Ref. No.: Ex/PG/EST/T/1210A/2018

M.TECH. ENERGY SCIENCE AND TECHNOLOGY EXAMINATION
FIRST YEAR SECOND SEMESTER – 2018

SUBJECT: ENERGY AND ENVIRONMENTAL IMPACT ANALYSIS

Full Marks: 100 (Group I: 40 & Group II: 60)

Group / Part: I **Marks: 40**

Attempt any two (2) from Questions 1 to 3 the following: (2x20)

1. What is ecological efficiency and carbon foot print? Apply Carnot principle in finding out the ecological efficiency of following power systems.
i. Gasifier based power plant,
ii. Nuclear Power plant
iii. Phovoltaic Power plant

2. a. Discuss the impact of coal fire power plants on human health and ecological systems.
b. Discuss the negative impacts of CO_2, CO, CFC and Black Carbon / Shoot in Eco-Efficiency.

3. Write Short notes on any two from following:

a. Potential for Bio-mass gasification technology
b. Underground coal gasification systems
c. Global warming and C sequestering
d. Terrestrial Ozone formation and its impact on ecological systems

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M.Tech. Energy Science & Technology First Year Second Semester Examination - 2018

Subject: Energy and Environmental Impact Analysis

(Use separate answer script for each part)

PART – II

Total Marks: 60

Answer **any three** questions.

4. a) State the major sources of air pollution. Define primary air pollutants and secondary air pollutants. Give examples. 3

   b) Define, with examples, point sources, area sources and line sources of air pollution. 5

   c) What is Thermal NO_X and what is Fuel NO_X ? Discuss briefly on the major air pollutants that are emitted due to energy conversion and energy use. Also discuss on their effects on the environment. 12

5. What is carbon trading ? Discuss on the three cooperative mechanism of the Kyoto Protocol – Emission Trading, Joint Implementation and Clean Development Mechanism. 20

6. Estimate stoichiometrically the emissions avoided by a solar photovoltaic power plant per unit of electricity generation taking emission factors of a coal-fired thermal power plant, for 1kWh of electricity generation, as a standard data.
   Data given:
   i) 0.65 kg coal is burnt to generate one unit of electricity in a coal-fired thermal power plant;
   ii) Average elemental analysis of Indian Bituminous coal (on air-dried basis):
   Carbon 50.4%, hydrogen 2.7%, nitrogen 1.0%, sulphur 0.3%, oxygen 7.6%, moisture 8.0%, and ash 30.0%. 20

7. What is Environmental Impact Assessment (EIA)? At which stage EIA is carried out? Discuss any two methodologies used in EIA study. 20