

Code No: **R42245**

**R10**

**Set No. 1**

**IV B.Tech II Semester Supplementary Examinations, July/Aug - 2015**

**AUTOMOTIVE AIR CONDITIONING**

**(Automobile Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions**

**All Questions carry equal marks**

**Note: Psychrometric chart permitted**

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- 1 a) Classify air conditioning systems. Explain year round air condition system with the help of a neat diagram [8]  
b) Explain about the psychrometric chart [7]
- 2 a) Draw and labeled the components of reciprocating air compressor. [8]  
b) Draw the diagram illustrating the location of various components of a typical car air conditioning system. [7]
- 3 a) State any four functions of comfort heating system [8]  
b) With a neat sketch explain the working of hot water heater systems [7]
- 4 A small office hall of 25 persons capacity is provided with summer air conditioning system with the following data :  
Outside conditions = 34°C DBT and 28°C WBT  
Inside conditions = 24°C DBT and 50 % RH  
Volume of air supplied = 0.4 m<sup>3</sup>/min./person  
Sensible heat load in room = 125600 kJ/h  
Latent heat load in room = 42000 kJ/h  
Find the sensible heat factor of the plant. [15]
- 5 a) What are the different air distribution modes? [8]  
b) Why are ducts used in an air-conditioning system? List the factors due to which pressure of air falls in a duct. [7]
- 6 a) Write a short note on air routing and temperature control of air conditioning system. [8]  
b) Enlist various types of vacuum operated devices with their functions. [7]
- 7 a) State any four faults and their remedies of compressor. [8]  
b) Explain following refrigeration terms: Charging, Evacuation, Adding oil to system. [7]
- 8 a) Explain the working of Thermostat and control dampers [8]  
b) How does LP and HP cut outs works. [7]

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**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks**

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- 1 a) Define the following terms :
  - i) Wet bulb temperature
  - ii) Dew point temperature
  - iii) Relative humidity
  - iv) Sensible heat factor

[8]
- b) Write Classification and desirable properties of refrigerants. Name the refrigerants generally used in automobile air conditioning. 

[7]
- 2 a) Classify Air conditioning systems. Describe any one of them. 

[8]
- b) Describe construction and working of thermostatic expansion valve 

[7]
- 3 a) What are the advantages and disadvantages of steam heating system 

[8]
- b) Explain maintenance of comfort heating system 

[7]
- 4 a) What do you understand by term Cooling load? What are the different factors considered in load estimation sheet for comfort application? 

[8]
- b) What is By-pass Factor? Write the equation of By-pass Factor. 

[7]
- 5 a) What are various components of air distribution system. 

[8]
- b) What are various ducts? Which is mostly use in A/C system? Why? 

[7]
- 6 a) Differentiate between general (manual) climate control system and electronic climate control system with any four aspects 

[8]
- b) Write brief note on: Automobile automatic temperature control. 

[7]
- 7 Explain the trouble shooting method of automobile air conditioning system. 

[15]
- 8 a) Explain the working of humidistat and control dampers 

[8]
- b) Explain the principle and operation of relays 

[7]



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**Set No. 3**

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**AUTOMOTIVE AIR CONDITIONING**

**(Automobile Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions**

**All Questions carry equal marks**

**Note: Psychrometric chart permitted**

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- 1 a) Define the following terms :  
i) Wet bulb temperature  
ii) Sensible heat factor  
iii) Dew point temperature  
iv) Wet bulb depression  
v) Air conditioning  
vi) Psychrometry  
vii) Relative humidity [8]  
b) Explain Car air conditioning types and its features. [7]
- 2 Compare the following:  
i) Central air conditioning and unitary air-conditioning system.  
ii) Water cooled condenser and Air cooled condenser [15]
- 3 a) With a neat sketch explain the working of any one type of heater systems [8]  
b) Performance of heating system is always better than cooling system – Discuss [7]
- 4 The following data refers to summer air-conditioning of a building:  
outside design conditions=43°C DBT, 27°C WBT.  
Inside design conditions =25°C DBT, 50% RH  
Room sensible heat gain =84000 KJ/hr  
Room latent heat gain =21000 KJ/hr  
By-pass factor of the cooling coil used=0.2  
The return air from the room is mixed with the outside air before entry to cooling coil in the ratio of 4:1 by mass. Determine:  
i) ADP of the cooling coil, .  
ii) Entry and exit conditions of air for cooling coil,  
iii) Fresh air mass flow rate,  
iv) Refrigeration load on the cooling coil. [15]
- 5 a) Describe about sources of noise in an automobile air conditioning system. [8]  
b) Explain any two types of grills and diffusers [7]
- 6 Describe with neat labelled sketch, working of electronic temperature controlled system. [15]
- 7 a) Explain with figure the refrigerant charging method for a refrigeration system [8]  
b) What are the causes of air conditioner failure [7]
- 8 a) It is better to set the thermostat to a high temperature- explain [8]  
b) Explain the principle and operation of relays [7]



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**Set No. 4**

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**(Automobile Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks**

**\*\*\*\*\***

- 1 a) What are primary and secondary refrigerants and list out the desirable thermo-physical properties of a refrigerant [8]  
b) Describe the working of the compressor with a neat diagram [7]
- 2 a) Explain with neat sketch working of unitary air conditioning system. [8]  
b) Draw the diagram illustrating the location of various components of a typical car air conditioning system. [7]
- 3 a) Explain how air conditioning system can be protected from the engine heat in an automobile [8]  
b) What are the requirements of a comfort heating system [7]
- 4 a) Explain various factors which forms load on automobile Air Conditioner [8]  
b) Explain the following psychrometric processes:  
i) Cooling and Dehumidification of air.  
ii) Cooling and humidification of air. [7]
- 5 a) Describe different methods of duct design. [8]  
b) Explain Duct system for automobiles and its impact on load. [7]
- 6 a) Write note on "Control Systems for Car air conditioner." [8]  
b) Write a short note on air routing and temperature control of air conditioning system. [7]
- 7 a) Discuss Refrigerant gas charging procedure and Servicing of heater system. [8]  
b) Before charging the refrigerant why refrigeration circuit needs evacuation [7]
- 8 a) Discuss the importance of cut in and cut out circuits [8]  
b) Discuss the role of humidistat control Air Conditioning Equipment [7]

