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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: BE103

Course Name: INTRODUCTION TO SUSTAINABLE ENGINEERING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all"a" OR "b" set questions, each set carries 5 marks. Marks

1	a)	What are the three levels with which you approach a sustainable issue? Explain with an example.	(5)
		OR	
	b)	List any five multi lateral environmental agreements.	(5)
2	a)	Apply 3R concept to mineral water bottles.	(5)
		OR	
	b)	List and explain any three local and regional environmental issues.	(5)
3	a)	Can we use life cycle analysis (LCA) as a tool for profit making? How?	(5)
		OR	
	b)	List any 5 products developed bases on bio mimics.	(5)
4	a)	List specialities of a green building in your dream and suggest any five green building materials that you will suggest for the same.	(5)
		OR	
	b)	Suggest any three suitable green transport systems for your travel from place of stay to college.	(5)
5	a)	Suggest two renewable energy sources for our state and validate your suggestion.	(5)
		OR	
	b)	What are the energy saving opportunities in a house?	(5)
6	a)	Suggest two renewable energy sources that can be utilized in automobiles.	(5)
		OR	
	b)	Explain different method using which we can utilize solar energy.	(5)
7	a)	Apply idea of industrial symbiosis to the coconut oil industry	(5)
		OR	
	b)	Do you prefer an urban area living? Substantiate your answer.	(5)
8	a)	In your view point, what are reasons of poverty?	(5)
		OR	
	b)	As an engineer suggest any 5 points to reduce pollution by an industry in your locality.	(5)

PART B

(Read the Stories/Cases/Data set as the case may be, and answer all questions, each full question carries 10 marks.)

Module 1

9	a)	List social, economic and environmental aspects of a hydro electric power project proposed/implemented in Kerala state.	(4)
	b)	Do you think Indian water act is sufficient to protect the water body that you	(2)

selected in the last question?

c) Identify an engineering/social problem in your locality and suggest any sustainable solution. (2)

d) What are the challenges that you will face while you are trying to implement the solution you suggested in the last question? (2)

Stories/Cases/Data set - 2

In metro cities in India, an individual produces an average of 0.8 kg/ waste/ person daily. The total municipal solid waste (MSW) generated in urban India has been estimated at 68.8 million tons per year (TPY) (0.573 million metric tons per day (MMT/d) in the year 2008). The average collection efficiency of MSW ranges from 22% to 60%.MSW typically contains 51% organic waste, 17% recyclables, 11% hazardous and 21% inert waste. However, about 40% of all MSW is not collected at all and hence lies littered in the city/town and finds its way to nearby drains and water bodies, causing choking as well as pollution of surface water. Unsegregated waste collection and transportation leads to dumping in the open, which generates leachate and gaseous emissions besides causing nuisance in the surrounding environment. Leachate contaminates the groundwater as well as surface water in the vicinity and gaseous emissions contribute to global warming.

Module 1I

10 a) Do you think local environmental issues contribute to global warming? (2)

b) Suggest any three solutions to the issues, mentioned in the above data. (4)

c) List any three global impacts of issues mentioned in above information. (2)

d) Do you prefer 3R concept or zero waste concept to address above issue? (2)

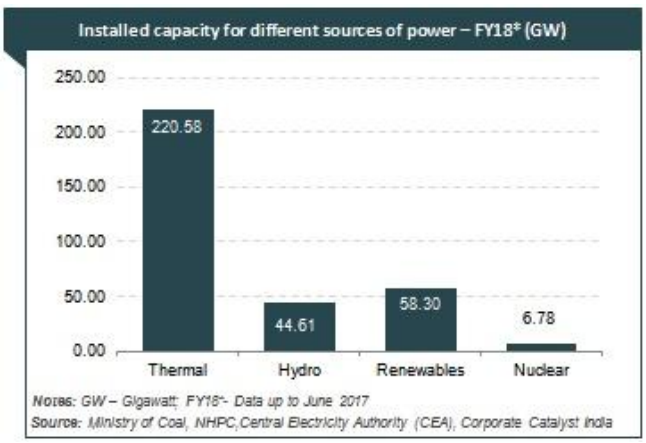
Module 1II

11 a) Conduct a sample life cycle analysis of any product given below (10)
Plastic pet bottles, lead acid batteries or hollow bricks.

Module 1V

12 a) Prepare schematic representation of a residential building with minimum ten aspects that are applicable to green buildings. (10)

Stories/Cases/Data set - 5



Module V

13 a) Comment about the utilization of renewable energy sources in India based on the above data. (3)

b) What are the challenges that we face to develop renewable sources in India? (3)

a) List the different sources that continues to the item renewable in the above data (2)

Stories/Cases/Data set - 6

(Stories/Cases/Data set)

Industrial Ecology In Practice

Kalundborg, Denmark

The exchange of 'wastes' between independent firms in some sectors has been taking place for over a century, simply because it makes good business sense. The establishment of 'industrial ecosystems,' however, is a relatively new phenomenon, with the best known example being located in Kalundborg, Denmark. There, an industrial ecosystem has been established which involves an oil refinery, a gyproc factory, a pharmaceutical firm, a fish farm, a coal-fired electrical power station and the municipality of Kalundborg, among others. At Kalundborg, steam and various raw materials such as sulfur, fly ash and sludge are exchanged in what is the world's most elaborate industrial ecosystem. Participating firms each benefit economically from reduce costs for waste disposal, improved efficiencies of resource use and improved environmental performance. For example, gas captured from the oil refinery which had previously been flared off is now sent to the electrical power station which expects to save the equivalent of 30,000 tons of coal a year.

Module VI

14 a) Based on above story explain your ideas about industrial ecology. 2

b) Can we implement industrial ecology in India? Substantiate your answer. 2

c) Differentiate industrial ecology and industrial symbiosis with examples. 2

d) List four set of industries were we can implement industrial symbiosis. 4

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