



INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR

Mid-Autumn Semester 2023-24

Date of Examination : 26/09/2023 Session (FN/AN) _____ Duration 2 hrs

Subject No. : EP 60044

Subject Name : Frugal Engineering

Department/Center/School : Rajendra Mishra School of Engineering Entrepreneurship

Specific charts, graph paper, log book etc., required _____

Special Instructions (if any) : _____

1. Elucidate the salient elements associated with 'unique value proposition (UVP)' in Frugal Innovation [5]

2. Illustrate the building blocks, 'frugal engineering' and 'need-based ideation' in the conceptual framework for reverse innovation. [4]

3. a) Give a run down on the features quintessential to frugal design (FD) approach.

b) Characterize the Principles in Frugal Design. [3 + 5]

4. Exound the steps of a widely adopted Design Thinking Model [5]

5. (a) Discuss an example of engineered 'medical/ healthcare' product/ system, delineating the features and attributes that makes it 'frugal'.

(b) Give an account of a non-healthcare/ medical product, underlining the features and aspects qualifying the system as 'frugal' [4+4]

Class Test: Frugal Engineering (EP60044) Time: 45 Min

1. State the tenets of 'Design Driven Innovation' [4]
2. Illustrate the 'Design for Manufacturing process with a diagram. [6]
3. Mention the steps of 'Engineering Design Process' prepared by NASA [6]
4. Show the implication of Fuzzy Front End of Product Development in a diagram [4]



INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

End-Autumn Semester Examination 2023-24

Date of Examination: _____ Session: (FN/AN) _____ Duration: 3 Hrs Full Marks: _____
Subject No. : EP 60044 Subject : Frugal Engineering
Department/Center/School: Rajendra Mishra School of Engineering Entrepreneurship _____
Specific charts, graph paper, log book etc., required _____
Special Instructions (if any) : _____

1. ✓ a) How to gain 'Empathic' understanding and (b) culminate into 'Defining' in the Design Thinking Process [5+3]
2. ✓ a) In the context of frugal disruptive innovation, how the Design Driven Innovation (DDI) approach can be embraced
- ✓ b) Explicate tenets of DDI using the example of iPod of Apple Inc. [3+5]
3. ✓ a) How does 'Mass Customisation' support the frugal innovation paradigm? [3+5]
- ✓ b) Elucidate the precepts of mass customization using an example
4. ✓ Illustrate 'Design for Manufacturing (DfM/A)' describing its steps and its tenets. [7]
5. ✓ a) Exponent the steps of Engineering Design Model prepared by NASA.
- ✓ b) What is the denotation of 'Double Diamond' in this context [5+3]
6. ✓ State the implication of Fuzzy Front End in Product Development [5]
7. ✓ Describe the steps involved in Value Engineering, useful for Frugal Design [6]