SRM Institute of Science and Technology
College of Engineering and Technology
School of Computing

Mode of Exam
OFFLINE

DEPARTMENT OF COMPUTING TECHNOLOGIES
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu
Academic Year: 2024 - 2025 - Odd Semester

Test: CLAT 2 **Batch 2 – Set D** **Date: 22.11.2024**
Course Code & Title: 21GNH101J Philosophy of Engineering **Duration: 75 min**
Year & Sem: I Year & I Sem **Max. Marks: 35**
Registration Number:

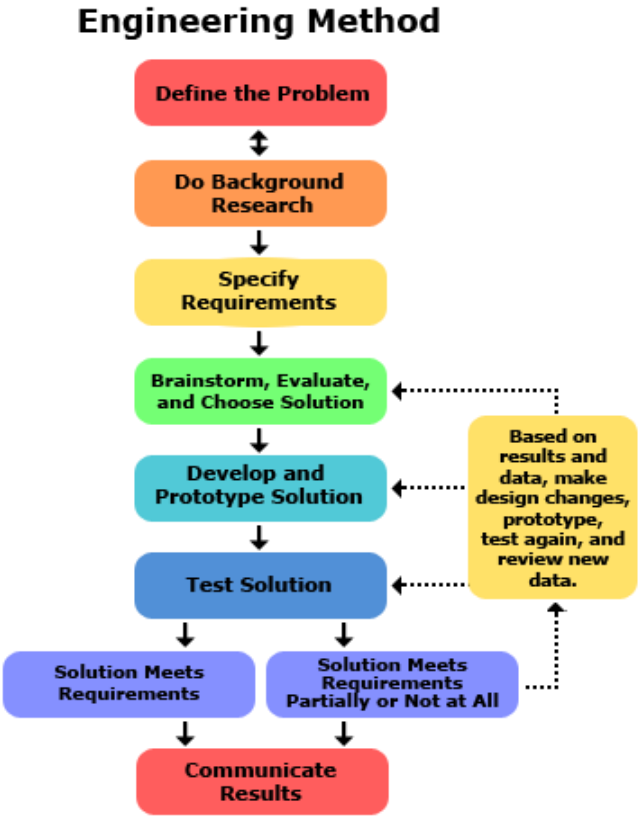
Part – A
(10 * 1 = 10 Marks)
Instructions: Answer all the Questions

Q. No	Question	Marks	BL	CO	PO
1	_____ is focus on ideas a) Creators b) helpers **c) Thinkers** d) Doers	1	1	3	1
2	Identify the odd element from RIASEC model. a) Realistic b) Social c) Conventional **d) Integrity**	1	1	3	1
3	Design as activity is primarily associated with which of the following fields? a) Business b) Medicine **c) Art and engineering** d) Music and literature	1	1	3	1
4	In this dimension of engineering, the completed job, which stands before the world, leads to the higher recognition. a) Basic sciences b) Social sciences c) Design **d) Practical accomplishment**	1	1	3	1
5	_____ as activity is related to the conceptualization (pre-execution) stages of making new products. **a) Design** b) Implementation c) Creation d) Thinking	1	1	3	1
6	_____ number of parts are involved in evaluation phase. **a) 2** b) 4 c) 6 d) 8	1	1	4	1

7	_____ model is practiced by instructional designers and training developers **a) ADDIE model** b) RIASEC model c) SPIRAL model d) DISERT model	**1**	**1**	**4**	**1**
8	In system design, what is a crucial consideration regarding data? **a) Data privacy** b) Data quantity c) Data color d) Data speed	**1**	**1**	**4**	**1**
9	_____ consist of formative and summative. a) Implementation phase b) Development phase **c) Evaluation phase** d) Design phase	**1**	**1**	**4**	**1**
10	_____ is the final stage of engineering design process. **a) Communicate results** b) Brainstorm possible solutions c) Research ideas d) Select an approach	**1**	**2**	**4**	**1**
Part – B **(1* 10 = 10 Marks)** **Instructions: Answer any ONE Question**					
Q. No	**Question**	**Marks**	**BL**	**CO**	**PO**
11	**Illustrate with an example, how the science, technology and engineering domains are related?** **Solution** **Science:-** • Definition: Science is the systematic study of the natural world, aiming to understand how it works through observation, experimentation, and the formulation of theories and laws. • Role: Science provides the fundamental knowledge and theories that serve as the foundation for technology and engineering innovations. • Example: In physics, scientists developed the theory of electromagnetism, which laid the groundwork for the technology of electrical power generation and distribution, leading to the engineering of power plants and electrical grids. **Technology:-** • Definition: Technology involves the application of scientific knowledge to create tools, devices, processes, and systems that solve problems and improve the quality of life. • Role: Technology acts as an intermediary	**10**	**2**	**3**	**1**

	between scientific discoveries and practical applications in various fields. • Example: The development of the internet and networking technologies, based on principles from computer science, has revolutionized communication, business, and education, creating a vast technological ecosystem. **Engineering** • Definition: Engineering is the application of scientific and mathematical principles to design, build, and optimize products, systems, and structures. • Role: Engineers use scientific knowledge and technology to develop real-world solutions that meet specific needs or solve practical problems. • Example: Aerospace engineers apply principles of physics and materials science to design and build spacecraft and aircraft. They use technology such as computer-aided design (CAD) software to create these complex systems. ……ex-(Autopilot) **To illustrate the relationship among these three domains** **<u>consider the example of Renewable energy:</u>** • Science: Scientists study the principles of physics, chemistry, and earth sciences to understand natural processes, such as solar radiation and wind patterns. This knowledge helps them identify renewable energy sources and their potential. • Technology: Technologists and inventors develop solar panels, wind turbines, and energy storage systems based on scientific principles. These technologies harness renewable energy sources efficiently and reliably. • Engineering: Engineers design and build renewable energy systems, such as solar power plants or wind farms, using the technology and scientific knowledge available. They optimize these systems for maximum energy production and sustainability. • In this example, science informs us about the potential of renewable energy sources, technology provides the means to harness them, and engineering creates practical solutions for generating clean energy.				
12	**Explain the difference between scientific method and engineering design method.**	**10**	**2**	**4**	**1**

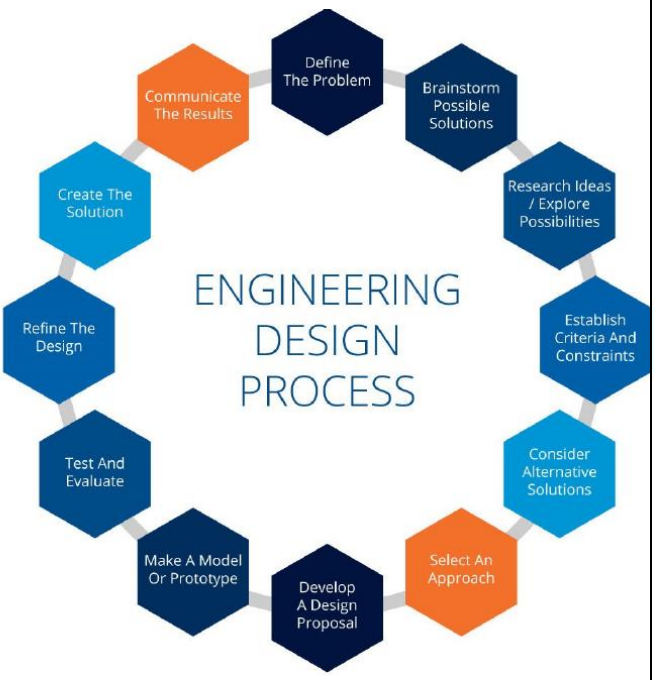
DIFFERENCE BETWEEN SCIENTIFIC METHOD AND ENGINEERING DESIGN



		The Scientific Method	The Engineering Design Process			
		State your question	Define the problem			
		Do background research	Do background research			
		Formulate your hypothesis, identify variables	Specify requirements			
		Design experiment, establish procedure	Create alternative solutions, choose the best one and develop it			
		Test your hypothesis by doing an experiment	Build a prototype			
		Analyze your results and draw conclusions	Test and redesign as necessary			
		Communicate results	Communicate results			
Part – C (1* 15 = 15 Marks) Instructions: Answer any ONE Question						
13	**Discuss in detail about four types of questions in philosophy of engineering.** **The four questions of Philosophy of Knowledge** 1. Ontological Question - a question that asks about the nature of reality, existence, or what is real. What reality can we known? 2. Epistemological question - questions about knowledge, including how we know things, how we distinguish between knowledge and opinion, and how we justify beliefs what is knowledge? what knowledge can we get? 3. Methodological question - how can we build that knowledge? 4. Axiological question what is the value of knowledge we build?		**15**	**2**	**3**	**4**
14	**Suppose you're leading a team to develop a mobile app for a local coffee shop chain. Using the engineering design process, describe how**		**15**	**2**	**4**	**4**

you would approach the development of this app.

Architecture (3)



12 principles – (12 mark)

1. Identify the Need or Problem: Clearly define the problem or opportunity that the design aims to address.
2. **Research and Gather Information**: Conduct research to gather relevant data, information, and constraints related to the problem or need.
3. **Define Design Criteria and Constraints**: Establish specific criteria and constraints that the design solution must meet, considering factors such as performance, cost, safety, and usability.
4. **Brainstorm Possible Solutions**: Generate a wide range of potential solutions through brainstorming and creative thinking techniques.
5. **Evaluate and Select the Best Solution**: Evaluate each potential solution against the design criteria and constraints, considering factors like feasibility, effectiveness, and practicality. Select the most promising solution for further development.
6. **Develop a Prototype or Model**: Create a prototype or model of the chosen solution to test its functionality, performance, and usability.
7. **Test and Evaluate the Prototype**: Conduct tests and evaluations to assess the

	prototype's performance, identify any shortcomings or areas for improvement, and gather feedback from stakeholders. 8. **Iterate and Refine the Design**: Based on the test results and feedback, make iterative improvements to the design, refining it to better meet the established criteria and address any identified issues. 9. **Finalize the Design Solution**: Once the design meets all criteria and constraints and has undergone sufficient testing and refinement, finalize the design solution for implementation. 10. **Implement the Design**: Carry out the necessary steps to bring the design solution to fruition, which may involve manufacturing, construction, programming, or other implementation processes. 11. **Evaluate the Implemented Solution**: Assess the performance and effectiveness of the implemented solution in real-world conditions, monitoring its functionality and addressing any unexpected issues that arise. 12. **Communicate Results and Reflect on the Process**: Communicate the results of the design process to stakeholders, sharing insights gained, lessons learned, and recommendations for future improvements. Reflect on the design process to identify strengths, weaknesses, and opportunities for enhancement in future projects.				

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions