

Code No: 56082

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech III Year II Semester Examinations, April - 2018****AUTO AIR CONDITIONING****(Automobile Engineering)****Time: 3 hours****Max. Marks: 75****Answer any five questions****All questions carry equal marks**

- 1.a) Explain the effect of suction and condenser pressures on the performance of VCRS with a neat p-h diagram.
- b) R-717 refrigerator based on ideal Vapor compression cycle operates between the temperature limits of -20°C and 40°C . The refrigerant enters the condenser as saturated vapor and leaves as saturated liquid in condenser. If the refrigerant circulation is 0.025kg/s , find (i) COP (ii) dimensions of the compressor, if $L:D = 1.5$, $N=2500\text{rpm}$. $c_{pl}=4.583\text{kJ/kg K}$, $c_{pv}=4.825\text{kJ/kg K}$. [7+8]
- 2.a) Derive bypass factor of a heating and cooling coil? If bypass factor of a single row cooling coil is 0.1, then what is the value of bypass factor of coil 3 row deep?
- b) Show the steam injection, Water Injection, Adiabatic Dehumidification, Adiabatic Saturation process on psychrometric chart. [7+8]
- 3.a) Describe the working principle of a Thermostatic expansion valve with a neat diagram.
- b) Describe the working principle of a flooded type evaporator with a neat diagram. [7+8]
- 4.a) What are the desirable properties of an ideal refrigerant used in automobiles?
- b) An Air conditioned auditorium is to be maintained at 27°C DBT and 55%RH. The ambient conditions are 39°C DBT and 28°C WBT. The total sensible heat load is $1,20,000\text{ KJ/hr}$ and the total latent heat load is $45,000\text{ KJ/hr}$. 60% of the return air is recirculated and mixed with 40% of makeup air after the cooling coil. The condition of air leaving the cooling coil is 17°C . Determine: i) RSHF ii) Condition of air entering the auditorium iii) Amount of makeup air iv) ADP v) Bypass factor of cooling coil. [7+8]
- 5.a) Differentiate window and split air conditioning systems. What type of air Conditioner is used in maruti cars?
- b) Explain the working principle of any one of manually controlled air Conditioner and heater systems with a neat sketch. [7+8]
- 6.a) Explain the function of Registers and Grills, blowers, filters in an air heating system?
- b) Determine the equivalent diameter of a circular duct for a rectangular duct for i) when velocities in both ducts are same ii) when quantity of air flowing through the both ducts are same? [7+8]

7.a) How can you charge the systems? Describe any one method?
b) What are the various methods to detect the leakage of halo carbon group of refrigerants? [7+8]

8.a) Describe the methods for checking and filling the oil levels in compressors?
b) What factors will affect maintenance and servicing of air conditioners? [7+8]

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