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

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-23 (ODD)

A

Test: CLA-T2 **Date: 28-03-2024**
Course Code & Title: 21GNH101J- PHILOSOPHY OF ENGINEERING **Duration:** 1 Period
Year & Sem: I Year / II Sem **Max. Marks:** 30

Course Articulation Matrix:

S.No.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	**CO1**	1	-	-	3	-	1	-	L	3	3	-	3
2	**CO2**	3	-	-	3	3	-	-	-	3	3	-	3
3	**CO3**	3	-	-	3	-	-	-	-	3	3	-	3
4	**CO4**	3	1	3	3	3	-	-	-	3	3	-	3
5	**CO5**	3	3	3	3	-	3	3	3	3	3	-	3

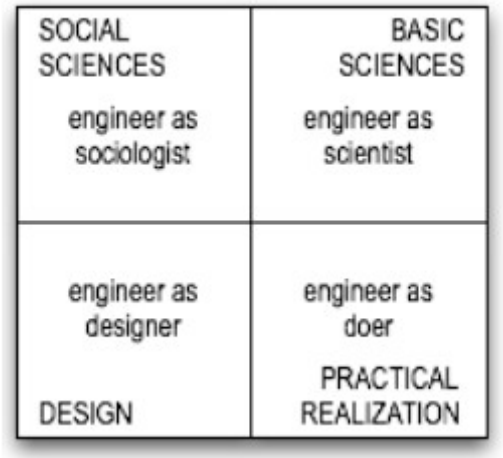
Part - A
(5 x 1 = 5 Marks)

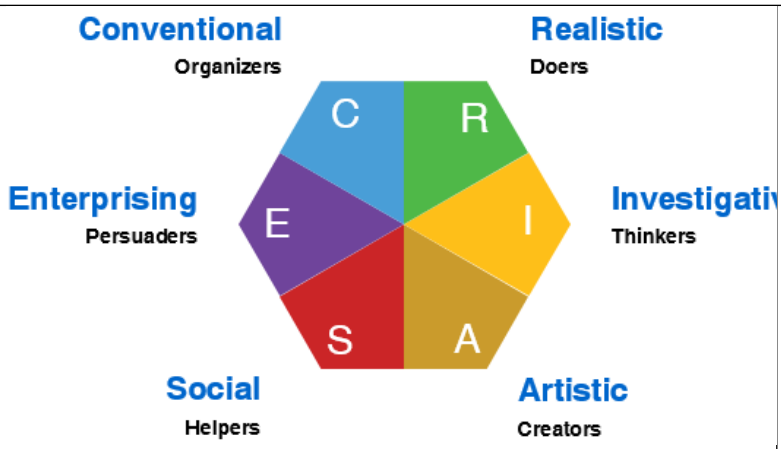
Instructions: Answer all

Q. No	Question	Marks	BL	CO	PO	PI Code
1	Science is a study of the natural world while ---------- is creating new things based on that study. a) Arts **b) Engineering** c) Scientists d) Developers	**1**	**1**	**3**	**4**	**1.5.1**
2	Engineering is creating new tools, devices, and processes based on ------- knowledge a) Practical **b) Scientific** c) Experimental d) Testing	**1**	**2**	**2**	**1**	**1.5.1**
3	---------- will prefer problems that are concrete rather than abstract a) Holland **b) Realistic** c) Creators d) Thinkers	**1**	**2**	**3**	**1**	**1.6.1**
4	Design ----------is distinct from analytic methodologies, which is crucial to develop scientific initiatives. **a) Thinkers** b) Epistemology c) Testers d) Developers	**1**	**1**	**2**	**1**	**1.6.1**

5	Design as---------- is more affiliated with management of a wide range of fields from business to military and from hospitals to academy. a) Epistemology **b) Planning** c) Activity d) Engineering	**1**	**2**	**3**	**1**	**1.7.1**
	Part – B **(2 x 5 = 10 Marks)** **Instructions: Answer any Two Question**					
6	Explain about Epistemology of Engineering Design of product. ***Epistemology of Engineering*** Science, Engineering, and Technology are often confused with each other. All three are closely related but mean different things. In this post, we have tried to bring out the differences between science, engineering, and technology. Let's start with a quote that brings out the difference between Science & Engineering: "Scientists study the world as it is; engineers create the world that has never been." —Theodore von Kármán As per the quote, we can observe that science is a study of the natural world while Engineering is creating new things based on that study. However, I would like to modify the quote in order to bring out a comparison between science, engineering and technology: "Science is the study of the natural world as it is; engineering is creating new tools, devices, and processes based on ***scientific*** knowledge; technology is the sum total of all the ***engineered*** tools, devices and processes available."	**5**	**2**	**3**	**4**	**1.6.1**
7	Discuss about engineering application ontology **Ontology** is the branch of philosophy that studies concepts such as existence, being, becoming, and reality. It includes the questions of how entities are grouped into basic categories and which of these entities exist on the most fundamental level. Ontology is sometimes referred to as the *science of being* and belongs to the major branch of philosophy known as metaphysics.	**5**	**1**	**2**	**1**	**1.5.1**

	Reference Ontology and Application Ontology **Reference Ontologies (RO)** There appear to be three central characteristics of reference ontologies (ROs). We examine these in turn. Theoretical Focus on representation The first characteristic of ROs is their theoretical focus on representation. ROs are constructed without any particular concerns for computational efficiency. Consequently, ROs avail themselves of (at least) the language of full first-order logic. Specifically, ROs avail themselves of: • Arbitrary n-place predicates; • Full classical negation; • Unbounded, arbitrarily nested quantifiers. The focus of ROs on representation is most clearly indicated in their generally unapologetic use of full first-order languages. The three features above are particularly noteworthy, as unrestricted use of any of them can render complete deductive procedures intractable, even undecidable. Philosophical inclination toward realism The second feature of ROs is that their inclination toward philosophical realism. There are generally two elements of this realism: • Metaphysical realism; • Epistemological realism.					
8	Briefly explain about four dimensions of Engineering ***Four Dimensions of Engineering:*** In the discussion of engineering knowledge it is helpful to think of engineering as comprising four major dimensions (Fig. 1): the dimensions of the basic sciences, of the social sciences, of design, and of practical accomplishment. This lets us think of the engineer as a professional who combines, in variable proportions, the qualities of a scientist, a sociologist, a designer, and a doer.	**5**	**3**	**3**	**4**	**1.7.1**

	 The 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.					
	Part – C **(1 x 15 = 15 Marks)**					
9	Briefly explain about RAISEC method using Epistemology of Engineering. 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.	**15**	**2**	**3**	**4**	**1.7.1**

	 **Realistic - R (Doers)** 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. **Holland typology:** realistic practical frank nature lover curious concrete selfcontrolled ambitious persistent athletic mechanical thrifty stable reserved independent systematic.					
10	Briefly explain about Ontology and its application with the concept or mind mapping. **Ontology** is the branch of philosophy that studies concepts such as existence, being, becoming, and reality. It includes the questions of how entities are grouped into basic categories and which of these entities exist on the most fundamental level. Ontology is sometimes referred to as the *science of being* and belongs to the major branch of philosophy known as metaphysics. ***Reference Ontology and Application Ontology*** **Reference Ontologies (RO)** There appear to be three central characteristics of reference ontologies (ROs). We examine these in turn. Theoretical Focus on representation The first characteristic of ROs is their theoretical focus on representation. ROs are constructed without any particular concerns for computational efficiency. Consequently, ROs avail themselves of (at least) the	**15**	**2**	**2**	**4**	**1.7.1**

language of full first-order logic. Specifically, ROs avail themselves of:

• Arbitrary n-place predicates;

• Full classical negation;

• Unbounded, arbitrarily nested quantifiers.

The focus of ROs on representation is most clearly indicated in their generally unapologetic use of full first-order languages. The three features above are particularly noteworthy, as unrestricted use of any of them can render complete deductive procedures intractable, even undecidable. Philosophical inclination toward realism The second feature of ROs is that their inclination toward philosophical realism.

There are generally two elements of this realism:

• Metaphysical realism;

• Epistemological realism.

According to metaphysical realism, the World (Reality, What There Is) exists objectively in itself, independent of any mind. According to epistemological realism, the World is knowable by us. Thus, the philosophical standpoint underlying most ROs is that the World and its properties are there to be discovered. This implies, in turn, that the World, being objective and knowable, puts constraints on what we can say about it. Thus, in our ontologies can get it wrong. An RO is right just insofar as it accurately reflects, as far as it goes, the way the World is. This leads to our third feature of ROs. Methodological emphasis on Truth Because our ROs can be wrong, there is in the construction of an RO a good reason to place a strong methodological emphasis on Truth.

This has two practical implications:

• The central function of an ontology is to represent the World accurately and comprehensively; hence:

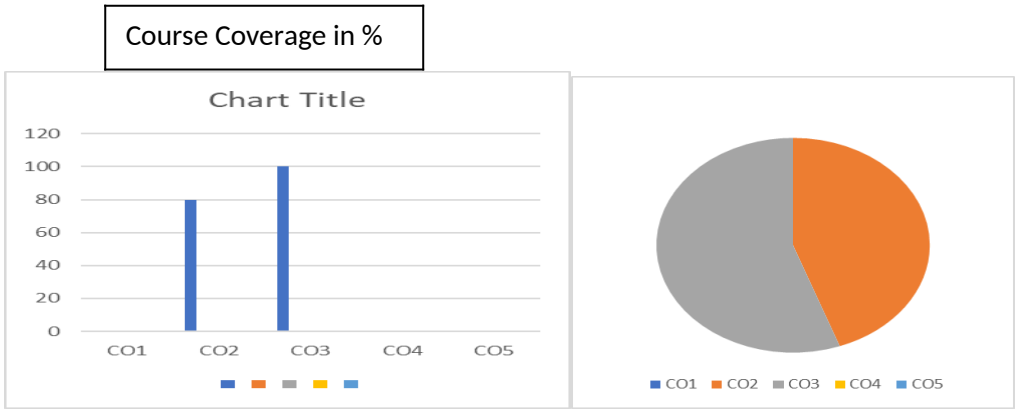
• The quality of an ontology a function of its accuracy and comprehensiveness.

ROs are all about getting the world — or some important piece of it — right.

An ontology of time purports to describe its actual

	nature, to proffer the sober metaphysical truth on such matters as whether time is discrete, continuous, some combination of the two; whether there are timepoints or intervals, or both, and so on. Consequently, the quality of an ontology is judged along two dimensions: its accuracy — i.e., whether what it purports to be the case is in fact the case — and its comprehensiveness — i.e., whether it takes in a sufficiently broad spectrum of facts as to be significant. **Application Ontologies** (AOs) Corresponding to our three features of reference ontologies are three salient features of application ontologies (AOs).					

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



Approved by the Audit Professor/Course Coordinator