

ESE-2021 Prelims Paper-I

Engineering Ethics



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PREFACE

Engineering professionals are required to serve the general public by strictly adhering to the codes of conduct, and giving utmost importance to the health, safety and welfare of the public.

Engineering Ethics is a textbook that explores the moral issues and decisions encountered by practicing engineering professionals, and the study of related questions about the moral ideals, character, policies and relationships of people and corporations involved in technological activities.

The main objective of this fourth and revised edition of Engineering Ethics is to prepare students for their professional responsibilities as Engineers. To help them recognise and think through ethically significant problem situations that are common in the field of engineering, and to evaluate the existing ethical standards for engineering practice.

A disaster during an engineering project can occur due to many factors such as overconfidence, negligence, poor maintenance, etc. If the necessary codes of Engineering Ethics are followed, most of the disasters can be avoided.

The understanding of human character and values is ethics. Values provide a unique, personal and moral template to assess the intentions and actions of ourselves and others. It also differentiates the right from the wrong.

Starting from the very basic concepts of Ethics and Values, this book condenses and maps all important discussion on Ethical Theories, Professional Ethics, Principles of Ethics, Human Values and Psychology, and Ethical Governance in a manner that it all interlinks as one reads para, pages, and chapters. Thus, one gets a vivid picture of the moral issues and dilemmas faced by engineers. And the book also gives a critical insight into the major global issues concerning Environmental Ethics, Intellectual Property Rights (IPRs), Computer Ethics and Internet, etc.

Further, to acclimatise students with engineering ethics, and to build their analytical and reasoning skills in solving problems, this revised and updated book includes more than 285 questions for self practice and grasping the essence of Engineering Ethics.

Any constructive ideas, suggestions, feedbacks for improving the content of future editions will be greatly appreciated.

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CONTENTS

Section	Description	Page No.
	<i>Preface</i>	<i>(iii)</i>
Chapter 1	UNDERSTANDING THE BASIC CONCEPTS OF ETHICS AND VALUES	1 – 28
1.1	Epistemology	1
1.1.1	Objectivist epistemology	1
1.1.2	Constructionist Epistemology	1
1.1.3	Subjectivist Epistemology	2
1.2	Values	3
1.2.1	Defining Values	3
1.2.2	Classification of Values	4
1.3	Social Change	5
1.3.1	Meaning of Social Change	5
1.3.2	Types of Social Change	5
1.3.3	Factors Influencing Social Change	5
1.4	Social Norms	6
1.5	Societal Development	6
1.6	Role of Socialization in the Development of Values	7
1.7	Moral values	8
1.7.1	Defining Moral Values	8
1.7.2	Classification of Moral Values	8
1.7.3	Defining Morality	8
1.7.4	Classification of Morality	8
1.8	Ethics and Ethical values	9
1.8.1	Defining Ethics	9
1.8.2	Defining Ethical Values	9
1.8.3	Classification of Ethical Values	9
1.8.4	Core Ethical Values	9
1.8.5	Dichotomy between Morals and Ethics	10

	1.8.6	Character	10
	1.8.7	Theories and Approaches Towards Understanding Ethics	11
	1.8.8	Theory of Justice	17
1.9		Ethical and Moral dilemma	18
	1.9.1	Defining Ethical Dilemma	18
	1.9.2	Defining Moral Dilemma	18
	1.9.3	An Engineering Perspective	18
1.10		Ethical and Moral autonomy	18
	1.10.1	Lawrence Kohlberg's Theory	19
	1.10.2	Carol Gilligan's Theory	19
	1.10.3	Abraham Maslow's Theory of Hierarchy of Needs	19
1.11		Ethics vs law	20
Chapter 2		AN INTRODUCTION TO ENGINEERING ETHICS	29 – 38
2.1		Meaning nature and scope of engineering ethics	30
	2.1.1	Meaning	30
	2.1.2	Nature of Engineering Ethics	30
	2.1.3	Scope of Engineering Ethics	31
2.2		Evolution of engineering ethics as a distinct discipline	32
2.3		Significance of ethics in engineering profession	32
	2.3.1	Technology and Society	32
	2.3.2	Engineering as Social Experimentation	32
2.4		Challenges to engineering ethics	33
	2.4.1	Social Challenges	34
	2.4.2	Economic Challenges	34
	2.4.3	Political Challenges	34
	2.4.4	Environmental Challenges	34
	2.4.5	Technical Challenges	34
	2.4.6	Cultural Challenges	34
2.5		A global approach to engineering ethics	34
2.6		Fundamental principles of engineering ethics	35
Chapter 3		ETHICS AND VALUES IN ENGINEERING PROFESSION	39 – 54
3.1		Engineering as a profession	40

3.1.1	Defining Profession	40
3.1.2	Defining Engineering	40
3.1.3	Is Engineering a Profession?	40
3.1.4	Several Features of a Profession	40
3.1.5	Attributes of a Profession	41
3.2	Professional Ethics	41
3.3	Engineering as a Profession	41
3.4	Roles of an Engineer	42
3.5	Engineer as a Moral agent	42
3.5.1	Variety of Moral Issues Affecting Engineers/Engineering	42
3.5.2	Reasons for Moral Problems	43
3.5.3	Types of Enquiry in Engineering Ethics	43
3.6	Engineering and society	43
3.6.1	Significance of Engineering	43
3.6.2	Engineering Social Responsibility	43
3.6.3	Engineering and Millennium Development Goals (MDGs)/Sustainable Development Goals (SDGs)	43
3.7	Responsibilities of an Engineer	44
3.7.1	Professional Responsibilities	44
3.7.2	Moral Responsibility	44
3.7.3	Responsibility for Safety and Risk-Evaluation	44
3.8	Liability of Engineers	46
3.9	Ethical and moral values in engineering	46
3.9.1	Ethical and Moral Values in Public and Private Organisations	46
3.9.2	Convergence of Public and Private Organisations' Values	48
3.10	Code of Ethics and Code of Conduct	48
Chapter 4	HUMAN VALUES AND PSYCHOLOGY	55 – 70
4.1	Human Values	55
4.1.1	Characteristics of Values	56
4.1.2	Role of Values	57
4.2	Attitude	57
4.2.1	Dimensions of Attitude	57
4.2.2	Functions of Attitude	57

4.2.3	Types of Attitude	58
4.2.4	Influence of Attitude on Human Behavior	58
4.2.5	Moral Attitude	58
4.3	Behaviour	59
4.4	Aptitude	59
4.5	Perception	59
4.5.1	The Perceptual Process	59
4.5.2	Perceptual Distortion in Public Services	59
4.6	Emotions and Emotional Intelligence	60
4.6.1	Types of Emotions	60
4.6.2	Emotional Intelligence	60
4.6.3	Aspects of Emotional Intelligence	61
4.6.4	Cognitive v/s Emotional Intelligence	61
4.6.5	Emotional Resilience	61
4.6.6	Skills For Developing Emotional Intelligence [EI]	61
4.6.7	Application and Relevance of Emotional Intelligence (EI) in Human Life	61
4.7	Decision Making	62
4.7.1	Characteristics of Decision Making	62
4.7.2	Advantages of Decision Making	63
4.7.3	Steps Involved in Decision Making Process	63
4.7.4	Why Rational and Right Decisions are Not Possible?	64
4.8	Leadership and Communication	65
4.8.1	The Traits Approach	65
4.8.2	Behavioral Approaches	66
4.8.3	Situational/Contingency Approaches	66
4.8.4	Contemporary Issues in Leadership	66
4.8.5	Communication	66
Chapter 5	ORGANIZATIONAL BEHAVIOUR AND MANAGEMENT	71 – 89
5.1	Introduction to the concept of organization	71
5.2	Functions of an Organization	72
5.3	Market structures	72
5.3.1	Type of market structure	73

5.4	Type of Activities of an organization	75
5.5	Allocation of Power and Authority	75
5.5.1	Authority and Power	76
5.5.2	Sources of Authority	76
5.5.3	Types of Authority	76
5.5.4	Relationship of Responsibility and Accountability	77
5.6	Requirements of the Organization and Employees and the overall goal	77
5.6.1	Benefits of Mechanization and Automation	78
5.6.2	Drawbacks of Mechanization and Automation	78
5.7	Employer-Employee Relationship	78
5.7.1	Proper Channels of Communication	78
5.7.2	Proper Mechanism for Conflict Resolution	78
5.7.3	Opportunity for Employee Motivation & Growth	78
5.8	Role of Management and Engineers	79
5.9	Organizational Control	80
5.9.1	Types of Control	80
5.9.2	Means of Control	81
5.9.3	Loyalty	81
5.9.4	Professionalism and Loyalty	81
5.10	Conflicts and Issues in the Organization and their Resolution	82
5.10.1	Conflicts of Interest	82
5.10.2	Issues in the Organisation and their Resolution	82
5.10.3	How to Resolve Conflicts and Issues	83
5.11	Regulation of Engineers through Professional Codes and Code of Ethics	84
5.11.1	Aspects of “Engineering as Social Experimentation”	84
5.11.2	Work Ethics	85
5.11.3	Professional Codes	85
5.11.4	Concept of Moral Responsibility and Official Responsibility (Responsibility vs. Obligation)	85
Chapter 6	ETHICAL GOVERNANCE in BUSINESS AND GOVERNMENT	90 – 105
6.1	Ethics in governance	90
6.2	Concept of Good Governance	90
6.3	Probity in Governance	91

(x) Contents

6.3.1	Measures to Achieve Probity	91
6.4	Accountability	91
6.4.1	Types of Accountability	91
6.4.2	Accountability v/s Responsibility	92
6.5	Aspects of Accountability	92
6.5.1	Openness and Transparency	92
6.5.2	Corruption	93
6.5.3	Whistle Blowing	96
6.6	Good Corporate Governance	98
6.7	Ethics in Design and Quality	98
6.8	Recommendations of 2nd ARC Report for improving ethics in governance	99
6.9	Consumer Protection Act-1986	100
6.10	The Consumer Protection Bill, 2018	100
Chapter 7	PHILOSOPHERS, ADMINISTRATIVE AND MANAGEMENT THINKERS	106 – 116
7.1	Indian Moral Thinkers	106
7.1.1	Kautilya	106
7.1.2	Mahatma Gandhi	107
7.1.3	Dr. B.R Ambedkar	107
7.1.4	Dr. Amartya Sen	107
7.1.5	Dr. A.P.J. Abdul Kalam	107
7.2	Western Moral Thinkers	107
7.2.1	Socrates	107
7.2.2	Plato	108
7.2.3	Aristotle	108
7.2.4	Machiavelli	108
7.2.5	Karl Marx	109
7.2.6	Immanuel Kant	109
7.2.7	Jeremy Bentham	109
7.2.8	John Stuart Mill	109
7.3	Modern Industrial thinkers	109
7.3.1	Frederick Winslow Taylor	110
7.3.2	Henry Fayol	110

	7.3.3 Luther Gulick & Lyndall Urwick	111
	7.3.4 Elton Mayo	111
	7.3.5 Herbert Simon	111
	7.3.6 Abraham Maslow	111
	7.4 Role of Moral and Industrial Thinkers in Engineering	112
	7.4.1 Moral Dilemma	112
	7.4.2 Nature of Moral Judgement	112
	7.4.3 Responsible Action	112
	7.5 Importance and Role of Moral Philosophy in Decision-Making by Engineers	113
Chapter 8	CONTEMPORARY ETHICAL ISSUES	117 – 127
	8.1 Ethical Issues	117
	8.2 Globalisation and Cross-Cultural Issues	117
	8.3 Types of Ethical Issues faced by Engineers in Various Spheres	118
	8.3.1 Research and Development	118
	8.3.2 Academic Integrity	118
	8.3.3 Advertising	119
	8.3.4 Competitive Bidding	119
	8.3.5 Being Dishonest as an Expert Witness	119
	8.4 Intellectual Property Rights (IPRs)	119
	8.5 The Main Features of Indian Patents Act, 1970	120
	8.6 Indian Patent (Amendment) Act 2005	121
	8.7 Environmental Ethics	122
	8.7.1 Aspects of Environmental Ethics	122
	8.7.2 Type of Environmental Ethics Sentient-Centered Ethics	122
	8.8 Computer Ethics and The Internet	123
	8.9 Engineers and Technological Progress	123
	8.10 Resource Allocation	124
	8.10.1 Various Bases of Resource Allocation	124
	8.10.2 Hard Skills vs Soft Skills	124
Chapter 9	ADDITIONAL READING	128 – 135
	9.1 Amoral	128
	9.2 Nonmoral	128

9.3	Ethics and Aesthetics	128
9.4	Morals, Manners and Etiquettes	129
9.5	Values as Totally Objective	129
9.5.1	The Supernatural Theory	129
9.5.2	The Natural Law Theory	129
9.6	Values as Totally Subjective	129
9.6.1	Criticisms of the Supernatural Theory	129
9.6.2	Criticisms of the Natural Law Theory	129
9.6.3	Criticism of the Subjective Position	130
9.7	Values as Both Subjective and Objective: A synthesis	130
9.8	Morality and the Law	130
9.9	Morality and Religion	130
9.10	The Cost-Benefit Analysis, or End-Justifies-the-Means, Approach—A Problem for Utilitarianism	131
9.11	Criticisms of Kant’s Duty Ethics	131
9.11.1	Consistency and Conflicts of Duties	131
9.11.2	The Reversibility Criterion	131
9.12	Determinism	131
9.12.1	Meaning of Determinism	131
9.12.2	Fatalism and Hard and Soft Determinism	131
9.12.3	Indeterminism	132
	<i>Code of Ethics as Enumerated by Various Organization</i>	<i>136 – 141</i>
	<i>Glossary of Engineering Ethics</i>	<i>142 – 149</i>
	<i>Additional Practice Questions</i>	<i>150 – 159</i>

Understanding the Basic Concepts of Ethics and Values

INSIDE

- ❖ Epistemology
- ❖ Values
- ❖ Role of Socialization in the Development of Values
- ❖ Moral Values
- ❖ Ethics and Ethical Values
- ❖ Ethical and Moral Dilemma
- ❖ Ethical and Moral Autonomy
- ❖ Ethics vs Law

OVERVIEW

The given chapter deals in detail with the basic understanding of the concepts of values, morals and ethics. It also talks about various ethical theories in depth. Then, it culminates into the concept of ethical and moral autonomy.

After going through this chapter, the reader would have a crisp understanding of the basic concepts and theories related to values, morals and ethics.

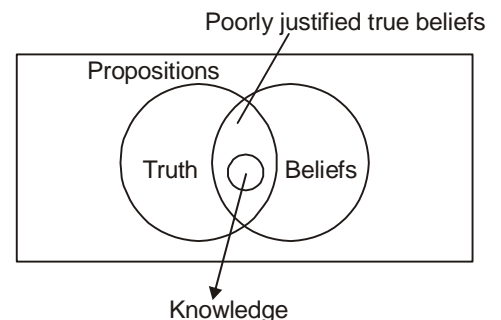
1.1 EPISTEMOLOGY

It is the philosophical study of the nature, origin and limits of human knowledge. It is derived from the greek word 'episteme' i.e., knowledge and 'logos' i.e., reason.

It is referred to as the theory of knowledge, especially with regard to its methods, validity and scope, and the distinction between justified belief and opinion.

It addresses the questions:

- “What is knowledge”?
- “How it is acquired”?
- “What do people know”?



1.1.1 OBJECTIVIST EPISTEMOLOGY

It assumes that reality exist independent or outside of the individual mind. Objectivist seeks methods to test reality by collecting and analysing evidence to explore assestions, corroborate claims, and provide correspondence with the real world.

1.1.2 CONSTRUCTIONIST EPISTEMOLOGY

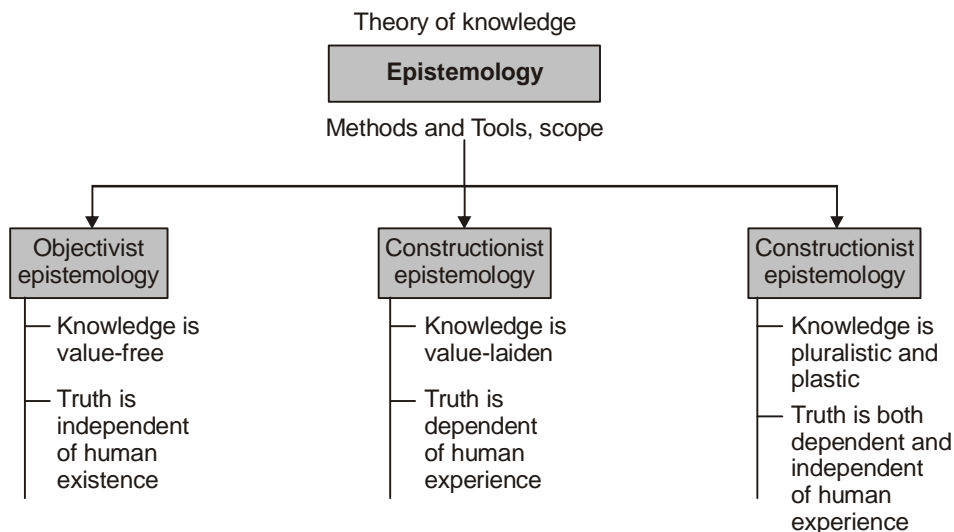
It rejects the idea that objective truth is waiting to be discovered. it assumes that truth comes into existence in and out of one's engagement with the

realities of the world. Different people in different societies may have different or even opposite sets of truth.

1.1.3 SUBJECTIVIST EPISTEMOLOGY

It assumes that reality is pluralistic (i.e., reality can be expressed in many ways) and plastic (i.e., reality is stretched and shaped to fit the purposes of individuals).

If objectivism implies seeing is believing, then subjectivism implies believing determines what is seen.



Example 1

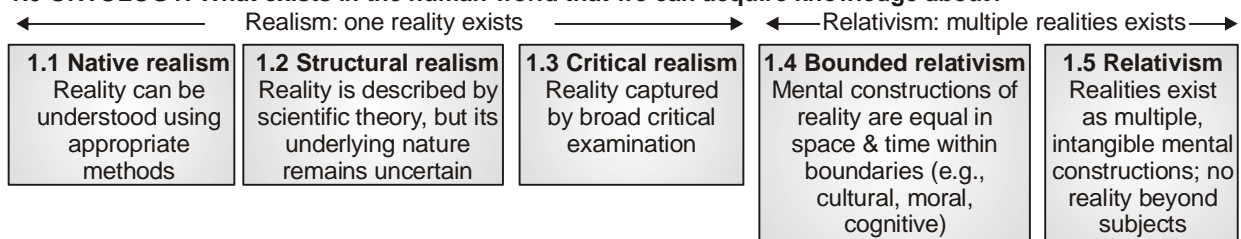
The philosophical study of beliefs and knowledge is better known as

- (a) Ontology (b) Epistemology
(c) Entomology (d) Etymology

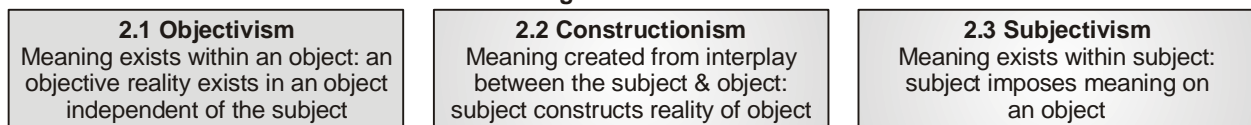
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Ans. (b)

1.0 ONTOLOGY: What exists in the human world that we can acquire knowledge about?



2.0 EPISTEMOLOGY: How do we create knowledge?



3.0 THEORETICAL PERSPECTIVE: What is the philosophical orientation of the researcher that guides their action/research?

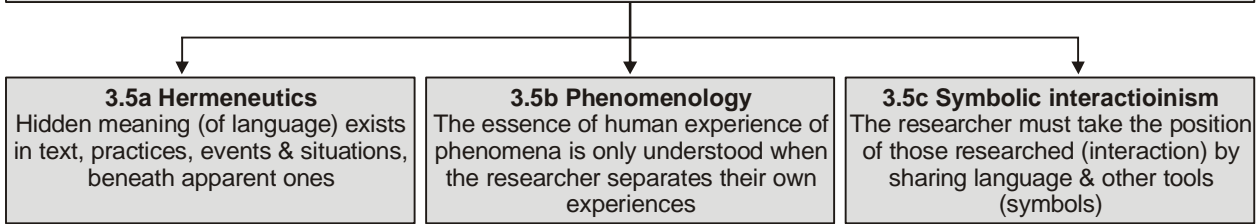
Knowledge acquisition is deductive, 'value-free', generalizable ↔ Knowledge acquisition is inductive, value-laden, contextually unique

Application: to predict

- 3.1 Positivism** Natural science methods (posit, observe, derive logical truths) can be applied to the social sciences
- 3.2 Post-Positivism** Multiple methods are necessary to identify a valid belief because all methods are imperfect
- 3.3 Structuralism** The source of meaning comes from the formal structure found in language & can apply to all aspects of human culture

Application: to understand

- 3.4 (Social) Constructivism** Meaning making of reality is an activity of the individual mind
- 3.5 Interpretivism** Natural science methods cannot apply to social science; interpretations of reality are culturally derived & historically situated



Application: to emancipate or liberate

- 3.6 Critical theory** Research & theory should be used to change situations (focuses on power relations, critiques assumptions & evolves)
-
- ```

 graph TD
 A["3.6 Critical theory
Research & theory should be used to change situations (focuses on power relations, critiques assumptions & evolves)"] --> B["3.6a Emancipatory
The subjects of social inquiry should be empowered"]
 A --> C["3.6b Advocacy or participatory
Politics & political agendas should be accounted for"]
 A --> D["3.6c Feminism
The world is patriarchal & the culture it inherits is masculine"]

```

**Application: to deconstruct**

- 3.7 Post-structuralism** Different languages & discourses divide the world & give it meaning
- 3.8 Post-modernism** Truth claims are socially constructed to serve interests of particular groups, methods are equally distrusted; might not be possible to arrive at any conclusive definition of reality

**Application: any or all**

- 3.9 Pragmatism** All necessary approaches should be used to understand research problem

**1.2 VALUES**

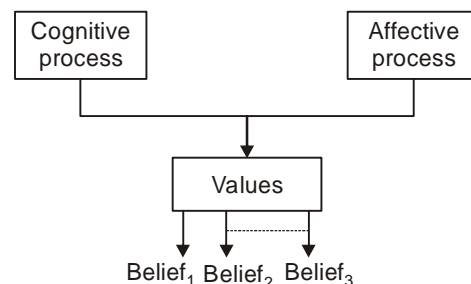
**1.2.1 Defining Values**

“Values are a set of beliefs which help an individual, organisation or a society to make preferences for certain things or in certain issues or events”.

- eg. **Tolerance** is a value which is very unique to Indian society.
- or, **Empathy** is a value held by someone who shows concern with others by putting oneself in other’s place.

In general, values have a positive connotation but in a cultural/contextual approach towards studying ‘values’, a society or an organisation may profess negative

values too. eg - ISIS. (Islamic state of Iraq and Syria), a terrorist outfit, which values killing innocent people. Values are a set of beliefs (not conviction) because they are byproduct of cognitive (reason) and affective (emotions, feelings) processes.



**Fig. 1.1**