Total No. of Questions : 10]

SEAT No. :

P2989

[Total No. of Pages : 3

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B.E. (Mechanical)

REFRIGERATION AND AIR CONDITIONING EQUIPMENT DESIGN

(2012 Pattern) (Semester - II) (Elective - III)

Time :2½ Hours] *[Max. Marks :70*

Instructions to candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator, steam tables and p-h chart is allowed.***
4) ***Assume suitable data, if necessary.***

Q1) What is dry ice? Explain with schematic diag. the method of manufacturing dry ice. **[10]**

OR

Q2) a) Explain the construction working of pilot-operated solenoid valve. **[6]**

b) Write a short note on: re-evaporator coils. **[4]**

Q3) a) List out the limitations of VCS for the production of low temperatures. **[5]**

b) Sketch and explain Linde cycle using T-s and p-h diagram. **[5]**

OR

Q4) a) Discuss various applications of cryogenies. **[5]**

b) Explain the performance characteristic curves of reciprocating compressor. **[5]**

Q5) a) Explain the procedure of thermal design of shell and tube condensers. **[8]**

b) Write a short note on "Pump Circulation System. **[8]**

OR

P.T.O.

Q6) a) Design R-22 condenser to meet the following conditions; **[10]**

Refrigeration load	30TR
Condensing temperature	55ºC
Evaporating temperature	–15ºC
Water inlet temperature	27ºC
Water flow rate per TR	0.00757 m^3/min
Heat rejection factor	1.013
Maximum tube length & diameter	3.6576 m & 2.54 cm
Fouling factor	0.001 m^2K/W

HTC inner & outer side respectively 6000$W/m^2.K$ & 1500 $W/m^2.K$

State the selection basis of condenser.

b) Write a short note on "Baudelot Cooler. **[6]**

Q7) A test is performed on an induced draft counter flow cooling tower. The following observations are made: **[16]**

Water flow rate:12.67 kg/s

Air flow rate :-11.9kg/s

Water entering temperature:-36.3ºC

Water leaving temperature:-32.1ºC

Ambient air conditions: 43.3ºC DBT, 25,6ºC WBT

If the dimensions of the tower are length L=3.9624 m, width W = 2.616 m and height H= 2.438 Determine the following:

a) Value of the performance coefficient.

b) The wetted area of tower if air HTC is 83 W/m^2K.

c) Value of mass transfer coefficient,

d) Exit condition of air.

OR

Q8) a) Explain the performance curves of cooling tower. **[8]**

b) Discuss various types of contact type of cooling tower. **[8]**

Q9) a) What is heat pipe? Explain advantages of heat pipe over other heat transport material. **[8]**

b) Explain limitations to heat transport in a heat pipe. **[10]**

OR

Q10) Write a short note on; **[18]**

a) Vortex Tube.

b) Thermoelectric Refrigeration.

c) Steam jet Refrigeration.