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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2025 Semester End Make-Up Examinations

Programme: B.E. **Semester: V**

Branch: CSE(DS)/AI & DS/CSE(IoT) **Duration: 3 hrs.**

Course Code: 23DS5AERMI **Max Marks: 100**

Course: Research Methodologies & IPR

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Summarize the importance of research approaches in scientific studies.	*CO2*	*PO 2*	**5**
	b)	With suitable example explain what is a research problem? Justify its relevance in defining the research problem accurately?	*CO2*	*PO2*	**5**
	c)	Elaborate on the following: I. Characteristics of the Scientific Method II. Components of the Scientific Method III. Common Pitfalls in Research	*CO1*	*PO2*	**10**
		OR			
2	a)	Describe the various types of research and provide an example for each.	*CO1*	*PO1*	**5**
	b)	A team of students are trying to carry out research. Provide them insights on how to select a problem, necessity of defining it and the techniques involved in defining the problem.	*CO2*	*PO1, PO2*	**5**
	c)	A pharmaceutical company plans to investigate the effectiveness of three new drug formulations for treating diabetes. Based on this scenario: I. Explain the different types of research designs that could be applied in this case. II. Justify the choice of design most suitable for this investigation	*CO1, CO2*	*PO1, PO2*	**10**
		UNIT - II			
3	a)	With examples for each summarize the types of sampling methods available in research.	*CO2*	*PO1, PO2*	**5**
	b)	Discuss the important sampling distributions commonly used in statistical analysis	*CO1*	*PO1*	**5**

		c)	Compare and contrast the sampling and non-sampling errors in detail with examples for each.	*CO2*	*PO2*	**10**
			OR			
	4	a)	Elaborate on Basic Principle of ANOVA and Importance of ANOVA	*CO1*	*PO2*	**5**
		b)	Summarize the following with examples: I. Purposive Sampling II. Convenience Sampling	*CO3*	*PO2*	**5**
		c)	A certain chemical plant processes sea water to collect sodium chloride and magnesium. From scientific analysis, sea water is known to contain sodium chloride, magnesium and other elements in the ratio of 62:4:34. A sample of 200 tons of sea water has resulted in 130 tons of sodium chloride and 6 tons of magnesium. I. Are these data consistent with the scientific model at 5% level of significance? (The chi-square value at 5% level of significance for two degree of freedom is *5.991*)	*CO3*	*PO3*	**10**
			UNIT - III			
	5	a)	Differentiate between copyright and industrial design with examples for each.	*CO1*	*PO1*	**5**
		b)	Analyze the following scenarios and determine which idea is patent-able and which is non-patent-able, providing clear justification based on the conditions required for patent-ability: I. A unique, biodegradable material developed for packaging: This material not only reduces environmental impact but also demonstrates durability and scalability for use across industries like food packaging and e-commerce. It incorporates a novel blend of plant-based polymers that enhance its decomposability compared to existing materials. II. A method of organizing a classroom seating arrangement based on a specific algorithm: This algorithm uses data inputs such as student preferences, learning styles, and behavioral patterns to optimize seating for collaborative learning. While innovative in concept, it involves mathematical principles. Furthermore, examine how patent protection and the associated rights can or cannot be applied to these ideas.	*CO3*	*PO3*	**5**
		c)	Patents serve as a cornerstone for technological innovation and legal protection. I. Interpret what a patent is and describe the key laws governing patents in India. II. Justify the necessity of patent laws using a case study of a patent.	*CO2*	*PO2*	**10**

			OR			
	6	a)	With an example explain what is geographical indicators and its significance in IPR	*CO1*	*PO1*	**5**
		b)	Discuss the conditions for obtaining a patent with examples for each.	*CO1*	*PO1*	**5**
		c)	Not all inventions qualify for patent protection due to specific exclusions. I. Discuss the categories of inventions eligible for patenting, with examples. II. Highlight non-patent-able matters with examples and explain the rationale behind such exclusions.	*CO2*	*PO2*	**10**
			UNIT - IV			
	7	a)	Interpret and analyze the Role of Patent Databases in Technology Transfer.	*CO2*	*PO2*	**5**
		b)	With proper justification elaborate on the validity of copyright and emphasize on important elements that may be included in copyright creation.	*CO2*	*PO2*	**5**
		c)	Case Study: A startup registers a trademark for its logo, but a competitor files a petition claiming that the logo is similar to an already registered trademark. I. Examine the conditions under which a trademark can be legally challenged. II. Discuss the steps the startup should follow to defend its trademark registration.	*CO3*	*PO3*	**10**
			OR			
	8	a)	Analyze and interpret different symbols used to indicate their trademark registration status and summarize the classes of trademarks with 2 examples.	*CO2*	*PO2, PO4*	**10**
		b)	Explain with examples the classes of the Geographical indication and elaborate on how we can identify the registered geographical indication.	*CO1*	*PO1, PO2*	**5**
		c)	With an example, elaborate on trademark and discuss the conditions that have to be met to be legally classified as a trademark.	*CO3*	*PO2*	**5**
			UNIT - V			
	9	a)	Justify the significance of a well-organized layout in a research report and explain how it influences the reader's understanding.	*CO2*	*PO1, PO2*	**5**
		b)	Identify and explain three precautions researchers must take when writing the conclusion of a research report to avoid misrepresentation of data.	*CO3*	*PO2*	**5**

		c)	An organization is preparing two types of reports: one for technical experts and another for the general public. I. Analyze the differences in the types of reports and their target audiences. II. Suggest specific variations in content and format to make each report effective.	*CO2*	*PO1, PO2*	**10**
			OR			
	10	a)	A report on climate change policies includes conflicting results from multiple datasets. Suggest two strategies the researchers can use to reconcile these inconsistencies.	*CO2*	*PO3*	**5**
		b)	Explain the role of precautions in ensuring objectivity during the interpretation of research findings. Provide two examples of potential pitfalls they can help avoid.	*CO1*	*PO1, PO3*	**5**
		c)	A pharmaceutical company wants to present its research findings on a new drug to a panel of stakeholders. I. Propose a layout for the research report suitable for the audience. II. Justify why this structure would be effective for presenting technical and non-technical details.	*CO3*	*PO4*	**10**

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