R15

Code No: 126ZM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, April - 2018

REFRIGERATION AND AIR CONDITIONING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	What are the applications of refrigerators?	[2]
b)	What is a heat pump? Explain.	[3]
c)	What are the cycles in working of a refrigerator?	[2]
d)	What are the advantages of compressor in a refrigerator?	[3]
e)	What are the components of vapor absorption refrigeration system?	[2]
f)	What are the differences between vapor compression and absorption refrigeration systems?	[3]
g)	What is wet bulb temperature?	[2]
h)	What is the concept of human comfort?	[3]
i)	What are the applications of air conditioning?	[2]
j)	Classify air conditioning systems.	[3]

PART- B

(50 Marks)

2.a)	Construct P-H and T-S diagrams for refrigeration cycle and what are its uses?	
b)	What is the meaning of super heating of vapor?	[5+5]
	OR	
3.a)	What is an ideal COP of a refrigerator? Derive an expression.	
b)	What is a Carnot engine and note down its applications?	[5+5]
4.a)	How are condensers classified? And explain the working cycle.	
b)	What are the advantages and disadvantages of a compressor?	[5+5]
	OR	
5.a)	What are the types of expansion devices? Explain.	
b)	What are the additional components that are used in a refrigerator?	[5+5]

6.a) Dense air is used as refrigerant in Bell Coleman cycle. The temperatures at the end of the heat absorption and heat rejection are 5^0C and 30^0C respectively. The pressure ratio is 4 bars and the pressure in the cooler is 6 bars. Determine:
i) Temperatures at all state points.
ii) Volume flow rates at inlet to compressor and outlet to turbine for 2 TR cooling capacity.

b) State the effects of suction pressure and discharge pressure on performance of vapor compression system. [5+5]

OR

7.a) Describe the working of Ammonia- water system.

b) Describe the working principle of Steam jet refrigeration system. [5+5]

8.a) What are the important terms in a psychometric chart? Explain them.

b) Explain RSHF and ADP. [5+5]

OR

9.a) Write a note on industrial air conditioning and requirements.

b) What is the need for ventilation and infiltration? [5+5]

10.a) What is the equipment used for filters and deodorants used in A.C?

b) Explain the use of heat pump for heating and cooling cycle with a neat diagram? [5+5]

OR

11.a) Explain the selection of the fan using fan characteristic curve.

b) Air from an air-conditioned room is exhausted into atmosphere through a grill. The quantity of air passes through the grill is 20 cubic meter minute. The duct area leading to the grill is 0.12 m^2. The static pressure behind the grill is 3 mm of water. Find the effective area of grill exhausting the air into atmosphere. Take the pressure loss passing through the grill as 0.5 mm of water. [5+5]

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