M.Tech. First Semester (Membrane & Separation Tech.) (F.T.)

13026 : Advanced Energy Technologies : 1 MST 4

P. Pages : 1 | **AW - 3709**

Time : Three Hours | * 0 3 4 4 * | Max. Marks : 80

Notes :
1. Answer **any six** question.
2. Assume suitable data wherever necessary.
3. Diagrams and chemical equations should be given wherever necessary.
4. Illustrate your answer necessary with the help of neat sketches.
5. Use of slide rule logarithmic tables, Steam tables, Moller's Chart, Drawing instrument, Thermodynamic table for moist air, Psychrometric Charts and Refrigeration charts is permitted.
6. Use of pen Blue/Black ink/refill only for writing the answer book.

1.		What are various energy intensive unit operations and unit processes in chemical process industries? What are opportunities to conserve energy & material in them?	**13**
2.		Explain the terms, 'Exergy' and 'Anergy'. Discuss the first law of thermodynamics, second law of entropy and efficiency of thermodynamic cycle.	**13**
3.		Discuss the principles of energy management. What are types of energy audit?	**13**
4.		Describe "Combined Heat and Power" (CHP) processes. What are its advantages? Discuss any one method of cogeneration in detail.	**13**
5.		Enumerate the ways to harness solar energy. What are the major challenges to convert solar energy into electricity on large scale? Explain the principle of photo voltaic cell.	**13**
6.	a)	What are harmful effects of fly ash, – SOx and – NOx as emissions from flue gases?	**7**
	b)	Describe any desulfurization process with a help of flow diagram.	**7**
7.		Explain in any two of the following. i) Bio-energy. ii) Wind energy. iii) Geothermal energy.	**13**
8.	a)	State the principle and applications of fuel cell.	**7**
	b)	Describe types of waste heat recovery units from flue gases.	**6**
9.		Discuss in detail, "Energy storage" systems.	**13**
10.	a)	Explain the principle and applications of SCR reactor.	**7**
	b)	Classify various sources of energy.	**7**

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