoint a committee for the investigation. What is the actual problem for the research or investigation that should be specified in the introduction, it defines the scope of the research or the investigation. How the research was carried out or what was the nature of investigation or experimentation that is specified here. Thus, it defines the background, which specifies technological, economical, social, political, legal condition under which the research or investigation was necessary.

Main Body or Core : The main body or core of the report is covered here. It first tries to identify the problem. How the problem was originated and what are the actual symptoms of the problem? The symptoms may be qualitative, quantitative or combination of the two. If the problematic event is a

onetime event, at what time and under which condition it took place? In case of a recurring problem, what are the factors leading to the problem? It is also necessary to know the exact time of occurrence of the event. The time frame helps in identifying other factors leading to it. If the problem has some geographical origin, it should be considered. In case of organizational problems, the section or department of origin is considered. If the problem is equipment related, the part creating problem should be mentioned. For a research or an investigation, usually the team is mentioned. The team includes the principal investigator and his team members. The research or investigation group follows some process or procedure in tackling the problem. If some hardware or software are used and if some experimentation or analysis is done, it should be described at length. In a survey report for a legal investigation, the exact procedure followed should be covered in detail. This part basically deals with tools and techniques. In case of a software based problem, algorithms and flow charts may be covered.

Results : In technical and scientific research, based on investigations, results are derived. The results are usually presented as observation tables giving a lot of alphanumeric data. The results are tabulated. Using the observations, some graphs and histograms are developed. The errors, means and standard deviations are found. In electronics, waveforms are recorded.

Conclusion : After getting the results, a lot of statistical analysis is done. To derive fruitful conclusion, large number of proper samples are taken under proper condition. If the condition is not proper, if the sample size is less and if the samples are not proper, the process may give wrong conclusion.

Recommendation : The research or investigation is done for a specific purpose. After completion of the research or the investigation, the results are analyzed. There is some conclusion of the work. Using the conclusion, recommendations are made for the future course of action. When some new medicine is developed, clinical trial is taken. The results of clinical trial, lead to some conclusion. If the medicine is able to cure some disease with excellent success ratio, regular production of the medicine can be taken up. If some diagnostic tool is developed and gives nearly 100% sensitivity and specificity, it is recommended for commercial production/application. If the research is original and the results are acceptable, the work can be recommended for a Ph.D. or a patent or an intellectual property rights (IPR), as the case may be. If the research is for a new process, procedure or material, with encouraging results the new process, procedure or material is recommended for routine practice.

References and Bibliography : For any research work, a lot of papers published in journals and presented in conferences are available. Some of the background may be available from some latest authentic books, also. Research is usually the extension of the work done by others. From failure and success of others, researcher learns many things, about various tools and techniques. In this process, he may strike at some new ideas. He can develop some new techniques. In science and technology, there is a tradition of expressing sense of gratitude to other researchers and authors by mentioning the references and books in a specified standard format. Now a days, due to internet and website, there is an explosion of information. It is an art to scan large number of references and select the relevant references.

Appendices : While writing the report, the researcher or the investigator has a lot of material. He tries to arrange the material in a logical sequence. The flow and content should be such that one can easily read and follow the report. In this process some information, particularly factual data, is necessary to make the report authentic. If all the information is covered in the main body, the flow is not smooth. Such data is usually covered at the end, as appendices. In the text the reference is given as Appendix I, Appendix II, etc.

Q.7 Explain shape and aspects of writing of technical report.

Ans. The formal technical report contains a complete, concise, and well-organized description of the work performed and the results obtained.

All reports have certain aspects in common regardless of expected usage.

Aspects of All Reports

- The report should be written in an active voice using the third person in most instances. Avoid using personal pronouns. Personal pronouns tend to personalize the technical information that is generally objective rather than subjective in nature. Use correct grammar, punctuation, and spelling. Attention to these details results in a professional tone to the report.
- All diagrams must be neatly presented and should be computer generated. Use a computer software package, such as Paint, Multisim or AutoCAD, to draw diagrams. Leave at least a one-inch margin on all sides of a full page diagram and always number and title all figures. Always insert a full-page diagram or graph so it can be read from the bottom or from the right side of the page.

Q.2 Define a technical project proposal.

OR

Describe what is a technical project proposal.

[R.T.U. 2018]

Ans. A technical proposal is a written official document to carry out some activity to specified conditions on either side with some financial consideration. One agency requires some material, some development or construction, some services, some software, or research. It advertises in a newspaper or a website or by any other mode, along with the nature of the product or services required, with detailed specification or scope of activity, conditions and time frame. The concerned, interested parties submit their techno-commercial proposals.

So, technical proposal is a written/printed document, indicating their interest in providing the service with specified conditions; procure material or equipment of given specifications; develop software for required application with given constrain; construct a building, road, bridge, railway line/station, dam, power house of given specifications; carry out research on a given problem or to solve some problem. The proposal also indicates financial expectations and other conditions like payment terms and time frame or schedule of completing the assignment.

Q.14 Discuss the kinds of Technical Proposals. Draft the format of technical proposal. [R.T.U. 2019]

Ans. There are four types of technical proposals :

1. Business Proposals
2. Research Proposals
3. Educational Proposals
4. Accreditation Proposals

1. Business Proposals : Supply of material, construction of roads, buildings, railway, a garden, a bridge, a dam, a party plot, a parking lot, etc; providing services for transportation, washing, catering, safety, security, insurance, fire fighting, training, consultation, recruitment, maintenance, etc; procurement of equipment, hardware, software, stationary, etc; all these can be considered as business proposals. One side has the requirement of material, machinery or man power or requires some type of service or requires development of some infrastructure or utilities. This first party has the funds but, it has no facility for in-house manufacture of the said item, or the temporary requirement is more than its manufacturing capacity, has no competent manpower to develop the said hardware or software, or to provide in house training, or the requirement is urgent and the organization cannot spend time for this activity or cannot wait, or in some cases the in-house solution is not cost effective or the

organizer is not able to diversify its activity. Under this condition, there is no option but, to take help of external persons or party. For the material, the type of material, its quality and quantity, schedule of requirement, affordable price, etc. may be identified. For the building or any other infrastructure or equipment, the specifications may be finalized. For the services, the nature of services required, duration of the services, urgency or priority of the services, quality of services, quantum of services, liability on either side, etc. are fixed up. For the equipment, the specifications are decided. For the hardware and software, technical details are decided. In case of a problem or a project, it is well defined. In this category of business or sales proposal, the initiating company requires the material, machinery, manpower, services, etc. For this purpose, after finalizing the deal, agreement will be made with the selected proposer. Apart from technical aspects of the deal, the financial aspects like initial quoted price, negotiated price, taxes, transportation charges, mode of payment, penalty clause, etc. should be well clarified by both the sides otherwise, there may be a legal dispute and the assignment may be delayed. Sometimes earnest money deposit (EMC) is taken against major proposals.

Characteristics of business proposals: Business proposals lead to some form of agreement for material, machinery, manpower or services from one party to the other party, against the financial return. Proposer has to convince the solicitor that it can supply the quality material at competitive price, required machinery with required specification at competitive price, provide the required manpower with appropriate qualification and experience, in required number at given time. In case of services, quality and promptness of service are to be ensured. In all the cases, competitive price is a deciding factor. The proposal should be rich in information. The arrangement of proposal should be easy to follow. The arguments should be logical. The information and supporting documents should be able to convince the initiator, about the competence, market standing, financial and technical soundness, capability and bonafide intentions of the proposer. Technical capability is also reflected by style of presentation in the proposal. Personal touch is desirable. The customer should fill that he is not spending the money but, is investing the money. This investment will earn value addition for him. The requirements and expectations of the solicitor should be well addressed. Doubts and expected queries, from the solicitor, should be addressed before hand. The structure of

the proposal should be sound. All the points related to the background of the proposer, objective of proposal, steps to be followed in implementation, schedule of implementation, quality assurance, specialty of approach, financial and technical soundness, keenness to undertake the assignment, payment terms, willingness to negotiate or justification of quoted price, strength of qualified and experienced manpower, major assignments successfully undertaken in past and final summary of the proposal should be covered and main points should be highlighted.

2. Research proposals : A research proposal is a document proposing a research project, generally in the sciences or academia, and generally constitutes a request for sponsorship of that research. Proposals are evaluated on the cost and potential impact of the proposed research, and on the soundness of the proposed plan for carrying it out. Research proposals generally address several key points:

- What research questions will be addressed and how they will be addressed.
- How much time and expense will be required for the research.
- What prior research has been done on the topic.
- How the results of the research will be evaluated.
- How the research will benefit the sponsoring organization and other parties.

Research proposals may be invited internally or externally. Government and public undertakings, private organizations and educational institutes encourage the research activities. For the technological growth of the nation and survival of the industries in global competition, research is inevitable. There are certain funding agencies at national and international level for the research. All India Council for Technical Education (AICTE), Government Department of Electronics (DOE), Department of Science and Technology (DST), Defence Research and Development Organization (DRDO), Central Scientific and Industrial Research Organization (CSIR) and University Grants Commission (UGC) are some of the government agencies, sponsoring research in science and technology. From time to time, they invite research proposals on thrust areas and other areas decided by them. There is some government organizations, exclusively set up to carry out full time research, in specific area already identified or areas which may be identified in future. Space Application Centre (SAC), Indian Space

Research Organization (ISRO), National Physical Research Laboratories (NPRL), Institute of Plasma Research (IPR), etc. have scientists and engineers employed on regular basis to carry out the research.

Characteristics of research proposals : R&D proposals stress on the research concept, its originality, and social, economical, academic gains. If some indigenous development, import substitution, cost effectiveness, energy conservation, new source of energy or efficiency gain is envisaged, it should be highlighted. If it is likely to lead to patents or intellectual property rights or prestige for the organizations involved, should be highlighted. Over all line of action and road map of project implementation should be presented. Capital and recurring costs, necessary infrastructure and other facilities required should be estimated. The contribution of either side should be well defined. This type of proposals are weighted by the qualification, experience, expertise and achievements of the coordinator or principal investigator of the R&D project proposed and his team, reputation and track record of the organization, where the project is to be carried out, infrastructure, library and computational facility available, and commitment of the organization.

3. Educational Proposals : Education spans from playgroup, kindergarten, primary school, secondary school, higher secondary school; under graduate colleges of various faculties like arts, commerce, science, law, pharmacy, engineering; post graduate institute and institutes offering Ph.D. programmes in various faculties and various branches in case of engineering. At lower, school level, local authority may be involved. At the higher school level, district and state authority may be involved. At the college level, state government, university and national authorities, like University Grants Commission (UGC), AICTE, Medical Council, Pharmacy Council, etc. may be involved. In all the cases, proposals are to be submitted to the competent authority, to initially start the institute with specified intake and later on to continue to run the institute. For schools and colleges, not offering professional courses, usually proposals are not invited. A particular trust or a body plans to start a school or a college. It prepares the proposal in a specified format and approaches the concerned authority.

Characteristics of educational proposals : For technical institute proposals, social commitment should be highlighted rather than profit orientation. The experience of running such other organizations, their success stories, acceptance by

students and employers, employability of students, quality assurance plan, faculty strength, infrastructure and utilities development, library, computer center, canteen facility, hostel are the key requirements. If some facility is existing, it should be highlighted with plan of expansion with time schedule and resources available or identified. The bonafide intentions are also projected by academicians, technocrats, social leaders, economists, government officers, and other renowned representatives in the governing council or board of trustees.

4. Accreditation Proposals : There is a national board accreditation for the accreditation of programmes offered by engineering institutes. Accreditation is programme wise, for the strengths and weaknesses, as per specified format. The detailed criterion covers teaching learning aspects, management aspects, administrative aspects and financial aspects. The information covers student intake, admission process, result, recruitment, student feedback, teacher feedback, employer feedback, etc. The visiting team interacts with the students, the faculty, the supporting staff, the management, the administration, the guardians and the employers too. Similarly, for Institutes and Universities, there is NAAC accreditation. These accreditations are not mandatory but, are useful for the institute or university to find its strengths and weaknesses and get third party assessment. There are various laboratories, testing equipments of different types. For the manufacturer, such testing is necessary for quality assurance with third party check. For the customer, it is necessary to verify the specifications and expected performance. The Bureau of Indian Standards (BIS) permits laboratories at some institutes to carry out the testing and issue certificate on behalf of BIS. There are some government and semi-government laboratories having good testing facility, to test as per the compliance of national or international standards. Electronic Quality and Development Centers (EQDC) and Software Testing and Quality Centers (STQC) also offer such facilities. These laboratories are approved by NABL, to undertake testing of certain items and software.

Nowadays, there is a trend for ISO certification. BIS and testing laboratories concentrate on quality of the product, in terms of verification of specifications and claimed performance. On the other hand, ISO concentrates on the verification of process and procedures. Logic is that, if the process and procedure are as per established standards, the product quality and performance of an organization can be

ensured. It may be a debatable point. But, ISO certification agencies are doing a good business. They do not invite the proposals. Government and private offices, educational institutes, banks and industries opt for such certification. There are number of consultants, who help in preparing and submitting the proposals for ISO certification and they also help for the defence of the proposal.

Characteristics of Accreditation Proposals :

Accreditation proposal formats for technical institutes are also well defined. Specific, quantitative information is required on various aspects. It may be laboratory facility, library facility, computer facility, faculty and staff strength, management, administrative, financial and academic details, hostel, transport, utilities. Feedback of all stakeholders is given due weightage. The format is so specific that it is difficult to hide weaknesses or negative points. For test laboratories, all the test equipments necessary to test with compliance of necessary standards are to be ensured. For ISO certification, procedures and practices ensuring smooth, systematic working and presenting transparency are to be highlighted.

Structure of the Proposal : The structure of the proposal is usually specified by the soliciting agency, as some well designed format.

Introductory Part

Cover Page: When some organization, industry or a statutory body invites the proposal in a specified format, this type of cover page may contain the name and address of the soliciting body inviting the proposal, along with its complete address, phone numbers, email addresses and its websites. In case of a statutory body, it mentions that the state or central government department under which it is working.

In bold letters and in a well defined rectangular block, it may mention the specific purpose, for which the proposals are invited and the target group of proposers.

The same page may also contain some instructions regarding preparation of the proposal. The dos and do not's for the proposal, the number of copies to be submitted and mailing address for the proposal may be specified by the soliciting organization.

Title Page : Title page is usually, the first page from the proposer side. Sometimes the format of this page may also be specified by the inviting organization. Otherwise, the proposer may prepare its design. The first option results in some uniformity. It is for administrative purpose. Again, it indicates the title of the proposal or project or assignment. It

also, covers the name of the authority to which proposal is submitted. The proposal usually goes in the name of the competent authority from proposer side. The authorized person may be a head of the department in an engineering educational institute, head of the educational institute, a registrar of the university, a principal investigator for the R & D proposal, a co-ordinator of the training programme or activity, or a chief operating officer of the company. The bottom of the title page requires dated signature with name, designation and official seal of the authorized signatory and institute. The whole responsibility about the correctness of facts and figures presented in the proposal and authenticity of documents solely lies with the authorized signatory. It is a part of the proposal.

Covering Letter: Particularly in government, semi government offices and some private organizations also, there is a system of writing a covering letter for any application or proposal. It starts with the name and address of the sender. It is addressed to the head or the controlling officer of the receiving organization, with or without name, designation and address. It is followed by "subject: ...", which mentions the subject or purpose of the communication, in one line. It may be followed by "Ref:.....", which covers the reference no. of the letter or the advertisement, inviting the offers or proposals. The next one or two paragraphs, mention the purpose of sending the proposal. This type of covering letter is given some outward number with date, which can be referred in the future communication or the reminder.

Summary of Proposal : In the beginning of the proposal, this type of summary highlights the whole proposal in short. It is the overview of the proposal. For initial scrutiny of the proposal, it gives idea about the purpose, nature of proposal, background and strength of the proposer. In initial scrutiny, if it is short listed, the proposal may go for final scrutiny or may be considered for personal visit of the expert team for personal interaction and assessment. If the summary is impressive, it will encourage the receiver to go through the whole proposal. Otherwise, it may be put aside.

Q.15 Describe Technical reports, mentioning types and characteristics of technical reports in detail.

[R.T.U. 2018]

Ans. Technical Reports : Refer to Q.3.

Types of Technical Reports

Technical background report : This type of report is a technical description. to give some background of topics like

disadvantages of the project. Reports may be related to physical description, process analysis, examination, laboratory and design. Technical reports are also classified as technical background report for information on a technical topic, instruction report for the activity or equipment, feasibility report for viability of a project, primary research report about experimentation and survey. Technical report may cover construction, working, special features and market potential of a new product, proposal reports are very detailed one, including feasibility analysis, literature review, etc. Business prospectus is also a report targeted at investors:

PART-B

Q.4 Explain the importance and types of technical articles. [R.T.U. 2019]

Ans. Importance of Technical Articles : Technical articles describe, discuss, or analyse a systematic investigation towards increasing the sum of knowledge in a specific field.

Technical and research articles are essential to all fields of science, technology, humanities, and management as they add to the existing knowledge and understanding of a particular topic or subject. Writing a technical article that can be published in a professional journal, or presented in a seminar or conference is a challenging understanding.

A technical article is an important form of technical communication, and it is essential to know how to write a technical article in order to be able to contribute to one's area of interest and specialisation. Technical paper writing skills help in achieving academic and occupational goals by establishing the authors presence in the professional world. Moreover, it will give a high degree of professional satisfaction and help in career advancement.

A technical article is a written composition describing, discussing, or analysing a systematic investigation towards increasing the sum of knowledge in a specific field. It transfers new research and findings to other scientists and researchers in the field by giving a systematic account of the results of some survey, research, fieldwork, and other activities. As it is an objective presentation of technical information, it distinctly and independently explores one area of research, and presents an objective analysis and interpretation of facts, findings, inferences, suggestions, recommendations, and conclusions.

Technical articles differ from general articles in style, presentation, and objectives. Unlike a general article that may

follow any form and pattern, a technical article is highly formalised in structure. For example, any technical article in a professional journal has the same major sections as all the others. On the other hand, two articles from the same film magazine, will be different in structure. Technical articles involve the use of technical vocabulary, specialised terminology, graphic aids, and a particular writing style. Moreover, while writing a technical article, the writing conventions of the particular discipline need to be followed.

Types of Technical Articles

Criteria	Types	Description
Mode of presentation	Journal articles	Communication of technical information in a structured form as per the established pattern for articles acceptable for publication in a particular journal
Content and functions	Conference Papers Review articles Research articles	The written form of a technical presentation that the author has presented in a seminar, conferences, or workshop Evaluation and analysis of published work on a particular topic An objective description and discussion based on a research project or on a small scale study

Journal Articles and Conference Papers : A journal article is the communication of technical information in a structured form as per the established pattern for articles acceptable for publication in a particular journal. The form of a journal article is as important as its content because most journals follow a style guide that the technical writer has to use to structure the article. These style guides provide detailed writing instructions that may include guidelines about the preparation of text, organisation, length, referencing system, and use of symbols, abbreviations, illustrations unit symbols, and so on.

A conference paper is the text of a paper that the author has presented in a seminar, conference, or workshop. As it is the written form of a technical presentation, it follows the pattern in which it has been presented before the audience. It may be published in the "proceedings" of the conference in which it has been presented. However, the academic value of a conference paper is usually less than that of a journal article. The main reason is that the reviewing process of journal articles is usually more formal and systematic than that of seminar papers. Moreover, the editor of a professional journal usually receives a large number of articles, and he or

she may adopt strict norms and select only a few of them. In contrast, the organiser of a professional seminar may not have the option of rejecting many conference papers.

Review and Research Articles : A review article is an evaluation and analysis of published work on a particular topic. The main purpose of a review article is to evaluate a published work in order to determine its academic value and research potential. While reviewing a particular piece of published research work, the review writer tries to answer the question, "How does the work under discussion increase the sum of knowledge in a specific field?". The review writer may also comment on the necessity for future research in the concerned area and purpose certain directions.

A research article, on the other hand, is based on original research carried out by the author. It may be the outcome of a particular research project carried out by the author or the result of a small scale study. The research might have been carried out in the laboratory or in the field. It might be theory based, or a part of action research to develop certain methods, equipment, procedures, systems, and so forth. The main purpose of a research article is to add to the existing knowledge, understanding, and scope of a particular subject. A research article could be either published in a journal or presented in a conference in order to achieve its objective.

Q.5 Write strategies, structure and formats of technical articles.

OR

Discuss the types, structure and written formats of technical articles. [R.T.U. 2018]

Ans. Elements of Technical Articles: Technical articles are formed technical documents, and are highly formalised in structure. They usually follow fixed-formula pattern to ensure objectivity. The components of a technical article include title, author by line, abstract, introduction methodology, results, discussion, conclusion, appendices, and references.

Title : All technical articles begin with a title. The title of a technical article is usually a long phrase that contains keywords and indicates the content of the article. It gives the readers a clear idea of the topic that is discussed in the article. A vague, abstract, or very general title will fail to indicate the content and will not be communicative. It is, therefore, important that the title of a technical article is informative, specific and comprehensive.

While writing the title of a technical article, sufficient information should be included for the reader to be able to understand the content of the article. This may be the title lengthy, but is better to use a lengthy title that is clear than to use a

short but unclear title. It is important to have a title that is specific and contains keywords that will guide the reader to the article.

Author By-line : This is the second element of a technical article. It includes the name of the author followed by institutional affiliations. The following are some examples:

1. LIZA SMITH
Nicholas Parker UK Ltd.
London EC3N 4HJ, UK
2. R. Ravi Kumar
Department of Organisation Behaviour,
Indian Institute of Management
Bangalore, India
3. V. Kumar and Dinesh Chandara
Department of Electronics and Instrumentation,
Indian School of Mines,
Dhanbad-826004, India

Abstract : The abstract is the most important element of a technical article. There are two kinds of abstract, that is, descriptive and informative. The descriptive abstract talks about the article and briefly states what the article contains while the informative abstract summarises the essential information in the article, focusing on key facts, findings, observation, results, conclusions, and recommendations. As informative abstracts are more comprehensive and self-explanatory than descriptive abstracts, most professional journals prefer the former to the latter.

Introduction : The main part of a technical article usually begins with an introduction that introduces the reader to the topic or research work under discussion. This section helps the reader to understand the article as it includes facts that the reader must know in order to comprehend the discussion and analysis that follow. A good article introduction may include some or all the following elements:

- **Background :** An objective description of the background of the problem, or events and conditions that led to the problem under discussion.
- **Research Status :** The status of research related to the problem, and the need of the present research.
- **Purpose :** Aims and objectives of the research or investigation.
- **Significance :** The significance of the work under discussion.
- **Methods :** Methods or procedures used to carry out the research work, and the rationale for using specific methods of investigation.
- **Scope :** The scope and limitation of the problem investigated.

Methodology : While writing a technical article, certain methods and materials need to be used to carry out the investigation. The professional value of an investigation largely depends on using appropriate methods and materials. In order to establish the validity of the findings, the materials and methods used need to be described with the rationale for using them. This may involve an objective description of materials that were used to conduct the investigation, the conditions under which the work was done, the methods of data collection, the procedures for investigating the situation/problem, and the criteria of survey.

Results/Findings: This is the main part of the article as it presents the results or findings of the investigation. This section is concerned with 'what was done', 'what happened' or 'what was looked into'. It focuses on facts and objectively presents the outcome, results, and findings of the research. It is usually divided into sections and sub-sections with well-structured and clear headings and sub-headings. This section should be written as carefully as possible because the value of the article depends on the relevance of its results.

Discussion: This section presents an analytical discussion of the results and findings of the investigation. It is an extension of the earlier section. As it conveys the significance meaning of the findings to the reader, it analysis the causes, implications, and significance of these findings. Moreover, it establishes a link between the findings and the existing research in the concerned area.

Conclusion: This section concludes the article by summarising the important highlights of the article. It may contain recommendations that are based on results and discussion. It may also indicate the need and nature for further work in the concerned area.

Appendices : A technical article may contain appendices. An appendix contains supporting material or data that is kept separate from the main body of the article to avoid interrupting the line of development of the article.

References: This section may contain references to books, journals, reports, dissertations, or/and published government documents, and so on used in the article. It may used the referencing method approved in the particular discipline to which the article belongs.