Centre for Energy Studies
Indian Institute of Technology Delhi
ESL 750: Economics and Planning of Energy Systems

Time: One Hour **Minor Test - I (2016-2017 batch)** **Maximum Marks: 15**

Note: Please answer all questions. The marks assigned to each question are indicated within square brackets at the end of the question. In case any additional information is required to solve the numerical question(s), please make suitable assumption(s) and mention the same explicitly in your answer to the question(s).

1. Define and discuss the relevance of any ONE of the following in selecting renewable energy based technological options for enhancing energy supply on a large scale:
   (a) Energetic Feasibility
   (b) Institutional Preparedness [2]
2. A country that has huge reserves of high ash low sulfur coal and it imports most of its oil requirement and also some amounts of superior quality coal and liquefied natural gas. It has small capacities installed of large hydro and nuclear based electricity generation.The country has vast potential for harnessing renewable energy sources and also for energy efficiency and other measures of demand side management. With the following objectives of energy demand –supply balancing, which mix of energy sources and measures are likely to be adopted by the country (answer for any TWO of the three)
   (a) Least import
   (b) Least cost
   (c) Least environmental emissions [3]
3. The following regression expression is obtained between the energy demand (ED), expressed in PJ, and the GDP (expressed in US $) of a country:

   $$\text{Log(ED)} = (-)\ 3.5 + 0.88\ \log(\text{GDP})$$

   The energy demand of the country was 3500 PJ in the year 2015. If it is envisaged to have 5% annual growth in GDP of the country for the next five years, estimate the energy demand of the country in the year 2020. [2½]
4. 80 million households in rural areas of a country are, on an average, using two incandescent bulbs of 60W each for five hours daily. Average loss in electricity transmission and distribution to rural areas have been estimated at 20%. Assuming that all households use the bulbs for lighting at the same time of the day, estimate the annual amount of electricity saved at the power plant level and also the peak power saving likely to result from the same if 75% of these households replace the 60W bulbs by 10W LED lamps. [2½]
5. In a country the demand for diesel increases by 10% with 5% increase in income of consumers while its demand increases by 4% with 10% increase in the price of petrol. Determine the values of the two Elasticities for the Demand of Diesel in the country based on this information. [2]
6. Please explain why (any THREE)
   (a) Timely and accurate forecasting of energy demand is critically important for a country?
   (b) For use of pricing as a policy tool for affecting the demand of a fuel, the value of corresponding Price Elasticity of Demand must be greater than unity and should preferably be as large as possible?
   (c) Biomass can be a non-renewable source of energy?
   (d) Time-Trend Analysis should not be used long term forecasting of energy demand? [3]