C **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: R9471

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Open Elective

R21UEC971-DESIGN THINKING FOR INNOVATIONS

(Regulations R2021)

(Common to all Engineering Branches)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. First process of design thinking is _____. CO1-U

   (a) Idea (b) Protocol (c) Empathy (d) Prototype

2. Which of the following is not a design thinking process? CO1-U

   (a) Empathize (b) Design (c) Ideate (d) Sales

3. The advantage of brainstorming in a group is ---------- of all participants CO1-U

   (a) Controlled Process (b) Mutual Process

   (c) Struggled Process (d) All of the above

4. LEGO prototypes helps explore and build empathy by reenacting user journeys using: CO1-U

   (a) Chemical products (b) Physical products

   (c) Mathematical products (d) All of the mentioned

5. Which of the following is a Design Thinking Process? CO1-U

   (a) Empathy (b) Design (c) Ideate (d) All of the mentioned

PART – B (5 x 3= 15 Marks)

6. Give one example where design thinking and engineering thinking would solve the same problem in different ways. CO2-App

7. Given a scenario where you need to understand the needs of elderly users for a new healthcare app, outline a plan for conducting empathetic research. Include at least three empathy methods. CO2-App

8.		Compare and contrast Ideathons and Hackathons in terms of their objectives and outcomes.	CO1-U	
9.		Summarize the significance of innovation in the design thinking process.	CO1-U	
10.		Choose a common business need (e.g., customer retention or product delivery). How would you use design thinking to address this need?	CO2-App	

PART – C (5 x 16= 80 Marks)

11.	(a)	How the principles of design thinking, from its origins, differ from traditional engineering thinking. Use practical examples to show how design thinking can be applied to generate innovative solutions in real-world product development.	CO2-App	(16)
		Or		
	(b)	Using a design thinking framework, propose a solution to a common real-world challenge (such as enhancing the urban commuting experience or creating a better classroom layout). Explain how each stage of the design thinking process supports the development of effective and user-centered outcomes.	CO2-App	(16)
12.	(a)	Describe the process of moving from the Empathy phase to the Problem Definition phase in Human-Centred Design. Include specific steps and techniques used in this transition.	CO1-U	(16)
		Or		
	(b)	Explain how you would create a journey map for a user setting up automatic bill payments in a mobile banking app, including how each step helps in enhancing the user experience.	CO1-U	(16)
13.	(a)	Apply your knowledge of low-fidelity prototypes by analyzing their role in early design stages for concept testing and user feedback. Discuss their advantages and limitations compared to high-fidelity prototypes. Provide examples of effective use cases where low-fidelity prototypes enhance the design process.	CO3-App	(16)
		Or		
	(b)	Apply user testing methods by analyzing how techniques like usability and A/B testing validate and refine design concepts. Discuss their advantages and limitations, providing examples of how they improve design outcomes.	CO3-App	(16)

14.	(a)	Explain the importance of teams in the design thinking process for driving innovation. Discuss the roles, skills, and characteristics that make an innovation team effective. Provide examples to illustrate how well-structured teams can enhance the innovation process in real-world scenarios.	CO1-U	(16)
		Or		
	(b)	Explain the relationship between materials and innovation. How do advancements in different types of materials drive innovation in product design, and what role do specific material types like metals, polymers, and composites play in this process?	CO1-U	(16)
15.	(a)	Analyze the use of design thinking in the development of the X-ray machine. Explain how the design thinking process identified and addressed challenges in medical imaging, and describe how the resulting innovations improved diagnostic accuracy and patient care.	CO4-Ana	(16)
		Or		
	(b)	Analyze the application of design thinking principles in the development of the microwave oven. Discuss how the process identified and solved key challenges in cooking technology and describe how the innovations improved efficiency and usability for consumers.	CO4-Ana	(16)