

# CBCS SCHEME

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## Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Research Methodology & Intellectual Property Rights

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. What is Engineering Research? What are the primary objectives of conducting research in engineering? (10 Marks)  
b. What are the various types of engineering research? Explain. (10 Marks)

OR

- 2 a. Explain Fabrication, Falsification and Plagiarism related to Engineering research. (10 Marks)  
b. What ethical considerations and responsibilities should be taken into account when determining authorship in Engineering research? (10 Marks)

### Module-2

- 3 a. How do researchers distinguish between new and existing knowledge during a literature review? (10 Marks)  
b. How can researchers effectively use search engines to find relevant literature in their fields? (10 Marks)

OR

- 4 a. What challenges do researchers commonly face when reading mathematical content or algorithm? (10 Marks)  
b. What is impact of Title and Keywords on Citations? Explain Citation based knowledge flow. (10 Marks)

### Module-3

- 5 a. What is definition of Intellectual Property (IP)? In what way does Intellectual Property contribute to economic growth and cultural development in a society? (10 Marks)  
b. Discuss the history of Intellectual property in India. (10 Marks)

OR

- 6 a. Explain the step by step process of obtaining a patent. From the initial idea to the grant of the patent. (10 Marks)  
b. What are the commonly used terms in the field of patenting and how do they contribute to effective communication in this domain. (10 Marks)

### Module-4

- 7 a. Explain the criteria that an original work must meet to qualify for copyright protection. (10 Marks)  
b. Explain the process of copyright registration? What are the benefits for the copy right holders? (10 Marks)

OR

- 8 a. Explain the process of Trademark registration. (10 Marks)  
b. Explain the classification system for trademarks and its role in categorizing different types of marks. (10 Marks)

**Module-5**

- 9 a. Explain the process of Industrial design registration. (10 Marks)  
b. Explain the famous case law between Apple Inc Vs Samsung Electronics Co. related with Industrial Design rights. (10 Marks)

OR

- 10 a. Which specific acts, laws and rules govern geographical indications in India? Give some examples of well known geographical indications registered in India. (10 Marks)  
b. How would you describe the overall ecosystem and significance of geographical indications in India? (10 Marks)

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Q.1a. What is engineering research? what are the primary objectives of conducting research in engineering?

Sol.  
Engineering research is a systematic & scientific investigation conducted to develop new knowledge, technologies, or processes that advance the field of engineering. Engineering research is multidisciplinary often collaborating with fields such as computer science, physics, chemistry, biology & economics, & other fields to address real world challenges.

Primary Objectives of Conducting Research in Engineering.

1. Innovation & development: The foremost objective is to innovate & develop new technologies, products & processes which also helps in creation of new materials, devices, systems & methods that can revolutionize industries & improve the quality of life.

2. Problem Solving: - Engg. research aims to solve existing problems by finding efficient, cost-efficient, & sustainable solutions.

3. Advancement of Knowledge: - Another key objective is to expand the existing body of knowledge in engineering. This knowledge is foundational for further research & development.

Ques

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4. Economic & Societal impact - Research in engineering often seeks to create economic value & address societal challenges. This develops technologies that boost productivity, enhance public health, improve safety & contribute to sustainable development.

1.b. What are the various types of engineering research? Explain.

8/1

- i) Descriptive versus Analytical
- ii) Applied versus Fundamental
- iii) Quantitative versus Qualitative

i) Descriptive versus Analytical :- Descriptive research includes comparative & correlational methods, & fact-finding inquiries, to effectively describes the present state of art. The researcher holds no control over the variables rather only reports as it is. Analytical research, already available facts for analysis & critical evaluation are utilized.

ii) Applied versus fundamental :- Research can either be applied research or fundamental (basic or pure) research. Applied research seeks to solve an immediate problem facing the organization, whereas fundamental research is concerned with generalization & formulation of a theory.

Ques

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iii)

### Quantitative versus Qualitative:-

Quantitative research uses statistical observations of a sufficiently large number of representative cases to draw any conclusions, while qualitative research, rely on a few non representative cases or verbal narrative in behavioral studies such as clustering effect in interaction in translation engineering to make a proposition.

Q. a. Explain fabrication, falsification & plagiarism related to engineering research.

Sol.

Fabrication:- Fabrication is the act of copying data or experiments with belief by knowledge about what the conclusion would be, but cannot wait for the result possibly, due to time line provide from supervisor or customer.

Q. b.

Falsification:- Falsification is the misrepresentation or misinterpretation or illegitimate alteration of data or experiments, was if partly, to support a desired hypothesis even when the actual data received from experiments suggest otherwise.

3)

Plagiarism - plagiarism take place when someone use or reuse the work of others (text, data, tables, figures, illustrations, or concepts) as if it were his/her own. Copying or reusing one's own published work is also an unacceptable practice in scientific literature.

2b. What ethical considerations & responsibilities should be taken into account when determining authorship in engineering research?

Ans. Determining authorship in engineering research requires careful consideration to ensure fairness, transparency, & accountability.

1. Contribution to research: - Authorship should be based on a significant intellectual contribution to the conception, design, data collection, analysis, or interpretation of the research.

2. Avoiding Honorary Authorship: - including individuals who did not make a substantial contribution simply to add prestige is unethical.

7. Fair allocation of credit; - Contributions should be appropriately recognized, & authors should agree on the order of names; The first author is the most who contributes more, while the last author often serves as the Principal investigator or Senior member.

Agreement on responsibilities; All listed authors should agree to their inclusion & the order of their names before submission.

Ethical research practices - Authorship should be determined without bias, Conflicts of interest or power imbalances.

3a. How do researchers distinguish between new & existing knowledge during a literature review?

Comprehensive search of existing literature. Researchers begin by collecting an extensive review of current literature using databases, journals, conferences, papers, & books. This helps them gather a wide range of studies on their topic of interest ensuring that they are aware of the body of existing knowledge.

2. Identifying gaps: - By carefully analyzing existing research, researchers look for gaps in the literature - areas where research is either missing, outdated, or insufficient. This helps them recognize where new knowledge can contribute to the field.

3. Analyzing theories & concepts: - Researchers compare & evaluate the theoretical frameworks, models, & concepts already established in the literature. They examine how these theories have been applied.

4. Assessing methodologies: - By reviewing the research methods used in previous studies, researchers can see if there are limitations or weaknesses in how past studies were conducted.

5. Recognizing emerging trends: - Researchers pay attention to the latest studies to identify emerging trends or shifts in understanding.

3b. How can researchers effectively use search engines to find relevant literature in their fields?



(5/8/20)

Choosing the right search engines:-

1. Researchers should use academic search engines like google scholar, pubmed, IEEE xplore, scopus or specialized data bases like springer, JSTOR & similar sites.

These engines help to search high quality academic sources.

2. Keyword optimization:- To improve search relevance, researchers should carefully select & use appropriate keywords, synonyms, & related terms in their search queries.

3. Setting alerts:- Many academic search engines allow users to set up email alerts for new publications based on specific queries or keywords.

4. Filtering results by citation & relevance:- Researchers can sort results by citation count, relevance or publication date. Highly cited papers often represent foundational knowledge in the field while publications (recent) may contain the latest advancement.

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5. utilizing references lists:-

Once relevant literature is found, researchers can use the references lists in those articles to find other important works in the field.

4a. What challenges do researchers commonly face when reading mathematical content or algorithms?

89 Complex notation & symbols: - Mathematical content often involves intricate notation & symbols that may not be familiar to all researchers. Understanding the meaning of specific symbols, especially when they vary across disciplines, can be a significant barrier.

Abstract concepts: - Many mathematical concepts are abstract, requiring a strong foundational understanding to interpret.

Lack of intuition: - Mathematical content is often presented in a formal, rigid structure, which can lack intuitive explanations or visualizations.

90 Difficulty in connecting theory to practice: -

Researchers may struggle to connect the mathematical theory or algorithms to practical problems.

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Error detection & debugging. - when reading or implementing an algorithm, it can be difficult to detect errors, especially if the mathematical derivations are lengthy or involve complex transformations.

4b. What is the impact of title & keywords on citations? Explain citation based knowledge flow.

sol. Visibility & discoverability. - The title & keywords play a crucial role in making research more discoverable in search engines & databases. A clear, descriptive & well-structured title helps potential readers quickly understand the focus of the research, leading to more citations. Relevant & specific keywords enhances searchability.

Relevance to research community. - An effective title & keywords ensure that the paper reaches the correct audience. By accurately reflecting the content on the paper, they help attract citations. A poor title or irrelevant keywords can cause the paper to be overlooked.

Ques

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Initial impression. - A well crafted title can create a strong first impression & serves as the first point of contact b/w the research & potential reader.

Search engine optimization (SEO): - in the digital age, academic papers are often found through search engines. title & keywords that begin with trending topic or popular search terms in the field. Can improve the paper's ranking in search results.

5a. Definition of intellectual Property (IP)?  
 In what way does intellectual property contribute to economic growth & cultural development in a society?

Sol Intellectual Property (IP) refers to creations of the mind, including inventions, literary & artistic works, designs, symbols, names & images used as trademarks. IP is protected by laws such as patents, copyrights & trademarks allowing creators to control & profit from their innovations.

1. encouraging innovation: - IP rights encourage innovation by providing legal protection for individuals & companies to invest in research & development, thereby driving economic growth.

2. Boosting Entrepreneurship: - By protecting new ideas & inventions, IP fosters entrepreneurship, enabling

Startups & business to commercialize their innovations without the risk of imitations contributing to job creation & market competition.

3. Attracting foreign investment - Strong IP protection create a stable legal environment that attract foreign direct investment, as international companies feel secure in bringing their technologies & products into markets with effective IP laws.

4. Preserving Cultural Heritage - Copying & trademark protect artistic creations, traditional knowledge & cultural expression. Helping preserve & promote cultural diversity while ensuring creators are fairly compensated.

5b. Discuss the history of Intellectual Property in India.

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Ques

1. Colonial Era foundation (1856) - India's IP framework began with the Indian Patent Act of 1856 modeled on British law, granting protection for inventions for the first time.

2. Post-independence Reforms (1950-1970s) - India reformed its IP laws, notably with the Patent Act of 1970.

which focused on process patents in sectors like pharmaceuticals, aiming to encourage local industry growth.

3. TRIPS Agreement (1995); - India became a member of the World Trade Organization (WTO) & committed to complying with the TRIPS agreements, leading to extensive IP law revision.

4. Patent Law Amendment (2005); - India introduced product patents aligning with TRIPS requirements, particularly impacting the industry & fostering stronger IP protection.

5. Modern IP Ecosystems; - India now has comprehensive IP laws covering patents, copyrights, trademarks, & geographical indications with ongoing efforts to strengthen enforcement & streamline processes for innovation - drive economic growth.

6a. Explain the step by step process of obtaining a patent. From the initial idea to the grant of the patent.

(12) Idea Evaluation; - Ensure the idea is novel, non-obvious & has industrial applicability by conducting a patentability

Search to check if it meets the legal requirement for a patent.

2. Patent application filing: - Draft & submit a detailed patent application, including claims, descriptions & drawings, to the patent office in the relevant jurisdiction.
  3. Publication: - After 18 months from the filing date, the patent application is published by the patent office, making its invention publicly known.
  4. Examination: - The patent office examines the application to assess if the invention meets the legal criteria for patentability. Issuing objections if necessary, which the applicant must address.
  5. Grant of patent: - If all objections are resolved & the application is found to be patentable, the patent is granted, & the inventor receives exclusive rights to the invention for a specific period.
- 6b. What are commonly used terms in the field of patenting & how do they contribute to effective communication in this domain.

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1. Patentability: - Refers to the criteria an invention must meet to be eligible for a patent, ensuring clarity in evaluating innovations.
  2. Claims: - These define the scope of legal protection granted by a patent helping communicate the boundaries of the inventor's rights & what competitors must avoid.
  3. Prior art: - Any existing knowledge or invention related to the patent used to determine whether an invention is novel. Comparison with existing technologies promoting transparency.
  4. Patent application: - A formal request to grant a patent, containing specifications & claims, essential for communicating the technical details of the invention to the patent office.
  5. Patent infringement: - The unauthorized use of a patented invention, contributing to legal communication regarding violations of patent rights & potential litigation.



7a. Explain the criteria - that an original work must meet to qualify for copyright protection.

Originality: The work must be the author's own creation, showing some level of creativity or independent intellectual effort, rather than being copied from another source.

Fixed in a tangible medium: The work must be expressed in a tangible form such as writing, recording, or digital format, allowing it to be perceived or reproduced.

Creative Expression: The work should embody an element of creative expression, distinguishing it from mere ideas, facts, or functional plans, which are not eligible for copyright.

Authorship: The work must be produced by a recognized author or group of authors, such as writers, artists, or musicians, who hold the rights to the creation.

Legal subject matter: The work must fall into one of the protected categories defined by copyright law, excluding works like titles, slogans, or short phrases.

7b.

Explain the process of copyright registration  
what are the benefits for the copy.  
right holder?

Sol.

### Process of Copyright registration

1. Application filing:- Submit a completed application form along with a copy of the work to the copyright office, either physically or online.
2. Fee payment:- Pay the required registration fee, which varies depending on the type of work being copyrighted.
3. Examination:- The copyright office reviews the application to verify that the work meets eligibility criteria, & any objections are served.
4. Publication:- After successful examination the work is published in the official copyright journal confirming its registration status.
5. Certificate issuance:- Once approved the copyright holder is issued a certificate recognizing their ownership.

Ques

### Benefits for Copyright holder

1. Legal protection:- Registration provides legal proof of ownership, helping enforce rights in cases of infringement.

2. Exclusive rights:- Holders can reproduce, distribute, & publicly perform their work granting them control over it use.
3. Monetary benefits:- Copyright enables holder to license or sell their work, generating income - through royalties or other compensation.

8a. Explain the process of trademark registration.

- 8a
1. Trademark Search:- Conduct a thorough search to ensure that the proposed trademark is unique & not already registered or in use by others.
  2. Application filings:- Submit a trademark application to the relevant trademark office including detail like the trademark logo, description, & the class of goods/services well represent.
  3. Examination:- The trademark office examines the application to ensure compliance with legal requirements & check for any objections or conflicts with existing trademarks.
  4. Publication:- If the application passes the examination, the trademark is published in the official trademark journal, allowing the public to oppose the registration if necessary.

Ques

5. Registration & Certificate issuance:- If there are no objections or oppositions the trademark is registered & the applicant is issued a registration certificate granting exclusive rights to use the trademark.

8.b. Explain the classification system for trademark & its role in categorizing different types of marks.

Sol. 1. International Classification:- Trademarks are categorized into 45 classes 34 for goods & 11 for services under the Nice Agreement standardizing trademark registration globally.

2. Categorizing Goods & Services:- Each class defines specific goods or services, helping organize & differentiate trademarks based on their industry or application.

3. Scope of Protection: The classification determines the scope of protection ensuring trademarks are registered only for the relevant goods or services, avoiding conflicts in unrelated sectors.

4. Simplified Search & Registration:- The system allows for efficient trademark search making it easier for applications & examines to check for existing similar marks within the same class.

5. Facilitates Legal Enforcement - Classification helps in enforcing trademark rights as it clearly defines the trademark which is protected, streamlining legal process in cases of dispute.

9a. Explain the process of industrial design registration

8/ Application filing:- Submit a detailed representation of the design & a description (including photographs) of the design & a description of the product's appearance, focusing on its shape, configuration, or ornamentation.

Formal Examination:- The design office conducts a preliminary examination to check for compliance with formal requirements such as the design is new, original, & not purely functional.

Publication:- Once the application passes the formal examination, the design is published in the official design journal making it open to public scrutiny & potential opposition.

Substantive Examination! - if requested the office conducts a more detailed examination to ensure the design meets legal criteria, such as novelty & uniqueness. & that no prior similar designs exist.

Registration & Certificate issuance - upon successful completion of the examination & opposition period, the design is registered, & the applicant is granted exclusive rights to the design for 10 years, extendable by 5 more years.

9b. Explain the famous case law b/w Apple Inc vs Samsung Electronics Co. related with industrial design rights.

Q1  
Q2

Design dispute: - Apple sued Samsung in 2011, claiming that Samsung's smartphones copied the design of the iPhone including the rounded corners, bezel & grid layout of icons.

Initial verdict (2012): - A US jury awarded Apple over \$1 billion in damages, ruling that Samsung had infringed on Apple's design patents, including key aesthetic features of the iPhone.

3. Appeals & reductions: - Samsung appealed multiple times, leading to reductions in the damages with courts focusing on the appropriate method of calculating damages for design patent infringement.

4. Supreme Court ruling (2016): - The U.S. Supreme Court ruled in favor of Samsung, stating that damages should not be based on total profits from the sale of devices but only on the infringing components. Sending the case back to lower court.

5. Settlement (2018): - After years of legal battles, Apple & Samsung reach a Confidential Settlement. Concluding one of the most significant undermarket design dispute in tech history, emphasizing the importance of design rights in consumer products.

~~Ques~~

10a. Which specific acts laws & rules govern geographical indications in india? Give some examples of well known geographical indications registered in india.

(21) ~~for~~

1. The Geographical Indications of Goods (Legislation & Protection) Act, 1999  
This is the primary legislation that provides for the registration & protection of geographical indications in India.

2. The Geographical Indications of Goods (Legislation & Protection) Rule 2002  
These rules outline the procedure for filing, examination & registration of GIs as well as their enforcement.

3. Registrar of Geographical Indications  
The office under the Controller General of Patents & Trademarks oversees the registration & protection of GIs.

4. International Agreements - India is a member of the World Trade Organization (WTO) & complies with the Agreements on the trade-related aspects of intellectual property rights (TRIPS).

5. Examples of registered GIs  
Famous GIs in India include Darjeeling tea, Mysore Silk, Basmati Rice, Kasurpuli silk sarees, & Tirupati Laddu.



10.6 How would you describe the overall ecosystem & significance of geographical indications in India?

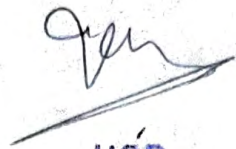
- Sol
- Cultural & Economic importance :- GIs preserve traditional knowledge & heritage promoting unique regional products that contribute to local economy & livelihoods.
  - Legal protection :- GIs provide legal recognition & protection to products linked to specific regions, preventing unauthorized use or imitation & ensuring authenticity.
  - Boost to rural development :- Many GIs represent rural products, enabling communities to gain recognition & enhance their market value, fostering sustainable development.
  - Export potential :- GIs help Indian products like masala, tea & basmati rice gain international recognition & booming exports by emphasizing quality & geographical origin.
  - Consumer trust & brand value :- GIs build trust among consumers by guaranteeing that products are made according to traditional methods & originate from specific regions, enhancing their brand value.

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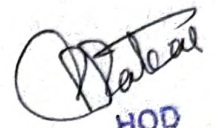
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