

GOVT. POLYTECHNIC, NAYAGARH

5TH SEMESTER, MECHANICAL ENGINEERING (2025-26)

SUBJECT:- Th.5 REFRIGERATION AND AIR CONDITIONING

Semester from 14.07.25 to 15.11.25

Total Periods -60, Theory- 4P/WEEK

NAME OF FACULTY:- Sri Saurav Ranjan Pradhan

Sl. No.	Week	Day	Topics to be covered
1	1ST	1st	AIR REFRIGERATION CYCLE:-Definition of refrigeration and unit of refrigeration
		2nd	Definition of COP, Refrigerating effect (R.E)
		3rd	Principle of working of open and closed air system of refrigeration
		4th	Calculation of COP of Bell-Coleman cycle
Sl. No.	Week	Day	Topics to be covered
2	2ND	1st	Numerical on Bell-Coleman cycle & Chapter-1 :- Discussion & Assignment Questions
		2nd	SIMPLE VAPOUR COMPRESSION REFRIGERATION SYSTEM:- Simple vapors compression refrigeration system,types
		3rd	Cycle with dry saturated vapors after compression
		4th	Related problems
Sl. No.	Week	Day	Topics to be covered
3	3RD	1st	Cycle with wet vapors after compression
		2nd	Related problems
		3rd	Cycle with superheated vapors after compression
		4th	Related problems
Sl. No.	Week	Day	Topics to be covered
4	4TH	1st	Cycle with superheated vapors before compression, Related problems
		2nd	Cycle with sub cooling of refrigerant, Related problems
		3rd	Chapter-2 :- Discussion & Assignment Questions
		4th	VAPOUR ABSORPTION REFRIGERATION SYSTEM:-Simple vapor absorption refrigeration system
Sl. No.	Week	Day	Topics to be covered
5	5TH	1st	Simple vapor absorption refrigeration system
		2nd	Practical vapor absorption refrigeration system
		3rd	Practical vapor absorption refrigeration system
		4th	COP of an ideal vapor absorption refrigeration system
Sl. No.	Week	Day	Topics to be covered
6	6TH	1st	Numerical on COP
		2nd	Chapter-3 :- Discussion & Assignment Questions
		3rd	REFRIGERANT COMPRESSORS:- Principle of working and constructional details of reciprocating and rotary compressors -
		4th	Centrifugal compressor, Important terms

Sl. No.	Week	Day	Topics to be covered
7	7TH	1st	Hermetically and semi hermetically sealed compressor
		2nd	CONDENSERS:- Principle of working and constructional details of air cooled and water cooled condenser
		3rd	Heat rejection ratio, cooling tower and spray pond
		4th	EVAPORATORS:- Principle of working and constructional details of an evaporator, types of evaporator
Sl. No.	Week	Day	Topics to be covered
8	8TH	1st	Bare tube coil evaporator, finned evaporator, shell and tube evaporator
		2nd	Chapter-4 :- Discussion & Assignment Questions
		3rd	EXPANSION VALVES:- Capillary tube, Automatic expansion valve, Thermostatic expansion valve
		4th	REFRIGERANTS:-Classification of refrigerants
Sl. No.	Week	Day	Topics to be covered
9	9TH	1st	Desirable properties of an ideal refrigerant
		2nd	Designation of refrigerant
		3rd	Thermodynamic Properties of Refrigerants
		4th	Chemical properties of refrigerants
Sl. No.	Week	Day	Topics to be covered
10	10TH	1st	Commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717
		2nd	Substitute for CFC
		3rd	APPLICATIONS OF REFRIGERATION:-cold storage, dairy refrigeration, ice plant, water cooler, frost free refrigerator
		4th	Chapter- 5 :- Discussion & Assignment Questions
Sl. No.	Week	Day	Topics to be covered
11	11TH	1st	PSYCHOMETRICS & COMFORT AIR CONDITIONING SYSTEMS, Psychometric terms
		2nd	Adiabatic saturation of air by evaporation of water
		3rd	Psychometric chart and uses
		4th	Sensible heating and Cooling, Cooling and Dehumidification
Sl. No.	Week	Day	Topics to be covered
12	12TH	1st	Heating and Humidification, Adiabatic cooling with humidification
		2nd	Total heating of a cooling process, SHF, BPF
		3rd	Related problems
		4th	Related problems
Sl. No.	Week	Day	Topics to be covered
13	13TH	1st	Effective temperature and Comfort chart
		2nd	Chapter-6 :- Discussion & Assignment Questions

		3rd	AIR CONDITIONING SYSTEMS,factors affecting comfort air conditioning
		4th	Equipment used in an air-conditioning
Sl. No.	Week	Day	Topics to be covered
14	14TH	1st	Classification of air-conditioning system
		2nd	Winter Air Conditioning System
		3rd	Winter Air Conditioning System
		4th	Summer air-conditioning system
Sl. No.	Week	Day	Topics to be covered
15	15TH	1st	Summer air-conditioning system
		2nd	Related problems
		3rd	Related problems
		4th	Chapter- 7 :- Discussion & Assignment Questions

LEARNING RESOURCES-

- 01:- REFRIGERATION AND AIR CONDITIONING, C.P ARORA
- 02:-REFRIGERATION AND AIR CONDITIONING, R.S.KHURMI &J.K.GOPTA
- 03:- REFRIGERATION AND AIR CONDITIONING, P.L BALLANY
- 04:- REFRIGERATION AND AIR CONDITIONING, DOMKUNDRA AND ARORA



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