Registration No :

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B.Arch.
AM623

6th Semester Regular / Back Examination 2017-18
BUILDING SERVICES - IV
(REFRIGERATION AND AIR CONDITIONING)
BRANCH : B.Arch
Time : 3 Hours
Max Marks : 70
Q.CODE : C387
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1. **Answer the following Questions :** **(2 x 10)**
  a) What do you mean by passfacor (BPF) of the coil?
  b) Differentiate between specific humidity and relative humidity.
  c) Draw the comfort chart and explain.
  d) Write down the chemical formula of R22, R 12 , R 744.
  e) What is desert cooler?
  f) A pressure gauge connected to a pipe reads 30cm Hg. Determine absolute pressure when atmospheric pressure is 1 bar.
  g) State Charles' Law and Boyle's law.
  h) During a process data are 10 bar, 5 m^3 and 400 K. Find density of air.
  i) During a compression process heat supplied to the system is 20 kJ/s while work done is 15 kJ/s. Determine the change in internal energy.
  j) What do you understand by specific heat and constant pressure and specific heat constant volume?

Q2. **a)** A reversible refrigerator is working between 7°C and 37°C. Obtain the COP. If same device is used as heat pump with all other data remains same, find the COP. **(4)**
  b) With a neat sketch, explain working of a refrigerator. **(6)**

Q3. An auditorium of 400 seating capacity is air-conditioned for summer season when the following data is known : **(10)**
Outdoor conditions: 42°C and 84%R.H., required comfort conditions: 21°C and 54% R.H., the quantity of conditioned air supplied at the entrance condition: 0.27 m^3/ min /person, 62% of the conditioned air is re-circulated and mixed with the fresh air, the dew point temperature of the cooling coil is 9°C. The required condition is achieved first by cooling and dehumidifying. Find the following :
  i) The condition of air after mixing.
  ii) The capacity of the cooling coil in T.R. and its b.p.f.
  iii) Condition of air before entering into heating coil.

Q4. With schematic, explain working of a heat engine, refrigerator and heat pump. **(10)**

Q5. **a)** A 100 tonne refrigerating plant using R-12 has a condensing temperature of **(6)** 35°C and an evaporating temperature of 5°C. The condition of refrigerant before entering the compressor is just dry. Calculate the power requirement of the compressor in kW, mass flow rate, and COP of the plant.

b) What are the different modes of heat transfer considered during building air **(4)** conditioning analysis

Q6. **a)** What do you mean by effective temperature? Draw and explain comfort chart. **(5)**

b) Explain construction of supply and return duct systems **(5)**

Q7. With neat sketch, describe HVAC system for a shopping mall **(10)**

Q8. **Give short notes on any TWO :** **(2 x 5)**

a) Summer air conditioning

b) Natural & Mechanical ventilation systems

c) Active & Passive solar space heating