E **B1E003**

Reg. No:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER B.TECH DEGREE EXAMINATION, JANUARY 2017

Course Code**: BE103**

Course Name**: INTRODUCTION TO SUSTAINABLE ENGINEERING**

Marks 100 Duration 3 hours

PART A

Answer all "a" OR "b" set questions; each set question carries 5 marks

1) (a) (i) Explain the three pillar model of sustainability. (3)

(ii) List four strategies for achieving Sustainable development. (2)

OR

(b) (i) Illustrate the nexus between agricultural technology and sustainability. (3)

(ii) What is the relevance of Kyoto Protocol? (2)

2) (a) (i) Suggest any two sustainable methods for waste water treatment. (2)

(ii) Explain the phenomenon of Ozone layer depletion. (3)

OR

(b) Explain the significance of carbon footprint. Suggest two methods for reducing the carbon footprint in your house. (5)

3) (a) (i) EMS frame work follows a Plan-Do-Check-Act (PDCA) cycle. Explain. (3)

(ii) What do you mean by Bio-mimicking? Support your answer with one example. (2)

OR

(b) List out various procedures of EIA in India (5)

4) (a) (i) List any four sustainable building materials. (2)

(ii) Explain three methods for increasing energy efficiency of buildings. (3)

OR

(b) Suggest five strategies for achieving sustainable transport and explain. (5)

5) (a) Explain a solar water heating system with the help of a diagram. (5)

OR

(b) Explain the working of a Photovoltaic cell with a neat diagram (5)

6) (a) What are the steps involved in bio-fuel production? (5)

OR

(b) Explain any one method to extract Geothermal energy. (5)

7) (a) Illustrate the push factors and pull factors which leads to the migration of people from rural areas to urban areas. (5)

OR

(b) Explain five major benefits that an industry can expect from the adoption of eco-friendly industrial practice. (5)

8) (a) Illustrate five practices for making the industrial process move towards the goal of sustainability. (5)

OR

(b) Explain Industrial Symbiosis? (5)

PART B

(Read the Stories/Cases/Data set as the case may be, and answer ALL questions. Each FULL question carries 10 Marks.)

Case 1

Kumarakom, a backwater tourism hub in Kerala is gaining importance in the tourist map due to its natural charm and aesthetic beauty. Kumarakom is situated in the banks of Vembanad Kayal (backwater); 10 km. west of the Kottayam District Head Quarters in Kerala. The arrival of tourism industry was well received by the local people initially with the land value increasing many folds in the potential areas for tourism ventures. Local farmers offered their agricultural lands and paddy fields for tourism construction at exorbitant prices. The temporary employment opportunities in the construction sector and relatively higher wages earned, made the local workers happy. But all was not well in the years to come. The clustering of the resorts on the banks of Vembanad Kayal denied access to local people involved in fishing and shell collection to the kayal. The irony is that tourism has contributed nothing in improving the infrastructure development or the development of service and productive sectors in Kumarakom. The employment opportunity in the tourism sector was not favourable to the local community with 80% of the regular employees in big hotels appointed from outside Kumarakom. Women and agricultural labourers displaced from the lands converted for tourism could not be compensated with alternative jobs. The contract labourers appointed by the tourism industry did not have job security and were terminated at any time without assigning any reason. Although these workers are eligible for minimum wages, they are paid at much lower rates.

Module 1

Q 9

a) List any three major challenges for attaining environmental sustainability in Kumarakom. (3)

b) Illustrate the need for sustainability in tourism sector. (4)

c) Suggest three ways to mitigate the adverse impacts created by tourism on the ecology of Kumarakom. (3)

Case 2.

Air pollution is responsible for many health problems in the urban areas. The air pollution status in Kerala has undergone many changes in terms of the levels of pollutants and the control measures taken to reduce them. Air pollution in the state is mainly due to Industrial and vehicular emissions. The transport sector in urban areas has created major problems of air pollution due to the rapid growth in the number of motor vehicles. Number of registered vehicles has increased considerably in the state for last ten years. The vehicle density in the state is very high compared to many other states in India. Kerala has 5958 vehicles per 100 sq. km. of area and 7272 of vehicles per lakh population. The number of vehicles is increasing at a rate of 10 percent annum, leading to concurrent increase in serious air pollution. Recently National Green Tribunal banned light and heavy diesel vehicles which are more than 10 years old in six municipal corporations in Kerala. The order also prevented the state government from registering new diesel vehicles of 2000 cc and above. Later Kerala High Court stayed above mentioned NGT orders on diesel vehicles.

Module 2

Q 10

a) List any two harmful effects of air pollution on human health. (2)
b) List any two possible impacts of diesel vehicles during the usage stage (2)
c) Suggest two methods to reduce the adverse impacts of diesel vehicle during utilisation (2)
d) There is a sudden decision to remove all vehicles from the road that fails to meet specified norms within a specified time period. As part of citizen forum you are requested to give views on the enforced regulation. State your views on this and justify your answer with not less than two points. (4)

Module 3

Q 11 Write the LCA of shoes made of Leather. (10)

Case 3

Green buildings represent the response of the building sector to the need to minimize negative environmental, social, and economical impacts in the building sector. Through using green building practices, it is possible to work toward the aim of meeting the needs and aspirations of today without compromising the ability of future generations to meet their own needs. To achieve a green building, green design and construction strategies should be incorporated at the planning stage to the demolition phase of the building. A green building relies upon a fully integrated "whole building" approach that covers the entire phase of building cycle including design, construction, operation, and demolition . Multiple studies have demonstrated how green buildings that incorporate green building practices offer benefits. For example, they can help mitigate building issues and problems, including environmental problems associated with existing buildings, and also provide healthier indoor environments to building users.

Module 4

Q 12

a) How a green building differs from a conventional building. Compare in any five aspects. (5)
b) Explain any three criteria for material selection for sustainable design of buildings. (3)
c) List any two green building certifications systems in India. (2)

Case 4

The development of infrastructure is an important factor to sustain economic growth. The power sector is one of the most important constituents of infrastructure. The achievement of energy security necessitates diversification of our energy resources and the sources of their supply, as well as measures for conservation of energy. So far, we were dependent on conventional sources of energy like thermal, hydro (large hydro) and nuclear. The impact of the energy crisis is particularly felt in developing countries like India, where an ever-increasing percentage of national budgets earmarked for development must be diverted to the purchase of petroleum products. After independence large hydroelectric projects have been executed, some of them are still under construction and some have been planned for future. For nuclear power plants also there is a problem of getting proper fuel, processing and safety from radiations. In addition, global warming caused largely by greenhouse gas emission from fossil fuel generating systems is

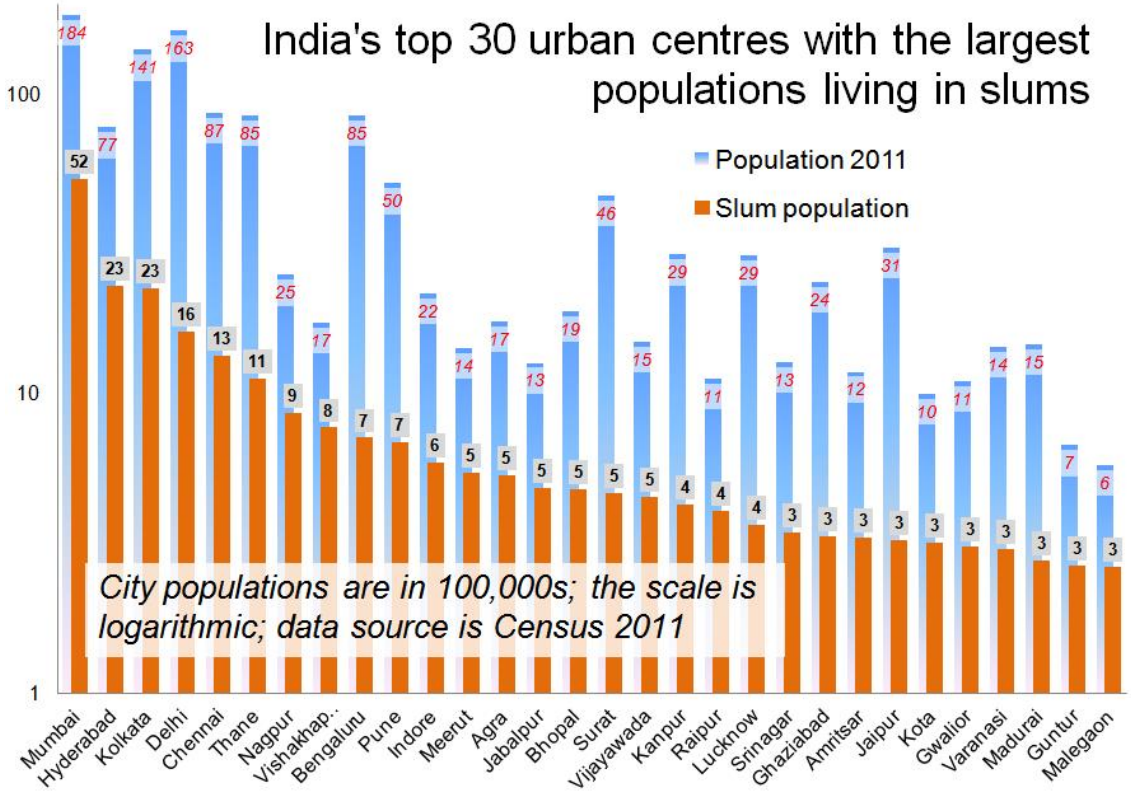
also a major concern. To overcome the problems associated with conventional sources of energy, most countries including India have shifted their focus to develop non-conventional sources of energy. With the various initiatives taken by the government, a healthy power sector would emerge in the country which would pave the way for fast industrialisation, growth in agricultural production, rural development and a better quality of life through non-conventional energy sources.

Module 5

Q 13

a) List out four non-conventional sources of energy and explain any two in detail (6)
b) Enumerate any two reasons for the challenges faced by India in energy sector. (2)
c) Suggest two ways to create awareness about the importance "Energy Conservation" among public. (2)

Case/ Data 5



Module 6

Q14

a) Illustrate any four major reasons behind slum formation in India. (4)
b) List any three methods for sustainable poverty reduction. (3)
c) Imagine that a campaign on poverty eradication is to be initiated in a Slum. Frame a slogan for that campaign (3)