

Code No: 56082

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year II Semester Examinations, December - 2017****AUTO AIR CONDITIONING****(Automobile Engineering)****Time: 3 hours****Max. Marks: 75****Answer any five questions****All questions carry equal marks**

- - -

- 1.a) Derive the equation for COP for a vapour compression refrigeration cycle from fundamentals.
- b) A bootstrap air refrigeration system of 15 TR capacity is used for an aero plane. The ambient temperature and temperature are  $10^{\circ}\text{C}$  and 0.8 bar. The air is rammed is entropically to a pressure of 0.1 bar. The pressure of air bled off from the main compressor is 3.0 bar and this is further compressed in a secondary compressor to a pressure of 4.0 bar, the isentropic efficiency of both the compressors is 90% and that of cooling turbine is 85%. The effectiveness of the heat exchangers is 90%. If the cabin is to be maintained at  $25^{\circ}\text{C}$  and the pressure in the cabin 1 bar.  
Find: i) Mass of air passing through the cabin ii) COP of the system. [7+8]
- 2.a) Explain the method of construction of Psychometric chart at 1 atm pressure.
- b) Explain the significance of ventilation and show it on psychometric chart along with RSHF and ESHF. [7+8]
- 3.a) Compare and contrast the working details of fillers and mufflers in their functions.
- b) What is meant by balance of equipment in the VCR system and how to achieve it? Explain in detail. [7+8]
- 4.a) Explain different refrigerants used in the automobiles and explain their desirable properties.
- b) How to calculate different loads on the automobiles air conditioning system and then design /selection of equipment? [7+8]
- 5.a) Compare and contrast the mechanism of manually controlled and automatical controlled air conditioning in automobiles.
- b) How heating process is obtained in automobiles and how it can be changed to cooling instantly? Explain with the help of cycle or operation. [7+8]
- 6.a) Draw the complete line diagram of ducts provided in automobile air conditioning and salient points.
- b) Explain the role of Grills, Registers and blowers and their limitations. [8+7]
- 7.a) Explain the different steps involved in the trouble shooting of air conditioner heater systems.
- b) Explain with the help of line diagram, the method of charging the system and precautions to take. [7+8]
- 8.a) With the help of line diagram, explain the trouble shooting and service of compressor and precautions to observe?
- b) Explain different steps involved in servicing of air conditioners and heating systems. [7+8]