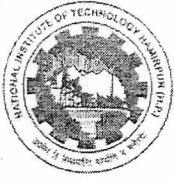


Dr Hammed Siddiqui 28/11/2022 (15)



NATIONAL INSTITUTE OF TECHNOLOGY HAMIRPUR
Department of Chemical Engineering

End-Semester Examination
Odd Semester (Session 2023-24)
Energy and Environmental Engineering (CH-306)

Maximum Marks: 50 | Time: 3 Hours

Instructions:

- Make suitable assumptions, if necessary, by clearly stating them.
- Draw the figure wherever needed.
- Exchange of calculator, pen, pencil etc. are strictly not allowed.
- All the questions are compulsory. However, there is only one choice in Question No. 5.

- Q1. Discuss in detail the major environmental challenges and the Indian government initiatives to mitigate their impacts? (10 Marks)
- Q2. (a) How are the radiation doses measured? What are the different doses range and their associated effect on living beings? (5 Marks)
- (b) Discuss the environmental impacts related to combustion of hydrocarbons? (5 Marks)
- Q3. (a) Discuss in brief the various techniques to harness tidal energy. (5 Marks)
- (b) What is a solar photovoltaic cell? Explain its working principle and P-V-I characteristics. (5 Marks)
- Q4. (a) Write a short note on watershed management. (5 Marks)
- (b) A geothermal aquifer supplies hot water with a wellhead temperature of 75 °C at a flow rate of 20 litre/sec. The heat energy is used to supplement a direct heating unit above a datum temperature of 40 °C. If the geothermal heat is used for 170 days each year. Calculate the amount of oil saved annually if the overall combustion efficiency of the oil burner is 75%. Assume the heat of combustion of the oil is 10^{10} calorie/tonne and specific heat of water is 1 calorie/g °C. (5 Marks)