

2.2.2. TE-1

1. Regarding 'humidification process' which of the following statement is incorrect? :-
->Humidification process plots as an inclined line on the psychrometric chart
2. During combined cooling and humidification process :->Air passes through air washer
3. If air is passes over a solid absorbent surface or through a liquid absorbent spray simultaneous _____ is accompanied :->Heating and dehumidification
4. Air conditioning is the simultaneous control of _____ in a confined space :->Temperature, humidity, parity and movement of air
5. For large Tonnage (more than 200 tons) air $T_0/2$ conditioning applications, which are of the following type of compressors is recommended? :->Centrifugal
6. In the case of sensible cooling of air, the coil efficiency is given by (BPF=By pass factor) :->1 - BPF
7. A value which maintains a constant degree of superheat at the end of the evaporator coil, is called :->thermostatic expansion value
8. Consider the following statements
I) Low value of the bypass factor for an air conditioning equipment signifies higher performance of the equipment.
II) Bypass factor for an air conditioning equipment signifies the fraction of ambient air mixed with the air to be conditioned
III) By pass factor for air conditioning equipment signifies the fraction of the air to conditioned space of these statements :->I and III are correct
9. The wet bulb temperature, at 100 percent relative humidity, is _____ dew point :->Same as
10. As warm air cools, its relative humidity _____ :->Increases
11. The dehumidification process, on the psychrometric chart, is shown by :->Vertical line
12. The dry bulb temperature during heating and dehumidification _____ :->Increase
13. During adiabatic saturation process on unsaturated air _____ remains constant :->Wet bulb temperature
14. The expression $\frac{0.622 P_a}{P_t - P_a}$ is used to determine :->Specific humidity
15. Consider the following statements:
In chemical dehumidification process
1. Dew point temperature decreases
2. Wet bulb temperature decreases
3. Dry bulb temperature increases of these statements
:->1 and 2 are correct
16. For air-conditioning the operation theatre in a hospital, the percentage of outside air in the air supplied is :->100
17. To cool and dehumidify a stream of moist air, it must be passed over the coil at temperature :->Which lies lower than the dew point temperatures of the incoming stream
18. The curved lines on a psychrometric chart indicate :->Relative humidity
19. In a psychrometric chart, specific humidity lines are :->Horizontal and uniformly spaced
20. Which of the following can be measured by a sling psychrometer :->Dry bulb as well as wet bulb temperatures
21. In a psychrometric chart, the vertical lines parallel to the ordinate indicate :->Dry bulb temperature
22. _____ The specific humidity is the mass of water vapour present in :->1 Kg of dry air
23. The relative humidity, during cooling and dehumidification of moist air :->Can increase or decrease
24. Consider the following statements:
A Psychrometer measures
1. Wet bulb temperature
2. Dew point temperature
3. Dry bulb temperature of these statements :->1 above is correct
25. In a spray washing systems, if the temperature of water is higher than the dry bulb temperature of entering then the air is air, :->Heated and humidified
26. Moist air a mixture of dry and water vapour. Hence three independent intensive thermodynamic properties are required to fix its thermodynamic state. Which using psychrometric chart, however, only two thermodynamic properties are needed since, psychrometric chart. :->Is drawn for a fixed pressure
27. It is devised to condition the outside air from 70 % RH and 45° dry bulb to 50 % RH and 15°C dry bulb room condition. The practical arrangement would be :->Cooling and dehumidification
28. The vapour pressure, during sensible heating of moist air :->Remains constant
29. The relative humidity, during sensible heating :->Decreases
30. During sensible heating of moist air, enthalpy :->Increases
31. For saturated air :->Wet bulb depression air zero
32. In an unsaturated air the state of a vapour is :->Superheated
33. During sensible cooling of air, :->Its wet bulb temperature increases and dew point remains constant
34. When a stream of moist air is passed over a cold and dry cooling coil such that no condensation takes Place, then the air stream get cooled along the line of :->Constant dew point temperature
35. During the adiabatic cooling of moist air :->WBT remains constant
36. Consider the following statements:
1. Dew point is reached by cooling air at constant moisture content
2. Wet bulb temperatures changes by addition of moisture at constant enthalpy
3. For saturated air, the dry bulb temperature, wet bulb temperature and dew point are the same
4. Dehumidification of air is achieved by heating of these statements :->1 and 3 are correct
37. In a saturated air-water vapour mixture, the :->Dry bulb, wet bulb and dew point temperatures are in same
38. In a vapour absorption plant, which of the following components is a substitute for the compressor of the vapour compression system? :->Absorber, aqua pump and generator
39. Which is the most distinguishing feature of absorption type refrigerator? :->Quieter operation
40. Which refrigerant is used in a vapour absorption refrigerator? :->Acqua-ammonia
41. The refrigerant used for absorption refrigeration working on heat from solar collectors is a mixture of water and :->Lithium bromide
42. Regarding absorption refrigeration which of the following statements is correct? :->It gives quiet operation
43. The maximum COP for the absorption cycle is given by T_G =generator temperature: T_c = environment Temperature; T_E = refrigerated space temperature :-> $\frac{T_G(T_c - T_E)}{T_E(T_G - T_E)}$
44. Which one of the following statements regarding ammonia absorption system is correct? :->A function of the temperature and pressure of the solution
45. _____ machines can be used to obtain refrigeration at places where there is no electric power :->Vapour absorption
46. Vapour absorption refrigeration system works using the :->Affinity of a substance for another substance
47. In the absorption refrigeration cycle, the compressor of the vapour compression refrigeration cycle is replaced by :->Absorber, liquid pump and generator
48. _____ is the refrigerant widely used in domestic refrigerators :->Freon-12
49. A refrigerant with highest critical pressure is :->Ammonia

50. _____ has the minimum freezing point :->Freon-22
51. Which of the following properties of a refrigerant is undesirable :->High boiling point
52. In milk chilling plants, the usual secondary refrigerant is :->Brine
53. Why is ammonia preferred as a refrigerant in large commercial installations? :->It is relatively cheap
54. The refrigerant Freon12 is a compound consisting of :->Carbon, chlorine and fluorine
55. The desirable combination of properties for a refrigerant include :->High specific heat and Low boiling point
56. Consider the following statements:
Moisture should be removed from refrigeration to avoid:
1. Compressor seal failure
2. freezing at the expansion valve
3. restriction to refrigerant flow
4. corrosion of steel parts
of these statements :->2,3 and 4 are correct
57. Which of the following statement are trip for ammonia as a refrigerant?
1. It has higher compressor discharge temperature compared to fluorocarbon
2. It is toxic to mucous membrane
3. It requires large displacement per TR compared to fluorocarbon
4. It heats with copper and its alloys
Select the correct answer being the codes given below codes
:->1,2 and 4
58. In a small refrigerator a capillary tube is used to serve the purpose of :->Expansion valve
59. In a refrigeration cycle a capillary tube is used :->to control the flow of refrigerant
60. _____ is usually the costliest item in a refrigeration system :->Compressor
61. In a hermetically sealed compresses unit :->Both the compressor and motor are sealed
62. In a refrigeration cycle, the superheating _____ C.O.P :->Decreases
63. In a refrigeration cycle, the sub-cooling _____ C.O.P :->Increases
64. In a vapour compression cycle the refrigerant after condensation process is cooled below the saturation temperature, such a process is called :->Sub-cooling
65. The lowest temperature during the cycle in a vapour compression systems occurs :->After evaporation
66. The formation of frost on cooling coils in a refrigerator :->Increases power consumption
67. In a vapour compression cycle, the superheated vapour state of refrigerant occurs :->At exit from the compressor
68. In the vapour compression refrigeration cycle, the refrigerant is generally in the form of fairly wet vapour at entry to :->Evaporator
69. In a refrigeration cycle the flow of refrigerant is controlled by :->Expansion valve
70. Where does the highest temperature of refrigerant in a mechanical refrigeration system occur? :->Between compressor and condenser
71. The condition of refrigerant before entering the expansionary throttle valve, in a vapour compression system, is :->High pressure
72. Consider the following statements:
In a vapour compression system, a thermometer placed in the liquid line can indicate whether the
1. Refrigerant flow is too low
2. Water circulation is adequate
3. Condenser is fouled
4. Pump is functioning properly of the statements
:->1,2 and 3 are correct
73. A simple stage vapour compression refrigeration system cannot be used to produce ultra low temperatures because :->Heat leakage into the system will be excessive
74. Consider the following statements:
In the case of a vapour compression machine, if the condensing temperature of the refrigerant is closer to the critical temperature then there will be
1. Excessive power consumption
2. High compression
3. Large volume flow
of the statements :->1 and 2 are correct
75. When the discharge pressure is too high in a refrigeration system, high-pressure control is installed to :->Stop the compressor
76. In a vapour compression refrigeration system, a throttle valve is used in place of an expander because :->The positive work isentropic expansion if liquid is very small
77. Walk changing the refrigeration system of an aircraft prime consideration is that the :->Weight of the refrigeration equipment is low
78. The cop of a heat pump, for the same operating temperature limits equals :-> $1 + (cop)_{ref}$
79. In air conditioning of aero planes, using air as a refrigerant, the cycle used is reversed _____ cycle :->Brayton
80. What is the critical temperature? :->the temperature above which a gas will never liquefy
81. The Bell Coleman refrigeration cycle uses _____ as the working fluid :->air
82. Bell Coleman cycle is a reversed _____ cycle :->Joule
83. A Bell Coleman refrigerator working on dense air system as compared to open air system, for the same range of temperature, results in _____ horse power per tonne of refrigeration :->lower
84. The capacity of a refrigerating machine is expressed as :->rate of abstraction of heat from the space being cooled
85. Regarding closed system of Bell Coleman refrigeration cycle, which of the following statements is incorrect? :->air comes in direct contact with the space or substance being cooled
86. Regarding a refrigerating machine working on Bell Coleman cycle, which of the following aspects is not true? :->simplification of design and performance
87. The cop of the Carnot refrigeration cycle decreases on :->increasing the upper temperature and decreasing the lower temperature
88. The cop of a heat pump working on a reversed Carnot cycle is
Where T_1 and T_2 are the highest and lowest operating temperatures in the cycle :-> $\frac{T_1}{T_1 - T_2}$
89. The cop of a refrigerator working on a reversed Carnot cycle is
Where T_1 and T_2 are the highest and lowest operating temperatures in the cycle :-> $\frac{T_2}{T_1 - T_2}$
90. The relative co-efficient of performance is equal to :->actual cop/theoretical cop
91. The coefficient of performance (cop) of a domestic refrigeration is :->more than 1
92. Rating of a domestic refrigerator is of the order of :->0.1 to 0.3 tonne
93. The ratio of heat extracted in the refrigerator to the work done on the refrigerant is called :->coefficient of performance of refrigeration
94. Air refrigerator works on _____ cycle :->both Bell Coleman and Reversed Carnot cycle
95. With regard to a refrigeration system which of the following statements is correct? :->it removes heat from a low temperature body and delivers it to a high-temperature body
96. A one tonne refrigerating machine means that :->1 tonne of ice when melts from and at 0°C in 24 hours, the refrigerating effect is equivalent to 14000 kJ/hr
97. Air refrigeration cycle is used in :->gas liquefaction
98. The degree of reaction is usually kept _____ for all types of axial flow compressors :->0.5
99. In axial flow compressor, axial flow angle deviation from the blade angle is a function of :->blade camber and incidence angle
100. The type of rotary compressor used in gas turbines, is of :->axial flow type
101. To check moisture troubles, the compressed air time should :->drag gradually towards the point

- of use
102. Due to which if the following reasons on axial flow compressor instead of centrifugal compressor, is used in aircraft turbines. :-> **considerable less frontal area**
 103. On axial flow compressor of compared to centrifugal compressor :-> **has large air handling ability per unit**
 104. _____ compressor is required to supply intermittent small quantity of air of high pressures :-> **reciprocating**
 105. Phenomenon of working in compressor means :-> **fixed mass flow rate regardless of pressure ratio**
 106. Surging basically implies :-> **unsteady, periodic and reversed flow**
 107. What does symmetrical blading in an axial flow compressor mean? :-> **equal diffusion in rotor and stator at a radial section**
 108. For an axial flow compresses the degree of reaction is to ratio of :-> **pressure in the rotor blades to the pressure rise in the compressor in one stage**
 109. Optional performance of axial flow compressor is obtained at _____ speed and _____ flow :-> **high, high**
 110. In an axial flow compressor, stalling of blades is the phenomenon of :-> **air stream not able to follow the blade control**
 111. An axial flow compressor resembles which :-> **turbine**
 112. _____ type of compressor is used in aero planes :-> **axial flow**
 113. If an axial flow compressor is designed for a constant velocity through all stages, then the area of annulus of the succeeding stages will :-> **progressively increase**
 114. Degree of reaction in an axial compressor is defined as the ratio of static enthalpy rise in the :-> **rotor to static enthalpy rise in the stage**
 115. A multistage compressor is to be designed for a given flow rate and pressure ratio. If the compressor consists of axial flow stages followed by centrifugal instead of only axial flow stages, then the axial flow compressor, exit flow angle deviation from the blade angle is a function of :-> **axial length of the compressor would be increased both blade camber and space chord ratio**
 116. In axial flow compressor, exit flow angle deviation from the blade angle is a function of :-> **both blade camber and space chord ratio**
 117. Which one of the following is the effect of blades shape on performance of a centrifugal compressor? :-> **forward curved blades produce lower pressure ratio**
 118. The stagnation pressure rise in a centrifugal compressor takes place :-> **in the impeller only**
 119. If the flow of air through the compressor is perpendicular to its axis, then it is a :-> **centrifugal compressor**
 120. _____ is the term not associated with bladed compressor :-> **work ratio**
 121. In a centrifugal compressor what is the equal value of power input factor? :-> **1.04**
 122. _____ is ratio of isentropic work to Euler work, in a rotary bladed compressor :-> **pressure coefficient**
 123. Slip factor for a centrifugal impeller with radial vanes is the ratio of :-> **whirl velocity to blade velocity at the impeller exit**
 124. For a given pressure ratio an increase in speed of centrifugal compressor would result in _____ of flow and _____ inefficiency :-> **increase, decrease**
 125. What will be the shape of the velocity triangle at the exit of a radial bladed centrifugal impeller, taking into account the slip? :-> **one angle greater than 90°**
 126. Given:
 V_w = velocity of whirl at outlet
 U_2 = peripheral velocity of the blade tips
 The degree of relation in centrifugal compressor is equal to :-> **$1 - \frac{V_w}{U_2}$**
 127. In a _____ compressor the flow of air is perpendicular to its axis :-> **centrifugal**
 128. An increase in speed at a given pressure ratio, in a centrifugal compressor, causes :-> **increase in flow and decrease in efficiency**
 129. In a centrifugal compressor, the flow of air is _____ of the compressor :-> **perpendicular to the axis**
 130. On which of the following factors does the surging phenomenon in a centrifugal compressor depend? :-> **stagnation pressure of the outlet**
 131. In a compressor the phenomenon of surging refers to :-> **in steady, periodic and reversed flow**
 132. In a compressor, what does phenomenon of choking means? :-> **fixed mass flow rate regardless of pressure ratio**
 133. In a centrifugal compressor, the thrust on the rotor is precluded by _____ component :-> **axial**
 134. The energy transfer process is :-> **continuous in both reciprocating and axial compressor**
 135. Centrifugal compressors are suitable for large discharge and mass flow range, but at a relatively low discharge pressure of the order of 10 bars, because of :-> **large speeds**
 136. Which of the following is the effect of blade shape on performance of a centrifugal compressor? :-> **forward curved blades produce lower pressure ratio**
 137. The compressor efficiency is the :-> **isothermal H.P./indicated HP**
 138. The volumetric efficiency of a compressor fans roughly by _____ percent for every 5°C increase in atmospheric temperature :-> **1.0**
 139. In a reciprocating compressor, more than one stage will be performed if the delivery pressure is more than :-> **2 bar**
 140. In case of an air compressor, the area of actual indicator diagram as compared to area of ideal indicator diagram is :-> **more**
 141. At high altitude a compressor with draw :-> **less power**
 142. Reciprocating compressors are employed to compress air upto a pressure of _____ bar :-> **more than 100**
 143. Which of the following compressor may be used if air is to be compressed upto a pressure that lies between 30-80 bar? :-> **multistage reciprocating compressor**
 144. Which of the following compressor is mostly used for super charging I.C. Engine? :-> **radial flow compressor**
 145. If W_c is the work done due to compression and W_{bf} is the work done due to back flow then the efficiency of the vane blower is :-> **$\frac{W_{bf}}{W_c + W_{bf}}$**
 146. The efficiency of vane type air compressor as compared to roots air compressor for the same pressure ratio is :-> **more**
 147. The static temperature of a moving gas is the actual temperature recorded by a :-> **thermometer which is moving with the gas with the speed equal to that of the gas**
 148. The criterion of thermodynamic efficiency is :-> **isothermal compression for reciprocating compressor and isentropic compression for rotary compressor**
 149. Choose the wrong statement :-> **a compressor at high altitude air required more power**
 150. The efficiency of a rotary air compressor as compared to that of reciprocating air compressor is :-> **nearly the same**
 151. The air is delivered _____ in one revolution in case of a three-lobbed rotor :-> **six times**
 152. Blower is a compressor which produces air pressure upto :-> **2.5 kgf/m²**
 153. The efficiency of roots blower _____ with the increase in pressure ratio :-> **decreases**
 154. The efficiency of roots blower is given by
 Where v = isentropic index for air
 R = ratio of discharge pressure to intake pressure of air :-> **$\frac{v}{v-1} \times \frac{P_2 - P_1}{P_2}$**
 155. Which of the following types of compressor is mostly used for supercharging of I.C engine? :-> **Roots blower**

156. Match list I and II (pertaining to blower performance) and select the correct answer using the codes given below the lists:

- | | |
|------------|--|
| List I | List II |
| A. Slip | 1. Reduction of useful velocity |
| B. Stall | 2. Fixed mass flow rate regardless of pressure ratio |
| C. Choking | 3. Flow separation |
| | 4. Flow area reduction |

:->A-1,B-3,C-2

157. If n_1 and n_2 are the indices of compression for first and second stage of compression then load shared in two stages as the ratio of first stage to second stage with perfect inter cooling will be :->

$$\frac{n_1(n_2-1)}{n_2(n_1-1)}$$

158. The isothermal compression in multistage compressor is achieved by :->employing inter cooler
159. Regarding multistage compression which of the following statements is incorrect? :->more loss of air alone to leakage part the cylinder

160. In two stage compressor what is optimum intermediate pressure :->geometric mean
161. In multi-stage reciprocating air compressor the compression will be isothermal if :->perfect inter cooling is provided to the air being compressor

162. Work done in a two stage reciprocating air compressor with perfect inter cooling is given by :->

$$\frac{n-1}{2n} P_1 V_1 \left[\left(\frac{P_2}{P_1} \right)^{\frac{n-1}{n}} + \left(\frac{P_3}{P_2} \right)^{\frac{n-1}{n}} - 2 \right]$$

163. Work done in a two stage reciprocating air compressor with imperfect cooling is given by :->

$$\frac{n-1}{n-1} P_1 V_1 \left[\left(\frac{P_2}{P_1} \right)^{\frac{n-1}{n}} - 1 \right] + \frac{n-1}{n-1} P_2 V_2 \left[\left(\frac{P_3}{P_2} \right)^{\frac{n-1}{n}} - 1 \right]$$

164. For the same overall pressure ratio, the leakage of air past the piston for multi-stage compression as compared to single stage compression is :->less

165. Work done in a single stage, single acting air compressor without clearance per kg of air delivered when the compression process is isothermal is given by :-> $P_1 V_1 \log_e \frac{P_2}{P_1}$

166. Which of the following statement is true? :->In a multi-stage compressor, adiabatic efficiency is less than stage efficiency

167. With suction pressure being atmospheric, increase in delivery pressure with fixed clearance volume :->decreases volumetric efficiency

168. With increase in clearance volume, the ideal work of compression 1kg of air :->remains same

169. The clearance volume in reciprocating air compressor is provided :->to accommodate values in the head of the compressor

170. Work input to the air compressor with "n" as index of compression, :->increases with increase in value of n

171. For reciprocating air compressor the law of compression desired is isothermal and that may be possible by :->very low speeds

172. For reciprocating air compressor with clearance ratio "k" the volumetric efficiency is given by :->

$$1 + k - k \left(\frac{P_2}{P_1} \right)^{\frac{1}{n}}$$

173. In reciprocating air compressor the clearance ratio is given by :-> $\frac{\text{Clearance volume}}{\text{ swept volume of cylinder }}$

174. The work input to air compressor is minimum if the compression law followed is :->isothermal $PV=c$

175. Consider the following statements:

- The volumetric efficiency of a compressor depends upon 1) clearance volume
 - 2) pressure ratio
 - 3) index of expansion
- of these statements :->1,2 and 3 are correct

176. The isothermal efficiency of a reciprocating compressor is defined as :->

$$\frac{\text{isothermal work done during compression}}{\text{actual work done during compression}}$$

177. The best method of controlling compress, during peak load period is :->constant speed unloads

178. _____ compressor is a negative displacement compressor :->centrifugal

179. For rotary compressor the criterion of the thermodynamic efficiency is _____ compressor. :->adiabatic

180. _____ is a positive displacement compress :->roots blower

181. _____ is used to drive a rotary compressor. :->Either engine or electric motor

182. Rotary compressor is limited for _____ quantity of air at _____ pressure :->large, low

183. In case of an air compressor, the area of actual indicator diagram is compared to area of ideal indicator diagram is :->more

184. Which of the following types of valve will be best suited for slow $1/2$ speed large capacity compressors? :->Disc or feather type

185. The negative displacement compress is :->both centrifugal blower compressor and axial slow compressor

186. Consider the following statements:

- 1) Reciprocating compressors are best suited for high pressure and low volume capacity.
- 2) The effect of clearance volume on power consumption is negligible for the same value of discharge.
- 3) While the compressor is idling, the delivery valve is kept open by the control circuit.
- 4) Intercooling of air between the stages of compression helps to minimize losses.

Of these statements :->1 and 3 are correct

187. The work done on a compressor will be least when air is taken from :->source of low temperature air

188. Standard air is the air :->at 10°C , 1kg/m^3 and relative humidity 36 %

189. Free air is the air :->at atmospheric conditions at any specific location

190. With an increase in compression ratio the volumetric efficiency of air compressor :->Decreases

191. In air compressor installations where are separators generally used? :->between after coolers and receiver

192. In compressor installations the function of a receiver is to :->dampen pulsations or pressure waves in compressor discharge

193. Why are intake air filters provided on compressors? :->to remove dirt and dust from suction air

194. Which of the following is not the probable cause of an air cooled compressor getting over heated? :->leakage in intercooler

195. At constant efficiency, the horse power of a fan is :->proportional to $(\text{rpm})^3$

196. Induced draught fans of a large steam generator have :->forward curved blades