

P. Pages : 1

Time : Three Hours



**AW - 3438**

Max. Marks : 80

- Notes :
1. Answer **any six** questions.
  2. Illustrate your answer necessary with the help of neat sketches.
  3. Use of pen Blue/Black ink/refill only for writing the answer book.

1. State the principle of "Pinch Technology". Explain the steps involved and its application to any type of chemical process industry. 13
2. a) What are various forms of energy and energy transformations in thermal power plant? 7  
 b) Distinguish between conventional and Renewable sources of energy. 7
3. a) Discuss the various types of energy storage systems. 7  
 b) What are energy conservation opportunities (ECO) in chemical process industry? 7
4. a) Give an account of various types of energy Audit and their methodology. 7  
 b) Explain the principles of Energy management. 6
5. Explain the methods of harnessing thermal energy and electrical energy from solar radiation. 13
6. Explain **any two** of the following. 13  
 i) Wind Energy.  
 ii) Bio-mass energy  
 iii) Geothermal energy.
7. a) Explain with suitable diagram the working of electrostatic precipitator. 7  
 b) Describe any one method of removal of SO<sub>x</sub> from flue gases to combat air pollution. 6
8. a) Discuss the various pollutants present in flue gases and their health hazards. 7  
 b) State the principle and applications of fuel cell. 6
9. a) Discuss the methods of waste heat recovery systems in chemical process industry. 7  
 b) Explain the principle and application of SCR reactor. 6
10. Explain the sources and harmful effects of NO<sub>x</sub> from flue gases. How is it controlled? 13

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