Faculty: V.S.Jorapur Subject: HVAC@R. Academic Year:21-22

| L.No | Module No. | Particulars |
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| 1 | 1 | BasicKnowledge:Carnotrefrigerator , Carnot heat pump , Carnot coefficient of performance,Reversed Carnot cycle and its limitation , Effect of temperature and pressure on COP of the cycle |
| 2 | 1 | Refrigerants: Classification,Designation,Selection of refrigerant,Physical and chemical properties of refrigerants ,Secondary Refrigerants |
| 3 | 1 | Air Refrigeration System:  Bell Coleman cycle, Necessity of air cooling, Factors considered for the  selection of air refrigeration system, Types of air refrigeration system with  schematic and T-S Diagram, Numerical based on simple and bootstrap air  refrigeration system. |
| 4 | 1 | Air Refrigeration System:  Bell Coleman cycle, Necessity of air cooling, Factors considered for the  selection of air refrigeration system, Types of air refrigeration system with  schematic and T-S Diagram, Numerical based on simple and bootstrap air  refrigeration system. |
| 5 | 1 | Videos (you tube) |
| 6 | 1 | Problems |
| 7 | 1 | Problems |
| 8 | 2 | VapourCompression Refrigeration System:  Simple system on P-h and T-s diagrams, analysis of the simple cycle, factors affecting the performance of the cycle, actual cycle. |
| 9 | 2 | Numerical based on using P-h chart and refrigerant table standard vapor compression system by using p-H chart and refrigeration tables. |
| 10 | 2 | Vapour Absorption Refrigeration System.  Simple and practical vapor absorption system , Refrigerant-adsorbent properties, COP of ideal vapor absorption system, DomesticElectroluxrefrigerator, Lithium Bromide Absorption system |
| 11 | 2 | Heat Pump : performance,Primary energy ratio,Energy efficiency Introduction,Coefficient of ratio,Heating season performance factor,Seasonal energy efficiency ,ratio. |
| 12 | 2 | Classification of heat pump,Vapour compression heat pump systemsHeat pump application in an industry. |
| 13 | 2 | Some useful videos from you tube and other online resources. |
| 14 | 2 | Interactive sessions to clear doubts. |
| 15 | 2 | Problems (from text books) |
| 16 | 2 | Problems(University Papers) |
| 17 | 3 | Thermal ComfortConditions: Selection of inside design conditions, thermal comfort, heat balance equation for a human being, factors affecting thermal comfort, Effective temperature. |
| 18 | 3 | Comfort chart and factors governing effective temperature, selection of outside design conditions. Psychrometry of Air Conditioning Processes Psychrometry properties. |
| 19 | 3 | Relations and processes ,Adiabatic air mixing , Psychrometric chart, RSHF,GSHF,ERSHF,Bypass factor process . |
| 20 | 3 | Numericalbased on psychrometric chart |
| 21 | 3 | Apparatus dew point .Classification of air conditioning system,relations. |
| 22 | 3 | Cooling Load Estimation : ,Introduction,Components of cooling load |
| 23 | 3 | Different heat sources ,Various load Estimation,Design of air conditioning system , |
| 24 | 3 | Building survey and economic aspect used in design. |
| 25 | 3 | Useful videos (online resources) |
| 26 | 3 | Problems.(from various text books),Problems(university papers) |
| 27 | 4 | Air DistributionSystem:  Duct : Classification of ducts,duct material, pressure in ducts., |
| 28 | 4 | Flow through duct, pressure losses in duct ,Air flow through simple duct system |
| 29 | 4 | Equivalent diameter,Methods of duct system design |
| 30 | 4 | Air Handling Unit : , Fan coil unit, Types of fans used air conditioning applications |
| 31 | 4 | Fan laws ,Filters,supply and return grills,Sensors. Problems. |
| 32 | 5 | HVAC & R Components : Working of reciprocating compressors. |
| 33 | 5 | screw and scroll compressors, |
| 34 | 5 | Working of air cooled, and water cooled and evaporative condensers, |
| 35 | 5 | Working of DX, Flooded, and Forced feed evaporators, |
| 36 | 5 | Expansion devices Capillary tube, TXV, EXV, Type of insulation materials. |
| 37 | 6 | Application of HVAC&R Ice plant, Food storage plants, dairy and food processing plants, freeze drying, A/c in textile. |
| 38 | 6 | Printing pharmaceutical industry and Hospitals ,Cold chain Technology, |
| 39 | 6 | Transport air conditioning,Solar refrigeration. |