**SRM Institute of Science and Technology**
**College of Engineering and Technology**
**DEPARTMENT OF ECE**
**SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu**
**Academic Year: 2022-2023 (EVEN)**

**BATCH 2**

**SET C**

**Test: CLAT-1 /Batch 2** | **Date: 20/02/2023**
**Course Code & Title: 21GNH101J Philosophy of Engineering** | **Duration: 1 Hour**
**Year & Sem: I / II** | **Max. Marks: 25**

**Course Articulation Matrix :**

| | 21GNH101J- PHILOSOPHY OF ENGINEERING | Program Outcomes (POs) | | | | | | | | | | | | Program Specific Outcomes (PSOs) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO | Course Outcomes (COs) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| 1 | Analyze the relation between Arts, Mathematics, Science, Technology and Engineering and desired attributes of an engineer | 1 | - | - | 3 | - | 1 | - | - | 3 | 3 | - | 3 | - | - | - |
| 2 | Build ontologies for systems engineering using concept/mind mapping techniques | 3 | - | - | 3 | 3 | - | - | - | 3 | 3 | - | 3 | - | - | - |
| 3 | Analyze the knowledge base in engineering, distinctive features of engineering design and RIASEC mode | 3 | - | - | 3 | - | - | - | - | 3 | 3 | - | 3 | - | - | - |
| 4 | Illustrate the engineering design process for the given application, analyze the requirements of CDIO engineers | 3 | 1 | 3 | 3 | 3 | - | - | - | 3 | 3 | - | 3 | - | - | - |
| 5 | Evaluate designs on their environmental and societal aspects and do organizational analysis on profession engineering organizations | 3 | 3 | 3 | 3 | - | 3 | 3 | 3 | 3 | 3 | - | 3 | - | - | - |

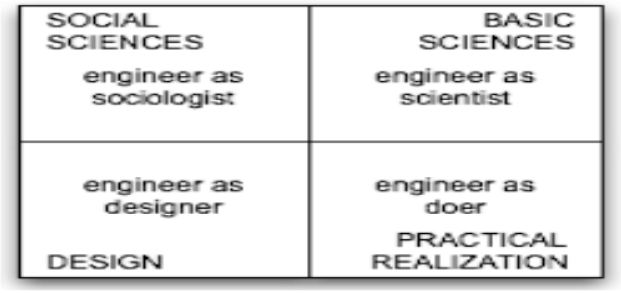
**Part – A (5x1 = 5 Marks)**
**Answer all the questions**

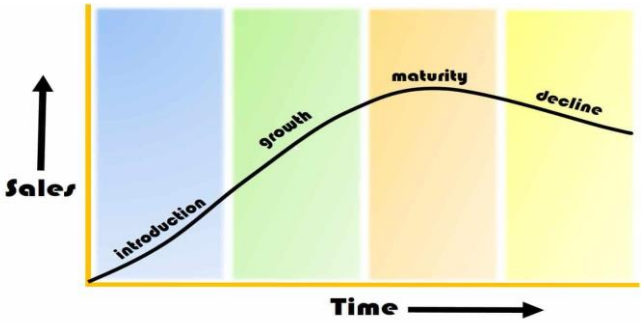
| Q. No | Question | Marks | BL | CO | PO |
|---|---|---|---|---|---|
| 1. | Ontology is a branch of philosophy that studies<br>(a) Existence (b) Being (c) Reality (d) All of the above<br>**Answer: (d) All of the Above** | 1 | 1 | CO2 | 6 |
| 2. | According to metaphysical realism<br>(a) World exists objectively in itself<br>(b) World does not exist<br>(c) World is knowable by us<br>(d) World is created by us<br>**Answer: (a) World exists objectively in itself** | 1 | 1 | CO2 | 1 |
| 3. | Which one is true?<br>(a) Reference ontology has minimal coverage<br>(b) Application ontology has minimal coverage<br>(c) Reference ontology has maximal coverage<br>(d) All of the above<br>**Answer: (c) Reference ontology has maximal coverage** | 1 | 1 | CO2 | 1 |
| 4. | Which one is not included in four dimensions of engineering?<br>(a) Design (b) Basic science (c) Social Science (d) Economic Science<br>**Answer: (d) Economic Science** | 1 | 1 | CO3 | 1 |
| 5. | The design dimension sees the engineer as:<br>(a) Art of design (b) Manufacturer (c) Scientist (d) Leader<br>**Answer: (a) Art of design** | 1 | 2 | CO3 | 12 |

**Part – B (2 x 4 = 8 Marks)**
**Instructions: Answer ANY 2 Questions**

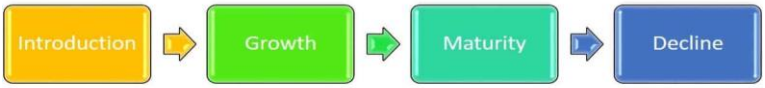
| | | | | | |
|---|---|---|---|---|---|
| 6 | Give the comparison between the reference ontology and Application ontology.<br>Answer: | 4 | 1 | CO2 | 1 |

| Reference Ontology | Application Ontology |
|---|---|
| theoretical Focus on representing | theoretical Focus on representing |
| establishes consensus about | offers terminological services for semantic ac |

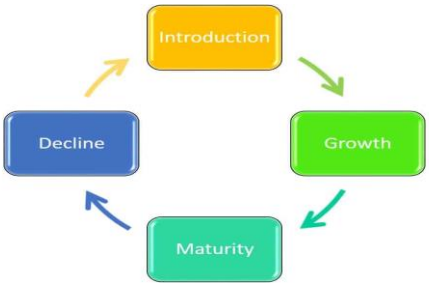
| | | | | | | |
|---|---|---|---|---|---|---|
| | meaning of terms | terms | | | | |
| | maximal coverage | provides a minimal terminological structure | | | | |
| | Fits the needs of a large community | fits the needs of a specific community | | | | |
| | Fits the needs of a large community | lightweight ontologies | | | | |
| | Can't be derived from application ontology | can be derived from Reference ontology | | | | |
| | broad and deep | broad and deep | | | | |
| | designed according to strict ontological principles | designed according to the viewpoint of an end-user in a particular domain | | | | |
| **7** | What are the four dimensions of engineering? Explain with suitable examples.<br>Answer:<br>The  <br>dimension inspired by the basic sciences views engineering as the application of the natural and exact sciences, stressing the values of logics and rigour, and seeing knowledge as produced through analysis and experimentation. Research is the preferred modus operandi of this dimension, where the discovery of first principles is seen as the activity leading to higher recognition. The social dimension of engineering sees engineers not just as technologists, but also as social experts, in their ability to recognize the eminently social nature of the world they act upon and the social complexity of the teams they belong to. The creation of social and economic value and the belief in the satisfaction of end users emerge as central values in this dimension of engineering. | | 4 | 4 | CO3 | 1 |
| **8** | What is Epistemology? How does it see the science?<br><br>Answer: Theory of knowledge, especially with regards to its methods, validity and scope, and the distinction between justified belief and opinion is call as epistemology.<br>They are all different ways of saying the same thing. Choose whichever appeals you the most:<br>1. Science is knowledge of the natural world put together, Engineering is creation based on the scientific knowledge put together, and Technology is the set of engineered creations put together.<br>2. Science comes from observation of the world, Engineering comes from acquiring and applying knowledge, and Technology comes from repeated application and approval of the engineered tools.<br>3. Science is about creating meaning of natural phenomenon, Engineering is about creating new devices, tools and processes, and Technology is about creating a collection of engineered and tested tools for the mankind. | | 4 | 1 | CO3 | 1 |

| Part – C (1 x 12 = 12 Marks) | | | | | |
|---|---|---|---|---|---|
| **9a** | What is product life cycle?<br>Explain the close loop manufacturing cycle.<br>What do you understand by commodities?<br>Answer:<br>PLC is an assumption that every product goes through that involves the same pattern of introduction into the market, growth, maturity, and decline. As the product spends more time in the market and it makes its way through the cycle, its sales increase. Each product's PLC is different in the length of scope and duration, and each product is at risk of not making it out of the introduction phase. However, the company strategy should remain consistent throughout each of the phases.<br>The PLC, in brief, is as follows:<br>Stage 1: Product Development: The new product is introduced; this is when all of the research and development happens.<br>Stage 2: Product Growth: The product is more than an idea or a prototype. At this stage, the product is manufactured, marketed, and released. Distribution increases, demand increases, and competition also increases.<br>Stage 3: Product Maturity: During this stage, the product is widely available, and there are many competitors in the marketplace. You market the product to different segments, but more spending on advertising will have no impact on its demand.<br>Stage 4: Product Decline: The product is losing market share, or becoming obsolete. It is well past its point of highest demand, and the demand decreases.<br>  <br><br>Additionally, the product life cycle affects the average selling price (ASP). The ASP is how much you generally sell your products or services for. When a product has many competitors or it is in the decline stage of its PLC, the ASP will be lower. Product image also drives the ASP. Products with an image of exclusivity have a higher ASP. For example, Louis Vuitton luggage is considered a luxury brand of products that are made by hand and use the finest materials. There is a limited assortment of products, a long wait time to procure one, and a higher than average price point. The company has even sped up their manufacturing process, but the price point still reflects the exclusivity and time to market of a custom bag. In fact, Louis Vuitton increased its prices in 2013 to attract more high-end consumers because they experienced a decline. This approach is an interesting twist on the PLC since normally the prices would drop with the waning in demand.<br><br>Closed-Loop Manufacturing Cycle<br>So far, we have been discussing the typical PLC. It is linear and at each stage has material, labor, and resource inputs. It also has waste outputs that can negatively affect the environment. | **12** | **2** | **CO2** | **12** |

Researchers assert that the introduction stage where design takes place determines between 70 percent and 90 percent of the life cycle costs. At this stage, manufacturers can also remove excess waste and continue to develop sustainable manufacturing practices. These practices should include products being reused, recycled, and remanufactured. With this, you are developing a closed-loop manufacturing cycle. Instead of a linear PLC, this represents a circular PLC.




A closed-loop cycle is a natural extension of PLM, and creates a truly full life cycle that takes your obsolete or used products back into raw materials, not just assigning them to waste. Although many of these closed-loop products are down cycled (converted into lesser-quality materials), the products are still recycled and reused repeatedly.




An example of this is Dell's take-back program, which takes the computers that it manufacturers and turns a majority of them into new computers. Other companies separate out product components and sell them to their partners on the commodities market, as raw materials, who then make them into new products. The benefits of a closed-loop system include:

- Better for the environment
- Does not affect performance or price
- Fewer carbon emissions in manufacturing
- As programs scale, they become cheaper and more effective

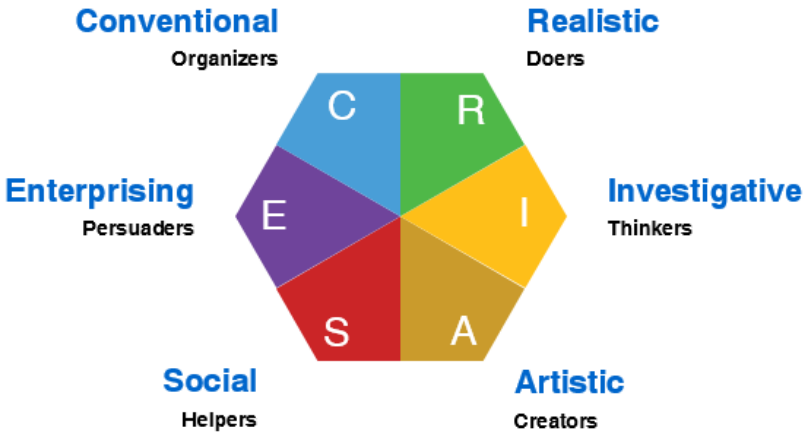
Commodities:

Commodities are an important aspect of most American's daily life. A commodity is a basic good used in commerce that is interchangeable with other goods of the same type. Traditional examples of commodities include grains, gold, beef, oil, and natural gas.

For investors, commodities can be an important way to diversify their portfolios beyond traditional securities. Because the prices of commodities tend to move in opposition to stocks, some investors also rely on commodities during periods of market volatility.

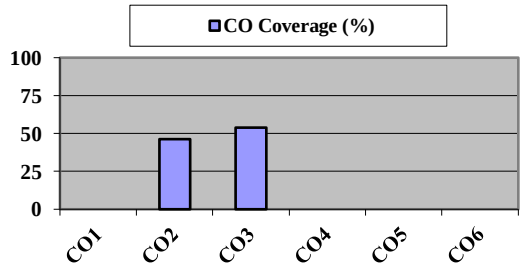
In the past, commodities trading required significant amounts of time, money, and expertise, and was primarily limited to professional traders. Today, there are more options for participating in the commodity markets.

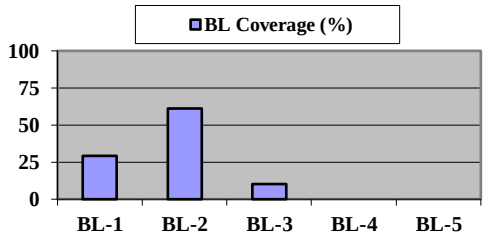
- Commodities that are traded are typically sorted into four categories broad categories: metal, energy, livestock and meat, and agricultural.
- For investors, commodities can be an important way to diversify their portfolios beyond traditional securities.

| | | | | | |
|---|---|---|---|---|---|
| | • In the most basic sense, commodities are known to be risky investment propositions because their market (supply and demand) is impacted by uncertainties that are difficult or impossible to predict, such as unusual weather patterns, epidemics, and disasters both natural and human-made.<br>• There are a number of ways to invest in commodities, such as futures contracts, options, and exchange traded funds (ETFs). | | | | |
| **9b** | What is RAISEC Model?<br>What are the Six basic personality type in the RAISEC model.<br>Answwer:<br>In the 1950s, John Holland theorized that personality and work environment are measurable, and that the two should be matched in order to find a satisfying career. Holland's theory describes six basic personality types (**RIASEC**, described below). One type is typically dominant; an individual's top three types -- in order -- make up that person's Holland Code. The goal is to match an individual's code, or personality type, with his or her career.<br>  <br><br>**Realistic - R (Doers)**<br>Like to work with their hands and focus on things in the physical world & use physical skills. Like to repair and work with tools, machines, or animals; outdoor work is often preferred. Prefer problems that are concrete rather than abstract; want practical solutions that can be acted out. Characteristics include stable, assertive, physical strength, practical.<br>**Holland typology:** realistic practical frank nature lover curious concrete self controlled ambitious persistent athletic mechanical thrifty stable reserved independent systematic.<br><br>**Investigative - I (Thinkers)**<br>Tend to focus on ideas. Like to collect and analyze data and information of all kinds. Curious and tend to be creative and original. Task oriented and motivated by analyzing and researching. Tend to prefer loosely structured situations with minimal rules or regulations. Prefer to think through rather than act out problems. Characteristics include reserved, independent, analytical, logical.<br>**Holland typology:** investigative inquisitive scientific precise cautious self-confident reserved independent analytical observant scholarly curious introspective broad-minded logical.<br><br>**Artistic - A (Creators)**<br>Creative and tend to focus on self-expression through all kinds of mediums: materials, music and words, as well as systems and programs. Able to see possibilities in various settings and are not afraid to experiment with their ideas. Like variety and tend to feel cramped in structured situations. Deal with problems in intuitive, expressive, and independent ways. Tend to be adverse to rules. Characteristics include intuitive, creative, expressive, unconventional.<br>**Holland typology:** artistic creative imaginative unconventional independent original impulsive courageous complicated nonconforming intuitive innovative emotional expressive introspective sensitive open idealistic.<br><br>**Social - S (Helpers)**<br>Concerned with people and their welfare. Tend to have well developed communications skills and like to help, encourage, counsel, guide, train, or | **12** | **2** | **CO3** | **6** |

| | | | | | |
|---|---|---|---|---|---|
| | facilitate others. Enjoy working with groups or individuals, using empathy and an ability to identify and solve problems. Value cooperation and consensus. Deal with problems through feelings. Flexible approach to problems. Characteristics include humanistic, verbal, interpersonal, responsible. **Holland typology:** social friendly idealistic outgoing cooperative responsible kind persuasive patient helpful insightful understanding generous forgiving empathetic.<br><br>**Enterprising - E (Persuaders)**<br>Work with and through people, providing leadership and delegating responsibilities for organizational and/or financial gain. Goal-oriented and want to see results. Tend to function with a high degree of energy. Prefer business settings, and often want social events to have a purpose beyond socializing. Attack problems with leadership skills. Decision-Maker. Characteristics include persuasive, confident, demonstrate leadership, interest in power/status. **Holland typology:** enterprising self-confident sociable enthusiastic adventurous impulsive inquisitive talkative spontaneous assertive persuasive energetic popular ambitious optimistic extroverted.<br><br>**Conventional - C (Organizers)**<br>Like to pay a lot of attention to detail and organization, and prefer to work with data, particularly in the numerical, statistical, and record-keeping realm. Have a high sense of responsibility, follow the rules, and want to know precisely what is expected. Prefer clearly defined, practical problems and to solve problems by applying rules. Oriented to carrying out tasks initiated by others. Characteristics include conscientious, efficient, concern for rules and regulation, orderly. **Holland typology:** conventional well-organized accurate numerically-inclined methodical efficient orderly thrifty structured ambitious persistent conscientious conforming practical systematic polite obedient. | | | | |

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




**Approved by the Course Coordinator** **Signature of the Question paper setter**

## Evaluation Sheet

**Name of the Student:** **Register No.:**

| Part- A (5 x 1= 5 Marks) | | | | | |
|---|---|---|---|---|---|
| **Q. No** | **CO** | **PO** | **Maximum Marks** | **Marks Obtained** | **Total** |
| 1 | CO2 | 6 | 1 | | |
| 2 | CO2 | 1 | 1 | | |
| 3 | CO2 | 1 | 1 | | |
| 4 | CO3 | 1 | 1 | | |
| 5 | CO3 | 12 | 1 | | |
| **Part- B (2 x 4= 8 Marks)** | | | | | |
| 6 | CO2 | 1 | 4 | | |
| 7 | CO3 | 1 | 4 | | |
| 8 | CO3 | 1 | 4 | | |
| **Part- C (1 x 12= 12 Marks)** | | | | | |
| 9a | CO2 | 12 | 12 | | |
| 9b | CO3 | 6 | 12 | | |

**Consolidated Marks:**

| CO | Maximum Marks | Marks Obtained |
|---|---|---|
| 2 | 19 | |
| 3 | 22 | |
| Total | 41 | |

| PO | Maximum Marks | Marks Obtained |
|---|---|---|
| 1 | 15 | |
| 6 | 13 | |
| 12 | 13 | |
| Total | 41 | |

**Signature of Course Teacher**

**Signature of the Course Coordinator**

**Signature of the Academic Advisor**