**SRM Institute of Science and Technology** 

**College of Engineering and Technology School of Computing**

**DEPARTMENT OF COMPUTING TECHNOLOGIES**

Mode of Exam **OFFLINE**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu **Academic Year: 2024 - 2025 - Odd Semester**

**Test: CLAT2 Batch 1 – Set B 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** | | | | | |
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| **Q.**  **No** | **Question** | **Marks** | **BL** | **CO** | **PO** |
| **1** | Design as \_\_\_\_\_\_\_\_\_\_\_\_\_is related to the conceptualization stages of making new products **a) activity**  b) planning  c) execution  d) epistemology | **1** | **1** | **3** | **1** |
| **2** | People prefer to work with data particularly in the numerical, statistical and record keeping realm are grouped under  **a) organizers**  b) persuaders  c) thinkers  d) helpers | **1** | **2** | **3** | **1** |
| **3** | What is one suggested approach to innovation when dealing with tight constraints on schedules and finances in engineering?  a) Overcomplicate the design for better results b) Rely on rigorous design rules  c) Keep the design as complex as possible  **d) Make a list of solutions early in the design process** | **1** | **1** | **3** | **1** |
| **4** | “RAISEC” model was theorized by  a) Isacc Newton  b) Imhotep  c) Archimedes  a) **John holland** | **1** | **1** | **3** | **1** |
| **5** | \_\_\_\_\_\_\_\_\_\_ is the preferred modus operandi of this dimension, where the discovery of first principles is seen as the activity leading to higher recognition. **a) Research**  b) Scientific  c) Experimental  d) Testing | **1** | **2** | **3** | **1** |

| **6** | The final stage of engineering design process in a) Define Problem  b) Research Ideas  **c) Communicate Results**  d) Establish Constraints | **1** | **1** | **4** | **1** |
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| **7** | The process of specifying requirements are done using a) scientific methods  **b) engineering methods**  c) classical business methods  d) profitable methods | **1** | **1** | **4** | **1** |
| **8** | What does “scalability” refer to in system architecture? a) The color scheme of the system  **b) The ability of handle increased traffic or growth**  c) The security of the system  d) The deployment process | **1** | **1** | **4** | **1** |
| **9** | Engineers follow the \_\_\_\_\_\_\_ engineering design process  **a) Creativity-based**  b) Scientific based  c) ADDIE based  d) CDIO based | **1** | **2** | **4** | **1** |
| **10** | An engineer identifies a specific need\_\_\_\_\_\_\_ need(s) \_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_? And then, he or she creates a solution that meets the need.  **a) Who, what, why**  b) Who, why, what  c) What, why, who  d) What, who, why | **1** | **1** | **4** | **1** |
| **Part - B**  **(1\* 10 = 10 Marks)**  **Instructions: Answer any ONE Question** | | | | | |
| **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 | **10** | **2** | **3** | **1** |

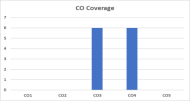
|  | of scientific knowledge to create tools, devices, processes, and systems that solve problems and improve the quality of life.  • Role: Technology acts as an intermediary between scientific discoveries and practical applications in various fields.  • Example: The development of the internet and networking 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**  **consider the example of Renewable energy:** • 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. |  |  |  |  |
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| **12** | **Explain in detail on how Addie model is useful for building training support tools.** | **10** | **2** | **4** | **1** |

|  | **Solution**  The ADDIE model is the generic process traditionally used by instructional designers and training developers**.**  The five phases—Analysis, Design, Development, Implementation, and Evaluation—represent a dynamic, flexible guideline for building effective training and performance support tools. While perhaps the most common design model, there are a number of weaknesses to the ADDIE model which have led to a number of spin-offs or variations. It is an Instructional Systems Design (ISD) model..  Analysis > Design > Development > Implementation > Evaluation  **Diagram** |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Part - C**  **(1\* 15 = 15 Marks)**  **Instructions: Answer any ONE Question** | | | | | |
| **13** | **Describe in detail on John Holland’s Theory with their personality types.**  **Solution:**  **RIASEC Model** | **15** | **2** | **3** | **1** |

|  | • **Realistic**: People who enjoy working with their hands, using tools, and engaging in physical activity. Careers in engineering, construction, or athletics are typical for this type.  • **Investigative**: Individuals who are analytical, curious, and enjoy solving complex problems. These people often thrive in science, research, and technical fields.  • **Artistic**: Creative thinkers who express themselves through art, music, writing, or  design. These individuals prefer jobs in the  creative industries.  • **Social**: Compassionate and helpful individuals who are drawn to teaching, counseling, or  healthcare. Social types enjoy working with others and making a positive impact.  • **Enterprising**: These people are confident, persuasive, and like to lead. They often excel in business, sales, or management roles.  • **Conventional**: Detail-oriented individuals who enjoy structure and organization. Jobs in  accounting, administration, or data management typically attract this type. |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **14** | **Explain the key differences between the scientific method and the engineering design process. How do these processes cater to different objectives in the fields of science and engineering?**  **DIFFERENCE BETWEEN SCIENTIFIC METHOD AND ENGINEERING DESIGN** | **15** | **2** | **4** | **1** |

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|  |  | The Scientific  Method | The Engineering  Design Process |  |  |  |  |  |
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| 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 |

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