

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No. : 17535 S O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (Mech. Engg.) VII-Semester Supplementary Examinations, July-2022**Refrigeration and Air conditioning**

Time: 3 hours

Max. Marks: 60

Note: 1 Answer all questions from **Part-A** and any **FIVE** from **Part-B**

2. Use of R&A/C Tables and charts permitted.

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	List the applications of refrigeration and air conditioning.	2	1	1	1
2.	What would be the COP of the Carnot refrigerator and heat pump working between temperature limits of 20°C and 450°C.	2	1	1	1
3.	Write the function of evaporator and condenser in a VCR system.	2	1	2	1
4.	Sketch and label the parts of a Domestic refrigerator with VCR system.	2	1	2	1
5.	Distinguish between Aqua ammonia and Li Br-water VAR system.	2	2	3	1
6.	Discuss the applications of cryogenics.	2	2	3	1
7.	Define DBT and bypass factor of cooling coil.	2	1	4	1
8.	Sketch chemical dehumidification process on psychrometry chart.	2	1	4	1
9.	List the components of a centralized air conditioning system.	2	1	5	1
10.	Define GSHF and RSHF.	2	1	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	Derive the expression for the COP of Bell Coleman cycle.	4	4	1	1
b)	In a refrigerator working on Bell-Coleman cycle, air is drawn into the compressor from the cold chamber at a pressure of 1 bar and temperature of -5°C. After isentropic compression to 5 bar air is cooled to temperature of 10°C. The expansion takes isentropically to initial pressure. Calculate COP and TR if mass flow rate of refrigerant is 1.2kg/min.	4	4	1	2
12. a)	Describe the working of two stage Cascade refrigeration system and mention its applications.	4	2	2	1
b)	An Ammonia vapor compression refrigerator works between an evaporator and condenser temperature of -10°C and 35°C respectively. The refrigerant is dry saturated at entry to the compressor and is discharged 100°C after compression. The single acting compressor has bore 80mm and stroke 80mm. It runs at 500rpm with volumetric efficiency of 80%. Assuming liquid subcooling by 10C, find i) Mass flow rate of refrigerant ii) Capacity of the plant in TR iii) Sketch the cycle on P-h chart iv) Heat rejection through condenser.	4	4	2	2

13. a)	Illustrate the working of steam jet refrigeration system with a neat sketch and list its limitations.	4	2	3	1
b)	Explain the working of pulse tube refrigerator and mention its applications.	4	4	3	1
14. a)	Sketch and explain cooling and dehumidification process.	4	2	4	1
b)	Air at 30°C DBT and 60%RH is passed through a cooling coil at the rate of 200kg/min. The surface temperature of the coil is 14°C and bypass factor is 0.12. Find the DBT, Cooling coil capacity in TR and moisture condensed.	4	4	4	2
15. a)	Distinguish between humidifiers and dehumidifiers.	3	3	5	1
b)	Discuss in detail the procedure for estimating cooling of a typical air conditioning building.	5	4	5	1
16. a)	Discuss the physical and thermodynamic properties of refrigerants.	4	2	1	1
b)	Explain the working of compound compression system with flash gas intercooling process.	4	4	2	1
17.	Answer any <i>two</i> of the following:				
a)	Describe the working of Aqua ammonia system with a schematic diagram.	4	2	3	1
b)	Sketch and explain the air conditioning process for Hot and dry outdoor conditions.	4	4	4	1
c)	Explain the working of split air conditioning system and mention its advantages.	4	4	5	1

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	30%
iii)	Blooms Taxonomy Level – 3 & 4	50%
