

CBCS SCHEME

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BRMK557

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Research Methodology and IPR

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course Outcomes.

Module - 1			M	L	C
Q.1	a.	Identify the meaning of Research and brief out the objective and motivation in engineering research.	10	L1	CO1
	b.	Explain brief about research cycle and verify with the research flow diagram.	10	L1	CO1
OR					
Q.2	a.	Identify the types of engineering research and briefly explain them.	10	L1	CO1
	b.	Explain about the different types of research misconduct.	10	L1	CO1
Module - 2					
Q.3	a.	Explain about the importance of literature review and technical reading.	10	L2	CO2
	b.	Mention the various benefits of bibliographic databases.	10	L1	CO2
OR					
Q.4	a.	Identify the impact of technical reaction and brief about it.	10	L1	CO2
	b.	Enumerate the impact of title and keywords on citation with example.	10	L2	CO2
Module - 3					
Q.5	a.	Define Intellectual properties and explain about its types.	10	L1	CO3
	b.	Explain about the key aspect of patent law.	10	L2	CO3
OR					
Q.6	a.	Explain about the assessment of novelty.	10	L1	CO3
	b.	Brief about the patent procedure in India.	10	L1	CO4
Module - 4					
Q.7	a.	Mention and brief about the justification for copyright law.	10	L2	CO4
	b.	Explain about the basic concepts of under lying copyright law.	10	L1	CO4
OR					
Q.8	a.	Brief about the various representations of sound recordings.	10	L2	CO5
	b.	Explain about TRIPS agreement in detail.	10	L1	CO5

Module - 5					
Q.9	a.	Explain about the justification of protection designs.	10	L2	CO5
	b.	Brief about the excluded subjected matter in the context of design protection.	10	L1	CO5
OR					
Q.10	a.	What are the rights of the owner of designs? Explain.	10	L1	CO5
	b.	Brief about the Assignment of Design Rights.	10	L1	CO5

Q1 a. Identify the meaning of Research and briefly outline the objective and motivation in engineering research. (10 M, L1)

Research is a careful, systematic, and objective process of searching for knowledge or formulating theories. It involves well-defined or redefined methods and is driven by a curiosity for the unknown. The aim is to address a specific aspect, contributing original insights that expand the existing knowledge base and offer useful applications.

- Research involves formulation of hypothesis or proposition of solutions, data analysis, and deductions; and ascertaining whether the conclusions fit the hypothesis.
- Ex: If you're studying the impact of exercise on mental health, your hypothesis could be: "Regular exercise reduces levels of anxiety in adults."

Motivation in Engineering research

Intrinsic motivations

- Interest, challenge, learning, meaning, purpose
- Linked to strong creative performance

Extrinsic motivations

Fame, money, awards, praise, status - STRONG MOTIVATORS - block creativity.

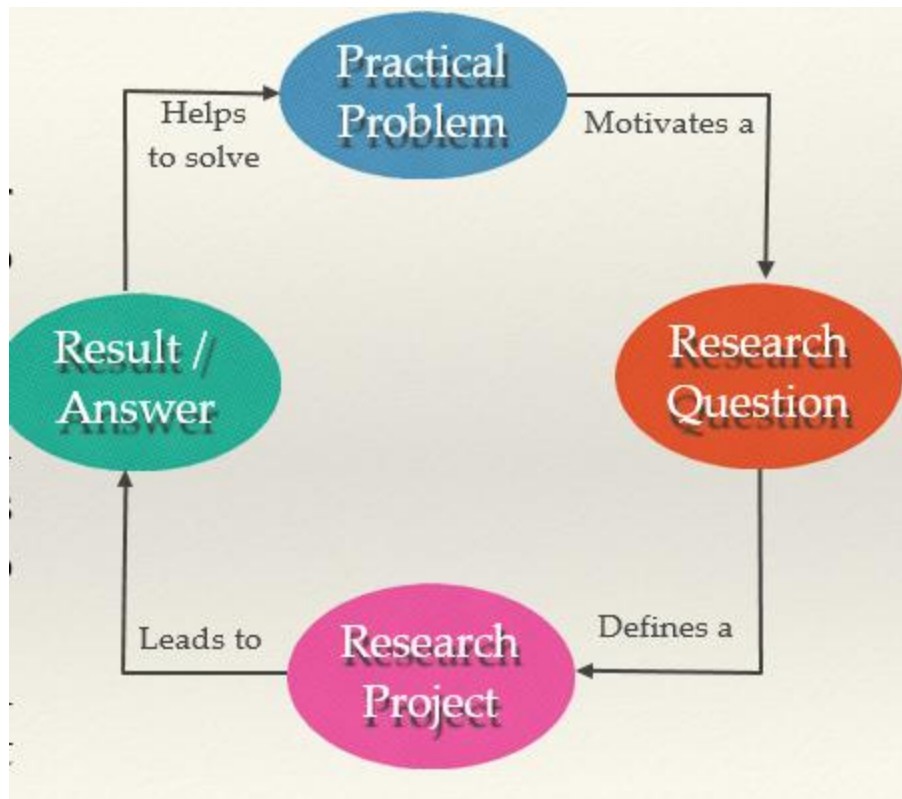
External motivation

Influences from others like competition, collaboration, commitment, and encouragement are also motivating factors in research.

For example: my friends are all doing research and so should I, or, a person that I dislike is doing well and I want to do better. arch outcome may enable to get a patent - rich and fame

Personal motivation in solving unsolved problems, intellectual joy, service to community, and respectability are all driving factors

Q1 b. Explain briefly about the research cycle and verify with the research flow diagram. (10 M, L1)



The research cycle starts with a practical problem.

Practical problem: one must be clear what the problem being attempted to solve is and why it is important.

The question helps one zero in onto manageable volume of information, and in turn defines a research project which is set of activities that ultimately leads to result or answer, which in turn helps to solve the practical problem that one started with in the first place

- The objective of a good research program is to try and gain insight into something. Or indeed, to try and solve a problem. Good research questions develop throughout the project actually and one can even keep modifying them.
- Through research, one would like to make, or develop, new knowledge about the world around us which can be written down or recorded in some way, and that knowledge can be accessed through that writing or recording.

The ways of developing and accessing knowledge come in three, somewhat over-lapping, broad categories:

• **Observation** is the most fundamental way of obtaining information from a source,

Observation takes different forms from something like measurements in a laboratory(Measuring the temperature change in a chemical reaction) to a survey among

a group of subjects(A survey to assess customer satisfaction) to the time it takes for a firmware routine to run(Measuring how long it takes for a program to execute). The observational data often needs to be processed in some form and this leads to the second category of knowledge, the model.

- **Models** are simplified ways of describing very complex interactions in the form of a statistical relationship, a figure, or a set of mathematical equations.For instance, the modeling equation captures the relationship between different attributes or the behavior of the device in an abstract form and enables us to understand the observed phenomena.

- The final category(**Processes**) is a way of arranging or doing things through processes, algorithms, procedures, arrangements, or reference designs, to get a certain desired result.The final category(Processes) is a way of arranging or doing things through processes, algorithms, procedures, arrangements, or reference designs, to get a certain desired result.

Q2.a. Identify the types of engineering research and briefly explain them. (10 M, L1, C)

Types of engineering research

1. Descriptive vs Analytical research

Descriptive research

comparative and correlational methods, fact-finding investigation, No control over the variables rather focus on reports.

Example: "Customer satisfaction with an online shopping platform."

70% of customers are satisfied, with product variety being the most appreciated feature.

2.Analytical research

Facts available for analysis, critical evaluation, Better control over variables, focus on the outcomes.

Example: "Factors influencing customer satisfaction with an online shopping platform."

Outcome: Delivery time has the strongest influence on satisfaction compared to price or product quality.

Descriptive: "What is happening?"

Analytical: "Why or how is it happening?"

3.Applied vs Fundamental research

Applied research

Focuses on immediate problems facing the organization.

Fundamental research

Pure or basic research, formulation of theory and generalisations. Eg. Mathematical researches. The primary objective of applied research is to determine a solution for compelling problems in actual practice, while basic research is aimed at seeking information which could have a broad base of applications in the medium to long term.

4.Quantitative vs Qualitative research

Quantitative research

Uses statistical observations, large data involved.

Ex: Effectiveness of an online learning platform."

Qualitative research

Less volume of data, focus on few non representative cases.

Ex: Students' experiences with an online learning platform."

Q2 b. Explain about the different types of research misconduct. (10 M, L1, C)

Research conduct

- Fair dealing with others
- Honesty about methods and results
- Protecting the welfare of research subjects.
- Ensuring laboratory safety

Fabrication of data

Illegitimate creation of data

Example: Adding imaginary data points to a drug trial to show efficacy.

Falsification of data

Inappropriate alteration of data

Example: 1.Modifying temperature readings in an environmental study to exaggerate climate trends.

2. Suppressing negative side effects of a drug during clinical trials to favor approval.

Plagiarism

Plagiarism takes place when someone uses or reuses the work (including portions) of others (text, data, tables, figures, illustrations or concepts) as if it were his/her own without explicit acknowledgement.

How are supervisors, reviewers or editors alerted to plagiarism?

Original author comes to know and informs everyone concerned.

(ii) Sometimes a reviewer finds out about it during the review process

(iii) Or, readers who come across the article or book, while doing research.

Other Aspects of Research Misconduct:

Simultaneous submission of same article to different journals.

Ethical issues as described by Newmen and Jones:

Credit for research contributions

Authorship- Accountability, significant contributor in research design, data interpretation or writing of paper

Citation - previously published research work.

Acknowledgement - External inputs to research work.

3a explain the importance of literature review and technical reading

The primary goal of literature review is to know the use of content/ideas/approaches in the literature to correctly identify the problem that is vaguely known beforehand, to advocate a specific approach adopted to understanding the problem, and to access the choice of methods used. It also helps the researcher understand clearly that the research to be undertaken would contribute something new and innovative. The quality of such review can be determined by evaluating if it includes appropriate breadth and depth of the area under study, clarity, rigor, consistency, effective analysis.

New knowledge in research can only be interpreted within the context of what is already known, and cannot exist without the foundation of existing knowledge. In this chapter, we are going to look at how that foundation of knowledge needs to be constructed so that our new knowledge is supported by it. The new knowledge can have vastly different interpretations depending on what the researcher's background, and one's perception of that new knowledge can change from indifference to excitement (or vice versa), depending on what else one knows. The significance can normally be argued from the point of view that there is indeed an existing problem and that it is known by looking at what already exists in the field. The existing knowledge is needed to make the case that there is a problem and that it is important. One can infer that the knowledge that is sought to be produced does not yet exist by describing what other knowledge already exists and

by pointing out that this part is missing so that what we have is original. To do this, one again needs the existing knowledge: the context, the significance, the originality, and the tools. Where does

this existing knowledge come from? Normally, one finds this knowledge by reading and surveying the literature in the field that was established long ago and also about the more recent knowledge which is in fact always changing. With this foundation in place, the new knowledge that one will make will be much more difficult to challenge than without that strong foundation in place which is ensured with lots of references to the literature. A good literature survey is typically a two-step process as enumerated below:

(i) Identify the major topics or subtopics or concepts relevant to the subject under consideration. (ii) Place the citation of the relevant source (article/patent/website/data, etc.) in the correct category of the concept/topic/subtopic (with the help of a __, for example). A comprehensive literature survey should methodically analyze and synthesize quality archived work, provide a firm foundation to a topic of interest and the choice of suitable research methodologies, and demonstrate that the proposed work would make a novel contribution to the overall field of research.

Technical Reading

It is now imperative for any active researcher to keep oneself abreast with research outcomes in their field of interest. Finding the right work to read can be difficult. The literature where knowledge is archived is very fragmented and there are bits and pieces all over the place. Very rarely will one find everything that one wants close together in one place. However, it is obvious that the number of papers relevant to a particular researcher is very few, compared to the actual number of research papers available from peer-reviewed technical sources. It is also important to know where to read from; relying on refereed journals and books published by reputed publishers is always better than relying on easily available random articles off the web. While reading an engineering research paper, the goal is to understand the technical contributions that the authors are making. Given the abundance of journal articles, it is useful to adopt a quick, purposeful, and useful way of reading these manuscripts [7]. It is not the same as reading a newspaper. It may require rereading the paper multiple times and one might expect to spend many hours reading the paper. A simple, efficient, and logical approach is described in this section for identifying articles and reading them suitably for effective research.

Amount of time to be spent will get ascertained after an initial skimming through the paper to decide whether it is worth careful reading. There will also be papers where it is not worth reading all the details in the first instance. It is quite possible that the details are of limited value, or simply one does not feel competent to understand the information yet. Start out the skimming process by reading the title and keywords (these are any-ways, probably what caught the initial attention in the first place). If on reading these, it does not sufficiently seem to be interesting; it is better to stop reading and look for something else to read. One should then read the abstract to get an overview of the paper in minimum time. Again, if it does not seem sufficiently important to the field of study, one should stop reading further. If the abstract is of interest, one should skip most of the paper and go straight to the conclusions to find if the paper is relevant to the intended purpose, and if so, then one should read the figures, tables, and the captions therein, because these would not take much time but would provide a broad enough idea as to what was done in the paper.

If the paper has continued to be of interest so far, then one is now ready to delve into the Introduction section to know the background information about the work and also to ascertain why the authors did that particular study and in what ways the paper furthers the state of the art. The next sections to read are the Results and Discussion sections which is really the heart of the paper. One should really read further sections like the Experimental Setup/Modeling, etc., only if one is really interested and wishes to understand exactly what was done to better understand the meaning of the data and its interpretation. As one works through the literature in this way, one should consider not only the knowledge that is written down but also the reputation of the people who made that knowledge. A researcher will always need to be searching for the relevant literature and keeping up to date with it. If one is busy with a small project, the advisor might just give a single important paper to read. But with a larger one, you will be searching for one's own literature to read. For this one will need a strategy as there is just too much work out there to read everything.

3 b. Mention the various benefits of bibliography databases

Benefits of Bibliography Databases

Bibliography databases are essential tools for researchers, students, and professionals to access, organize, and manage scholarly references. They provide numerous advantages, including:

1. Easy Access to Research Materials

- Offer a vast collection of academic papers, journals, books, and conference proceedings.
- Provide a centralized platform for finding credible and peer-reviewed sources.

2. Efficient Literature Review

- Help researchers quickly find relevant literature on their topic.
- Enable keyword-based searches, filtering by publication year, author, and discipline.

3. Citation Management

- Automatically generate citations in multiple formats (APA, MLA, IEEE, etc.).
- Allow users to save, categorize, and organize references for future use.

4. Time-Saving and Productivity Enhancement

- Reduce the time spent manually searching for references.
- Provide tools for bookmarking, annotating, and exporting references easily.

5. Up-to-Date and Reliable Sources

- Regularly updated with the latest research publications.
- Ensure access to authoritative and peer-reviewed content.

6. Cross-Disciplinary Research Support

- Cover multiple disciplines, making it easier to explore interdisciplinary studies.
- Provide recommendations based on related research topics.

7. Networking and Collaboration

- Some databases allow researchers to connect, share references, and collaborate on projects.
- Enable tracking of citations and impact of scholarly work.

8. Integration with Writing and Research Tools

- Can be linked with reference management software like **Zotero, EndNote, and Mendeley**.
- Support integration with word processors for seamless citation insertion.

Popular Bibliography Databases:

- **Google Scholar**
- **Scopus**
- **Web of Science**
- **PubMed**
- **IEEE Xplore**
- **ACM Digital Library**

Bibliography databases significantly enhance research efficiency, ensuring high-quality, well-referenced, and impactful academic work.

4 a Identify the impact of technical reaction and brief about it

Impact of Technical Reaction and Its Brief Explanation

What is a Technical Reaction?

A **technical reaction** refers to how systems, processes, or individuals respond to technological changes, innovations, or specific technical interventions. It can occur in various fields, such as engineering, computing, manufacturing, and research.

Impact of Technical Reaction

1. Innovation and Advancement

- Leads to the development of new technologies and solutions.
- Encourages efficiency and optimization in industries.

2. Improved Problem-Solving

- Helps in troubleshooting technical issues through analytical responses.
- Enhances decision-making in critical situations.

3. Automation and Efficiency

- Reduces manual efforts through automated responses in machines and software.
- Enhances productivity in industries like manufacturing and IT.

4. System Stability and Security

- Ensures proper functioning of technical systems through quick reactions to failures.
- Strengthens cybersecurity by responding to threats and vulnerabilities.

5. Economic and Industrial Growth

- Drives competitive advantages for businesses and industries.
- Encourages technological investments and research funding.

6. Social and Ethical Considerations

- Raises concerns about job displacement due to automation.
- Requires responsible technological development to prevent negative societal impacts.

A technical reaction plays a crucial role in shaping technological progress, improving system performance, and ensuring stability across various sectors. Proper management of technical reactions can lead to innovation while minimizing risks and disruptions.

4b Enumerate the impact of title and keyword on citation with example.

The **title** and **keywords** of a research paper significantly influence its **visibility, discoverability, and citation count**. A well-crafted title and relevant keywords help researchers find the paper easily, leading to more citations.

Impact of Title on Citation

1. **Clarity and Precision:** A clear and concise title attracts more readers.
 - Example:
 - ✓ **"AI-Powered Predictive Analytics for Healthcare: A Systematic Review"** (*Specific and informative, likely to attract citations*)
 - ✗ **"AI in Healthcare"** (*Too broad and unclear, less likely to be cited*)
2. **Use of Relevant Terms:** Including key research terms makes the paper searchable.
 - Example:
 - **"Blockchain-Based Secure Data Sharing in IoT Networks"** (*Includes blockchain, IoT, and security—popular research terms*)
3. **Avoiding Jargon or Ambiguity:** A confusing title reduces accessibility.
 - Example:

- ✓ **"Machine Learning-Based Intrusion Detection for Cybersecurity"** (*Clear and direct*)
 - ✗ **"Smart Shields: A Novel Cyber Approach"** (*Vague and unclear*)
4. **Length and Readability:** Short yet informative titles are more effective.
- Ideal length: **10–15 words** for better impact.

Impact of Keywords on Citation

1. **Improves Search Engine Ranking:** Keywords help indexing in databases like **Google Scholar, Scopus, Web of Science**.
 - Example: Keywords for a paper on AI in healthcare:
 - ✓ **Artificial Intelligence, Machine Learning, Predictive Analytics, Healthcare, Medical Diagnosis**
2. **Enhances Discoverability:** More researchers find the paper if keywords match their search queries.
3. **Increases Interdisciplinary Citations:** Keywords can attract researchers from related fields.
 - Example:
 - A paper titled **"Big Data Analytics in Smart Cities"** with keywords like **"Urban Planning, Data Science, IoT, Sustainability"** can attract researchers from multiple disciplines.
4. **Aligns with Trending Research Topics:** Using trending keywords ensures relevance.
 - Example: In AI research, using keywords like **"Deep Learning, NLP, Generative AI"** can boost citations.

A well-structured **title** and **relevant keywords** improve a paper's visibility, accessibility, and citation potential. Researchers should strategically select their titles and keywords to maximize their impact.

5a) Define Intellectual Properties and explain about its types

Intellectual Property (IP) is a special category of property created by human intellect (mind) in the fields of arts, literature, science, trade, etc. Since IP is a novel creation of the mind, it is intangible (i.e. invisible and indivisible) in nature and differs from the tangible property, such as land, house, gold and car with which we are quite familiar. Intellectual Property Rights (IPR) are the privileges accorded to the creator/inventor (of IP) in conformance with the laws. These rights are given to the creator/inventor in exchange for revealing the process of creation/invention in the public domain. The inventor is conferred with the special rights to use, sell, distribute, offering for sale and restricting others from using the invention without his prior permission. The aforementioned rights do not apply to the physical object (e.g. book or computer or mobile phone) in which the creation may be embodied but attributed to the intellectual creativity.

Broadly, IP comprises of two branches i.e. 'Copyrights and Related Rights' and 'Industrial Property Rights'. 'Copyrights and Related Rights' refer to the creative expressions in the fields of literature and art, such as books, publications, architecture, music, wood/stone carvings, pictures, portrays, sculptures, films and computer-based softwares/databases. The 'Industrial Property Rights' refer to the Patents, Trademarks, Trade Services, Industrial Designs and Geographical Indications. The salient features of all the above-mentioned categories are discussed in the ensuing chapters.

2.1. Patents



A patent is an exclusive right granted for an innovation that generally provides a new way of doing something or offers a new technical solution to a problem. The exclusive right legally protects the invention from being copied or reproduced by others. In return, the invention must be disclosed in an application in a manner sufficiently clear and complete to enable it to be replicated by a person with an ordinary level of skill in the relevant field.

Invention is the creation of a new idea or concept.

Innovation is the process of translating an invention into commercial entity or widespread use.

2.1.1. Conditions for Obtaining a Patent Protection

There is a set criterion, as provided in Section 2(1)(j) of the Patents Act, 1970, which must be fulfilled for a product or a process to qualify for the grant of a patent. The criterion encompasses:

- **Novelty** - *Not part of 'State of the Art'*. The innovation claimed in the patent application is new and not known to anybody in

the world. In other words, the innovation is a) not in the knowledge of the public, b) not published anywhere through any means of publication and c) not be claimed in any other specification by any other applicant.

- **Inventive step** - *Not obvious to the person (s) skilled in the art.* The innovation is a) a technical advancement over the existing knowledge, b) possesses economic significance and, c) not obvious to a person skilled in the concerned subject.
- **Capable of industrial application** - *For the benefit of society.* The invention is capable of being made or used in any industry.

2.2 Copyrights and Related Rights ©

‘Copyrights’ refer to the legal rights provided by law to the original creator of the work in the fields of literature and computer software. The ‘Related Rights’ encompass the author’s work in the fields of dramatics, sound recording, film/video recordings, paintings, architecture, etc. Copyrights and Related Rights are one of the categories of IP and governed by the Copyright Act, 1957 of India. This Act provides rights of reproduction, communication to the masses, adaptation and translation of the work.

The words ‘author’ and ‘work’ need to be understood from the perspective of Copyrights. The term ‘author’ refers to an individual who develops the content (of work). The author can be a writer (literary work), computer programmer (software), composer (musical work), producer (cinema films, sound recording), photographer (photos). The term ‘work’ is a task undertaken in the fields of literature, dramas, music, artistic, cinematograph film and sound recording.

2.2.1. Classes of Copyrights

In India, following classes of Copyrights exist:

- **Literature:** Books, Essays, Research articles, Oral speeches, Lectures, Compilations, Computer programme, Software, Databases.
- **Dramatics:** Screenplays, Dramas.
- **Sound Recordings:** Recording of sounds regardless of the medium on which such recording is made e.g. a Phonogram and a CD-ROM.
- **Artistic:** Drawing, Painting, Logo, Map, Chart, Photographs, Work of Architecture, Engravings, and Craftsmanship.
- **Musical:** Musical notations, excluding any words or any action intended to be sung, spoken or performed with the music. A musical work need not be written down to enjoy Copyright protection.
- **Cinematograph Films:** 'Cinematograph Film' is a visual recording performed by any medium, formed through a process

2.3 Trademark



In simple language, a Trademark (or Trade Mark) is a unique symbol which is capable of identifying as well as differentiating products or services of one organization from those of others. The word 'Mark' stands for a sign, design, phrase, slogan, symbol, name, numeral, devise, or a combination of these. Essentially, the Trademark is anything that identifies a brand to a common consumer.

2.3.1. Eligibility Criteria

For goods/services to be legally classified as Trademark, they need to pass the following conditions:

- **Distinctiveness** - The goods and services for which the protection is sought should possess enough uniqueness to identify it as a Trademark. It must be capable of identifying the source of goods or services in the target market.
- **Descriptiveness** - The Trademark should not be describing the description of the concerned goods or services. Descriptive marks are unlikely to be protected under Trademark law. However, descriptive words may be registered if they acquire "secondary meaning", such as the brand name 'Apple' is used by a USA based multinational company that manufactures electronic gadgets.
- **Similarity to the prior marks** - The mark should be unique and should not be having similarity to the existing marks.

2.4. Industrial Designs

The word 'Design' is defined as the features of shape, configuration, pattern, ornament or composition of lines or colours applied to any article. The Design may be of any dimension i.e. one or two or three dimensional or a combination of these. In addition, it may be created by any industrial process or means, whether manual, mechanical or chemical, separate or combined, which in the finished article appeal to and is judged solely by the eye. But the word 'Design' does not include any mode or principle of construction or anything which is in substance a merely mechanical device.

The main object of registration of industrial Designs is to protect and incentivize the original creativity of the originator and encourage others to work towards the art of creativity.

2.4.1. Eligibility Criteria

The Design for which the protection is being sought must be **novel or original** i.e., should not be disclosed to the public by prior

publication or by prior use or in any other way. The Design should be **significantly distinguishable** from the already registered Designs existing in the public domain.

2.6 Trade Secrets



Trade Secret, a form of IP, deals with a practice or a process of a company that is generally not known outside the company. The confidential secret provides the company a commercial advantage over its rivals and is often a product of internal R&D. **Trade Secret** document comprises of technical information involving manufacturing processes, experimental research data, formulas, recipes, software algorithms, and commercial information comprising of marketing strategies and a list of product/process recipients. The document may also have a combination of elements, each of which by itself is in the public domain, but where the combination, which is kept secret, provides a competitive advantage.

2.6.1. Criteria for **Trade Secret**

For a product/process to qualify as a **Trade Secret**, the information should have, at least, the following criteria:

- Should be of commercial value.
- Secret information should not be in the public domain. It should be known to a limited group of people.
- Legal owner/s of the secret must ensure taking reasonable steps to keep the secret information and agreements (if any) confidential.

2.5 Geographical Indications



In every country, there are certain regions famous for their traditional knowledge/heritage in various sectors, such as agriculture, food products, textiles, etc. People from far-off places used to travel to buy these products. For example, Christopher Columbus sailed from Spain to import world-famous spices from India. British people travelled to Arabian countries to import Arabian horses for siring fast running horses for commercial gains. Similarly, China silk and Dhaka Muslin have been in great demand from times immemorial. The reputation of these products was built upon and painstakingly maintained by the experts/masters of respective geographical locations. The know-how of these reputed products was passed onto future generations. With the passage of time, a specific link between the goods produced and geographical location evolved, resulting in the growth of Geographical Indications (GI).

A GI is defined as a sign which can be used on products belonging to a particular geographical location/region and possesses qualities or a reputation associated with that region. In GI, there is a strong link between the product and its original place of production.

5b) Explain the key aspect of patent law?

Patent law is a branch of intellectual property law that grants inventors exclusive rights to their inventions for a limited period, typically 20 years from the filing date. The key aspects of patent law include:

1. Patentability Requirements – An invention must meet certain criteria to be patented:
 - Novelty – It must be new and not publicly disclosed before the filing date.
 - Non-Obviousness – It must not be an obvious improvement over existing inventions.
 - Utility – It must be useful and capable of practical application.
 - Patentable Subject Matter – It must fall within patentable categories, such as machines, processes, or compositions of matter.
2. Types of Patents – There are different kinds of patents, including:
 - Utility Patents – Protect functional inventions like machines, processes, and compositions.
 - Design Patents – Protect the ornamental design of an article.
 - Plant Patents – Protect new plant varieties that are asexually reproduced.
3. Patent Application Process – The process involves:

- Filing a Patent Application – Includes a detailed description, claims, and often drawings.
 - Patent Examination – The patent office reviews the application to ensure it meets legal criteria.
 - Granting of the Patent – If approved, the inventor gets exclusive rights to the invention.
4. Patent Rights and Enforcement – A granted patent allows the owner to exclude others from making, using, selling, or distributing the invention without permission. Patent holders can enforce their rights through litigation.
 5. Patent Infringement – Unauthorized use of a patented invention can lead to legal disputes, where the patent holder may seek damages or an injunction.
 6. Patent Licensing and Assignment – Patent owners can license or sell their patents to others in exchange for royalties or a lump sum payment.
 7. International Patents – Patent protection is territorial, but international treaties like the Patent Cooperation Treaty (PCT) help streamline applications across multiple countries.
 8. Patent Expiry and Public Domain – After the patent term expires, the invention enters the public domain, allowing anyone to use it freely.

OR

6a) Explain the assessment of novelty ?

The assessment of novelty in patent law determines whether an invention is new and has not been publicly disclosed before the filing date. Novelty is one of the fundamental requirements for obtaining a patent. Here's how it is assessed:

1. Definition of Novelty

- An invention is considered novel if it has not been disclosed in any form (written, oral, or public use) before the priority date (filing date) of the patent application.
- Even if the inventor themselves disclosed the invention before filing, it can be considered prior art, leading to rejection (except in cases where grace periods apply).

2. Prior Art Search

- Prior art includes any existing knowledge that is publicly available before the filing date, such as:
 - Published patents and patent applications
 - Scientific and technical journals
 - Websites and online publications
 - Public demonstrations or commercial use

- Any other publicly accessible disclosures
- Patent examiners conduct prior art searches in patent databases, literature, and online sources to determine if the invention has been disclosed before.

3. Absolute Novelty Standard

- Many jurisdictions follow the absolute novelty standard, meaning that any public disclosure of the invention before the filing date can prevent patentability.
- Some countries provide a grace period (e.g., the U.S. allows a 12-month grace period for disclosures made by the inventor before filing).

4. Anticipation Test

- If a single prior art document fully discloses all aspects of the claimed invention, the invention lacks novelty and is considered anticipated.
- If the prior art only partially overlaps but does not disclose every element, the invention may still be novel but could face challenges under the non-obviousness requirement.

5. Assessment by Patent Offices

- Major patent offices like the USPTO (U.S.), EPO (Europe), JPO (Japan), and others apply strict novelty checks.
- Each office may have its own rules regarding prior art interpretation and disclosure timelines.

6. Overcoming Novelty Rejections

- If an examiner rejects a patent due to lack of novelty, the applicant can:
 - Argue that the prior art does not fully disclose the invention.
 - Amend the claims to distinguish the invention from prior art.
 - Provide evidence of earlier invention dates (in certain jurisdictions).

6b) Brief about the patent procedure in India?

The patent procedure in India is governed by the Indian Patents Act, 1970, as amended. The Controller General of Patents, Designs & Trade Marks (CGPDTM), under the Department for Promotion of Industry and Internal Trade (DPIIT), manages the patent process in India. Below is a step-by-step guide to the patent application process in India:

1. Patentability Check

Before filing, the invention must be assessed for patentability, ensuring it meets the following criteria:

- Novelty – The invention must be new.
- Inventive Step (Non-Obviousness) – It must not be an obvious improvement over prior art.
- Industrial Applicability – It must be useful and capable of being manufactured or used in an industry.
- Patentable Subject Matter – Must not fall under non-patentable categories (e.g., abstract ideas, mathematical formulas, business methods, or traditional knowledge).

2. Patent Application Filing

An application can be filed at the Indian Patent Office (IPO) in Delhi, Mumbai, Chennai, or Kolkata, depending on the applicant's location.

Types of Applications:

- Provisional Application – If the invention is still in development, a provisional application can be filed. This grants a priority date and gives the applicant 12 months to file a complete application.
- Complete Specification Application – Must include full details, claims, and drawings.
- Convention Application – If priority is claimed from a patent filed in a convention country.
- PCT (International) Application – If filed under the Patent Cooperation Treaty (PCT) for international protection.

Required Documents:

- Form 1: Patent Application
- Form 2: Specification (Provisional or Complete)
- Form 3: Statement of Foreign Applications (if applicable)
- Form 5: Declaration of Inventorship
- Form 26: Authorization of Patent Agent (if applicable)
- Priority Documents (if claiming priority from a foreign application)

3. Publication of the Patent Application

- The application is published in the Patent Journal after 18 months from the filing date.
- An early publication request (Form 9) can be filed to get it published within 1 month.

4. Examination & Patent Search

- The application is examined only upon filing a Request for Examination (RFE) (Form 18).
- The First Examination Report (FER) is issued by the IPO, citing any objections.
- The applicant must respond to the objections within 6 months, extendable by 3 months.

5. Pre-Grant & Post-Grant Opposition

- Pre-Grant Opposition (before grant) can be filed by anyone after publication.
- Post-Grant Opposition (within 12 months of grant) can be filed by interested parties.

6. Grant of Patent

- If all objections are resolved, the patent is granted and published in the Official Patent Gazette.
- The patent is valid for 20 years from the filing date.

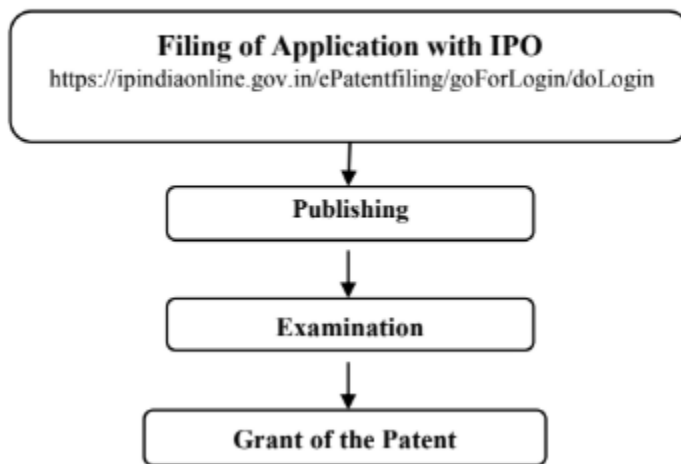
7. Renewal & Maintenance

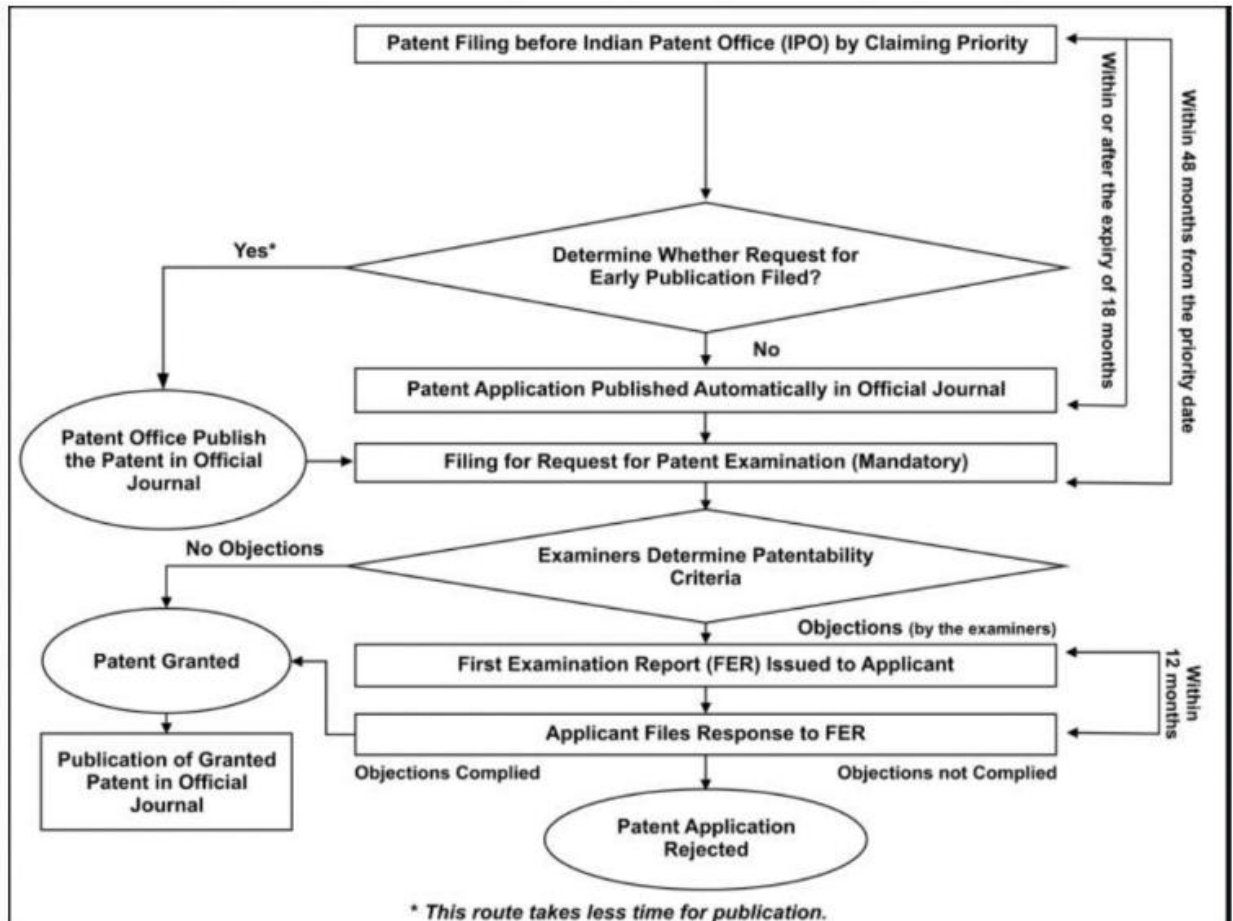
- Annual renewal fees must be paid from the third year onward to maintain the patent.
- If the renewal fee is not paid, the patent lapses.

8. Patent Enforcement & Infringement

- The patent holder has the exclusive right to prevent others from using, selling, or making the patented invention without permission.
- In case of patent infringement, legal action can be taken in the High Court.

Figure 2.1: Flow chart of major steps involved in the grant of a patent.





7. a. Mention and brief about the justification for copyright law.

b. Explain about the basic concepts of under lying copyright law.

SOLUTION

Copyrights‘ refer to the legal rights provided by law to the original creator of the work in the fields of literature and computer software. The ‘Related Rights‘ encompass the author’s work in the fields of dramatics, sound recording, film/video recordings, paintings, architecture, etc. Copyrights and Related Rights are one of the categories of IP and governed by the Copyright Act, 1957 of India. This Act provides rights of reproduction, communication to the masses, adaptation and translation of the work.

To qualify for Copyright protection, a work must exist in some physical (or tangible) form. The duration of the existence of the physical form may vary from a very short period to many years. Virtually any form of expression which can be viewed or listened to is eligible to qualify as

Copyright. Even hurriedly scribbled notes for an impromptu speech are considered copyrightable material.

The Copyright work has to be expressed by the creator in his frame of thought. In other words, the work has to be original i.e. the author created it from independent thinking void of duplication. This type of work is termed as an Original Work of Authorship (OWA). It may appear similar to already existing works but should not be the same. The original work may lack quality or quantity or aesthetic merit or all these parameters; still, it will pass the test of copyrightable work. In addition to originality for the work, Copyright protection also requires at least some creative effort on the part of the author. There is no minimum limit for the extent of creativeness. It is a subjective matter.

Copyright protection depends on the judgment of the evaluator

(adjudicated by the Office of Registrar of Copyright). As an example, mere changing the dimensions of a book will not be granted Copyright protection. Similarly, an address book of alphabetically arranged telephone numbers does not qualify for Copyright protection as it involves a straightforward alphabetical listing of phone numbers rather than a creative selection of listings.

The justification for copyright law is based on the following key principles:

1. Encouraging Creativity and Innovation: Copyright provides creators with exclusive rights over their work, giving them the incentive to invest time and resources in producing original content. Without protection, creators might lack motivation due to the risk of unauthorized copying and financial loss.

2. Economic Incentive for Creators: By granting exclusive rights to reproduce, distribute, and monetize their works, copyright law ensures creators can earn revenue. This protection is especially important in industries like publishing, music, film, and software development.

3. Protection of Moral Rights: Copyright law safeguards the integrity and reputation of authors by preventing unauthorized modifications or misrepresentations of their work. This ensures that the original intent and creativity of the creator remain intact.

4. Promoting Public Interest & Knowledge Sharing: Copyright law balances private rights with public access by allowing for fair use, which permits limited use of copyrighted material for education, research, and criticism. After a certain period (e.g., 60 years in India for literary works), works enter the public domain, making them freely available to society.

Basic Concepts Underlying Copyright Law

Copyright law is a fundamental aspect of Intellectual Property Rights (IPR) that grants creators exclusive rights over their original works. It protects various forms of creative expression, ensuring that authors, artists, and inventors have control over the use of their works while balancing public access. Below are the key concepts underlying copyright law:

1. Subject Matter of Copyright: Copyright law applies to original works of authorship that are fixed in a tangible form. These works include:

- Literary Works – Books, articles, computer programs.
- Artistic Works – Paintings, sculptures, architectural designs.
- Musical Works – Songs, compositions, sheet music.
- Dramatic Works – Plays, scripts, screenplays.
- Cinematographic Works – Films, documentaries, animations.
- Sound Recordings – Podcasts, recorded speeches, musical performances.
- Broadcasts – Television and radio programs.

2. Ownership and Authorship

Author: The person who creates the work (e.g., writer, musician, artist).

First Owner: Generally, the author is the first owner, except in cases of employment where an employer may own the work created by employees.

Joint Ownership: If multiple people contribute to a work, they share ownership rights.

3. Exclusive Rights of the Copyright Owner: Copyright grants the owner exclusive rights to:

- Reproduce the work (copying or printing).
- Distribute copies (sell, rent, or lease).
- Publicly perform the work (music, plays, films).
- Create derivative works (translations, adaptations, remixes).

- Display the work publicly (art exhibitions, online sharing).

These rights allow creators to commercialize and control how their works are used.

4. Duration of Copyright Protection: In India, the copyright duration for literary, musical, and artistic works lasts for 60 years after the author's death. For films, sound recordings, and broadcasts, the duration is 60 years from the date of publication. After expiry, the work enters the public domain, meaning anyone can use it freely.

5. Fair Use and Limitations: While copyright grants exclusive rights, certain limitations ensure that knowledge and creativity can still be accessed:

- Fair Use Doctrine: Limited use of copyrighted material for criticism, research, teaching, and news reporting without permission.
- Educational Use: Using copyrighted material in schools and universities for learning purposes.
- Libraries and Archives: Copying for preservation or research purposes.

6. Moral Rights : Apart from economic rights, authors also have moral rights, which include:

- Right to Attribution (Paternity Right) – The author must be credited.
- Right to Integrity – The work cannot be distorted or misrepresented in a way that harms the author's reputation.
- These rights ensure ethical treatment of creative works.

7. Copyright Infringement and Remedies

Unauthorized use of copyrighted work leads to infringement, which includes:

- Direct Copying – Reproducing or distributing without permission.
- Piracy – Unlawful reproduction and sale.
- Plagiarism – Presenting someone else's work as one's own.
- Legal remedies for infringement include:

8. International Copyright Protection: Copyright laws are recognized globally under treaties like:

- Berne Convention (1886) – Ensures copyright protection in all member countries.
- TRIPS Agreement (1995) – Sets minimum standards for copyright laws in World Trade Organization (WTO) countries.
- WIPO Copyright Treaty (1996) – Provides additional protections for digital works.

These agreements help protect copyrighted works internationally without requiring multiple registrations.

8. a. Brief about the various representations of sound recordings

b. Explain about TRIPS agreement in detail.

SOLUTION

Sound recordings are protected under Intellectual Property Rights (IPR) through copyright laws. They refer to audio content, such as music, podcasts, speeches, and other recorded sounds, stored in any medium. Several legal protections apply to sound recordings, ensuring that creators and rights holders can control their usage and commercial exploitation. In most jurisdictions, including India, sound recordings are protected under copyright law.

Key aspects include:

- Definition: A sound recording is a recorded fixation of sounds, irrespective of the medium (CDs, MP3 files, vinyl, etc.).
- Duration of Protection: In India, copyright for sound recordings lasts 60 years from the date of publication.
- Exclusive Rights: The copyright owner has the right to:
 - Reproduce the recording.
 - Distribute copies.
 - Perform it publicly.

- Create derivative works.

Rights of Various Stakeholders

Different entities involved in sound recordings hold separate rights:

- Composer & Lyricist – Owns copyright in the musical composition and lyrics.
- Performer (Singer/Musician) – Has performer's rights in the recorded work.
- Producer – Owns the sound recording copyright if they finance and manage the production.

Licensing & Royalty Collection

Licensing of sound recordings allows legal use through:

- Mechanical Rights – For physical/digital reproduction (e.g., CDs, streaming platforms).
- Synchronization Rights – For use in films, TV, ads.
- Public Performance Rights – For radio broadcasts, events, etc.

Infringement & Legal Remedies

Sound recording infringement includes:

- Piracy – Unauthorized copying/distribution.
- Unauthorized Sampling – Using portions of a sound recording without permission.
- Illegal Public Performance – Playing copyrighted music without a license.

TRIPS

In the later part of the 20th century, industrialization became the major objective of many nations. As the industrialization process grew, so did the innovative products as well as the trade amongst various countries. Many of the trading goods involved a high proportion of the IP. Thus, IPR became a crucial component of international trade. As IP is a territorial property and each nation has its own set of rights/rules/enforcements/punishments for IPR related issues, it led to many confusions and disputes between developed and developing countries. The World Trade Organization (WTO) addressed this issue during the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) between 1989 and 1990. As of now, WTO has 164 members including, India and 24 observer governments (i.e. nations). The TRIPS Agreement appears as Annex 1 C of the Marrakesh Agreement (Morocco, 15 April 1994). The TRIPS Agreement is one of the most important agreements of the WTO. The Agreement plays a crucial role as legal recognition of the significance of links between trade and IP. The IPs covered under TRIPS are:

- Patents including the protection of new varieties of plants.
- Copyright and related rights.
- Trademarks.
- Geographical indications.
- Industrial designs.
- Layout designs of integrated circuits.
- Undisclosed information, including trade secrets and test data.

Main Features of TRIPS

TRIPS Agreement is the most important multilateral instrument for the globalization of IP Laws. The obligations under the Agreement are the same for each member country. TRIPS Agreement has three main features i.e. Standards, Enforcement and Dispute Settlement as Standards - Each member state is mandated to recognize minimum standards for IP protection. In each type of IP, the key elements of protection are clearly defined, namely:

- Subject-matter to be protected.
- Rights associated with IP.
- Permissible exceptions to those rights.
- The validity period of the rights.

The minimum standards include obligatory compliance to the substantive obligations of the Paris Convention (1886) for the Protection of Industrial Property. Similarly, the Berne Convention (1886) for the Protection of Literary and Artistic Works in their most recent versions, except moral rights. Sometimes, the TRIPS Agreement is also termed as the ‘Berne and Paris-plus Agreement’. The TRIPS Agreement also includes certain other parameters which are not a part of the pre-existing Conventions or have been addressed inadequately. Enforcement - To tackle IP issues related to infringements and misuse, the TRIPS Agreement has laid down IPR enforcement procedures (civil and administrative) to be adopted by WTO members. The objectives of IPR protection and enforcement are meant to encourage the promotion of technological innovations as well as their transfer and dissemination.

Dispute Settlement - The Agreement also specifies dispute settlement procedures for addressing the violations of the Agreement by the member countries. Dispute settlement is taken care of through Dispute Settlement Body (DSB) administered by WTO. There is a time limit for the

implementation of TRIPS obligations. However, extra time has been allowed for their implementation in developing countries. In general, the verticals of the TRIPS Agreement (minimum standards, enforcement and dispute settlement) were appreciated by all the member countries. However, a concern was raised about the restricted access to patented medicines and pharmaceutical products. Therefore, in 2001 in Doha, a special Ministerial Declaration was adopted by the WTO members to clarify the regulations of the TRIPS Agreement with regard to the principles of public health. Under this declaration, the member countries were affirmed that the TRIPS Agreement should not affect the important measures to assure better health care in developing countries. The main aspect of this declaration is the grant of ‘compulsory license’ during a national emergency.

9.a Explain about justification of Protection designs

Protecting industrial designs is justified because it incentivizes innovation and creativity in product aesthetics, allowing designers and companies to reap the economic benefits of their unique designs by preventing unauthorized copying, thus fostering fair competition in the market while safeguarding consumer interests by ensuring quality and originality in product appearance.

Key justifications for protecting industrial designs:

- **Stimulating Innovation:**

By granting exclusive rights to a design, companies are encouraged to invest in research and development to create visually appealing and distinct products, driving innovation in the design field.

- **Market Differentiation:**

Protecting industrial designs allows companies to differentiate their products from competitors, enabling them to command premium prices and gain a competitive edge based on aesthetics.

- **Protecting Intellectual Property:**

Similar to other forms of intellectual property, industrial designs represent creative effort and should be protected to ensure designers receive fair compensation for their work.

- **Consumer Protection:**

By preventing imitation, design protection safeguards consumers from being misled by counterfeit products that may appear identical to a well-established brand.

- **Economic Growth:**

A robust design protection system can foster a vibrant design industry, leading to economic benefits through job creation, export opportunities, and increased consumer confidence.

Examples of design elements protected under industrial design laws:

Product shape, Surface ornamentation, Color combinations, and Lines and contours.

Important Considerations:

- **Balance with Fair Competition:**

While protecting original designs, it's crucial to avoid overly restrictive design protection that could stifle competition based on functional design elements.

- **Design Registration Process:**

Clear and efficient registration procedures are important for ensuring effective protection of industrial designs.

- **Enforcement Mechanisms:** Robust legal mechanisms are needed to deter infringement and provide remedies for design right holders.

9.b Brief about the excluded subject matter in context of design protection

When discussing design protection, "excluded subject matter" refers to elements that are typically not considered eligible for design registration, often including purely functional aspects like mechanical principles, methods of construction, trademarks, artistic works protected under copyright law, and anything considered solely a presentation of information, not a unique aesthetic design feature.

Key points about excluded subject matter in design protection:

- **Functional aspects:**

Designs that primarily serve a technical function rather than aesthetic appeal, like the internal mechanism of a device, are usually not protected by design law.

- **Trademarks:**

A design that is essentially a trademark or logo cannot be registered as a design.

- **Artistic works:**

Purely artistic creations like paintings or sculptures, not intended for industrial production, are generally excluded from design protection and fall under copyright law.

- **Presentation of information:**

The way information is displayed, like a simple layout or text formatting, is not considered a design feature eligible for protection.

- **Prior art:**

Designs that are already widely known or previously published cannot be registered as new and original designs.

Example of excluded subject matter:

- The basic shape of a chair (considered purely functional)
- A company logo used as a product design
- A detailed painting reproduced on a product

- A simple user interface layout on a website

10. a What are the rights of owner of design? Explain

In India, the rights related to registered designs are governed by the Designs Act, 2000. This Act outlines the legal provisions and rights granted to the owners of registered designs. Here are the key rights associated with registered designs under the Designs Act, 2000 in India:

1. **Exclusive Right:** For the item to which it has been applied or embedded, the owner of a registered design has the right to utilize the design and prevents others from using or making without his consent. It follows that anybody else who wants to use the design for profit must first obtain permission from the owner.
2. **Prohibition of Unauthorized Use:** No person is allowed to reproduce, sell, import, or distribute any article to which the registered design is applied without the consent of the registered owner.
3. **Monetary Compensation:** If someone infringes upon the registered design owner's rights by using the design without permission, the owner can seek legal remedies, including monetary compensation (damages) for the losses suffered due to the infringement.
4. **Legal Action:** The registered design owner can take legal action against anyone who infringes upon their design rights. This can include filing a lawsuit for infringement and seeking remedies like injunctions, damages, and accounts of profits.
5. **Assignability and Transmission:** Registered designs are considered property rights and can be assigned (transferred) or transmitted (inherited) just like any other property. This means that the owner can sell, license, or transfer their design rights to another person or entity.
6. **Duration of Protection:** A registered design's protection is given for an initial duration of 10 years from the date of registration, with the possibility of extending it for another 5 years (total of 15 years). The design owner can renew the registration to maintain their rights.
7. **Publication:** After registration, the design is published in the official designs journal, which makes the design and its details publicly available. This helps prevent inadvertent infringement and provides notice to the public.

10.b Breif about assignment of design rights

"Assignment of design rights" refers to the legal process where the owner of a registered design transfers full ownership of that design to another party, essentially "selling" the exclusive rights to use and commercially exploit the design, which is typically done through a written agreement and

requires registration with the relevant intellectual property authority to officially change ownership on the design register;.

Key points about assignment of design rights:

- **What it entails:**

The transfer of all rights associated with a design, including the ability to manufacture, sell, and license the design to others.

- **Legal requirement:**

This transfer must be done through a written agreement outlining the terms and conditions of the assignment, including consideration (payment).

- **Registration process:**

After signing the agreement, the new owner needs to apply to the relevant intellectual property office to formally register their ownership of the design.

- **Relevant legislation:**

The specific rules and procedures for assigning design rights are governed by the design law of the jurisdiction where the design is registered.

Example scenario: A company designs a unique chair and registers its design rights. They then decide to sell the design rights to a manufacturing company, allowing that company to produce and sell the chair exclusively.