

**Examination questions on the subject of „Chłodnictwo, wentylacja i klimatyzacja okrętowa”**

Item	Question	Correct answer
1.	The maximum permitted storage temperature for frozen products shall be: A. -16°C B. -18°C C. -10°C D. -15°C	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">B</div>
2.	Too low air humidity in the frozen products' chamber may cause: A. Loss-in-weight by drying of stored products B. Moulding of stored products C. Increased gas emission from stored products D. Increased odour emission by stored products	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">A</div>
3.	The recommended air parameters for seagoing vessels in rooms with heat release at workstations in summer for the tropical shipping area are as follows: A. $T_p = 20 \div 22 \text{ } ^\circ\text{C}$ i $\varphi_p = 40 \div 70 \%$ B. $T_p = 22 \div 23 \text{ } ^\circ\text{C}$ i $\varphi_p = 40 \div 60 \%$ C. $T_p = 25 \div 28 \text{ } ^\circ\text{C}$ i $\varphi_p = 40 \div 60 \%$ D. $T_p = 25 \text{ } ^\circ\text{C}$ i $\varphi_p = 40 \div 60 \%$	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">C</div>
4.	Steam cooling circuit is executed in a system of sequentially running machines and apparatus: A. Condenser, compressor, evaporator, expansion element B. Evaporator, expansion element, condenser, compressor C. Compressor, condenser, expansion element, evaporator D. Expansion element, evaporator, condenser, compressor	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; line-height: 40px;">C</div>

5.	<p>Left-handed refrigeration circuit is a set of sequentially running thermodynamic transformations:</p> <p>A. Isentropic compression, isobaric condensation, isenthalpic throttling, isobaric boiling</p> <p>B. Isentropic compression, isobaric boiling, isentropic throttling, isobaric condensation</p> <p>C. Isobaric condensation, isentropic compression, isenthalpic throttling, isobaric boiling</p> <p>D. Isenthalpic throttling, isobaric boiling, Isobaric condensation, isentropic compression</p>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;">A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	A				
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6.	<p>The theoretical cooling efficiency rat <math>\varepsilon</math> of the Linde comparative circuit is expressed by the eqation:</p> <p>A. <math>\varepsilon = \frac{l_t}{q_o}</math>, where <math>l_t</math>- individual compression work, <math>q_o</math>- individual cooling capacity</p> <p>B. <math>\varepsilon = \frac{q_o}{l_t}</math>, where <math>l_t</math>- individual compression work, <math>q_o</math>- individual cooling capacity</p> <p>C. <math>\varepsilon = \frac{q_o+q_g}{l_t}</math>, where <math>l_t</math>- individual compression work, <math>q_o</math>- individual cooling capacity, <math>q_g</math> – individual condenser capacity</p> <p>D. <math>\varepsilon = \frac{q_o}{q_k+l_t}</math>, where <math>l_t</math>- individual compression work, <math>q_o</math>- individual cooling capacity, <math>q_g</math> – individual condenser capacity</p>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td style="text-align: center;">B</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>			B		
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7.	<p>The cooling agent R404A is a long-term replacement for the following cooling agent:</p> <p>A. R12</p> <p>B. R717</p> <p>C. R13</p> <p>D. R22</p>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td style="text-align: center;">D</td></tr> <tr><td> </td></tr> </table>				D	
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8.	<p>One of the causes of too low evaporation and condensation pressure may be:</p> <p>A. Insufficient cooling agent quantity in the installation</p> <p>B. Too high quantity of cooling agent in the installation</p> <p>C. Humidification of the installation</p> <p>D. Air block of the installation</p>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td style="text-align: center;">A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		A			
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9.	<p>The ODP abbreviation means:</p> <p>A. Equivalent of the greenhouse effect</p> <p>B. Greenhouse effect creation potential</p> <p>C. Ozone layer depletion potential</p> <p>D. Limited product surveillance</p>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td style="text-align: center;">C</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>			C		
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10.	<p>The causes of knocks in the compressor and noisy operation can be:</p> <ul style="list-style-type: none"> <li>A. Leaky, broken or contaminated plates of operating valves</li> <li>B. Hydraulic impacts due to the presence of liquid cooling agent</li> <li>C. Excessive wear on the cylinder sleeve or piston rings</li> <li>D. Insufficient lubrication of the cylinder runnings</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;">B</td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> </table>		B		
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11	<p>To avoid hydraulic impacts during compressor start-up, it is necessary to:</p> <ul style="list-style-type: none"> <li>A. Drain the cooling agent from the evaporator after stopping it</li> <li>B. The phenomenon cannot be prevented</li> <li>C. Preheat the suction line of the compressor</li> <li>D. Close the shut-off valve on the steam pipe after stopping it.</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;">A</td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> </table>	A			
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12	<p>During normal operation of the reciprocating compressor, oil is replaced every:</p> <ul style="list-style-type: none"> <li>A. 1500-2000 hours</li> <li>B. 3000 – 6000 hours</li> <li>C. 6000 – 8000 hours</li> <li>D. 8000 – 9000 hours</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;">B</td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> </table>		B		
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13	<p>In the case of capacity control of the 4 cylinder piston compressor consisting in switching off individual cylinders, the following capacity steps are possible:</p> <ul style="list-style-type: none"> <li>A. 50,75,100%</li> <li>B. 33,67,100%</li> <li>C. 40,70,100%</li> <li>D. 20,60,100%</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;">A</td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> </table>	A			
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14	<p>The decrease in the compressor suction pressure may be caused by:</p> <ul style="list-style-type: none"> <li>A. Decreasing the evaporator heat load</li> <li>B. Increasing the heat load on the evaporator</li> <li>C. Overflow through the expansion valve</li> <li>D. Too much operating overheating TZR</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;">A</td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> </table>	A			
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15	<p>In dry evaporators, the liquid fills:</p> <ul style="list-style-type: none"> <li>A. up to 15% of the exchanger volume</li> <li>B. up to 25% of the exchanger volume</li> <li>C. up to 45% of the exchanger volume</li> <li>D. up to 55% of the exchanger volume</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;">A</td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> </table>	A			
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16	<p>The reason for an increase in the air temperature in the cooling compartment, despite the constant operation of the unit, may be caused by:</p> <ul style="list-style-type: none"> <li>A. Evaporator surface frosting</li> <li>B. Presence of oil in the cooling system</li> <li>C. Feeding too much cooling agent to the evaporator through the expansion valve</li> <li>D. Damage to the maximum pressure switch</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;">A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	A			
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17	<p>The increase of condensation pressure in the cooling system may be caused by:</p> <ul style="list-style-type: none"> <li>A. Too high condenser cooling water flow rate</li> <li>B. Contamination of the condenser surface</li> <li>C. Compressor operating valves leakage</li> <li>D. Passing of too much cooling agent through the thermostatic expansion valve</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td style="text-align: center;">B</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		B		
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18	<p>Depending on the diameter of the evaporator exhaust line, the sensor of the thermostatic expansion valve shall be mounted in the following clockwise position:</p> <ul style="list-style-type: none"> <li>A. Between 15:00 and 16:00</li> <li>B. Between 13:00 and 15:00</li> <li>C. Between 15:00 and 18:00</li> <li>D. Between 16:00 and 19:00</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td style="text-align: center;">B</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		B		
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19.	<p>Thermostatic expansion valve's task is:</p> <ul style="list-style-type: none"> <li>A. Maintaining constant evaporation pressure</li> <li>B. Maintaining a constant temperature in the cooled environment</li> <li>C. Delivering the liquid cooling agent to the evaporator in the quantity corresponding to its instantaneous heat load</li> <li>D. Maintaining a constant pressure differential in the system</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td style="text-align: center;">C</td></tr> <tr><td> </td></tr> </table>			C	
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20.	<p>Excessive superheating of the cooling agent at the evaporator outlet can be caused by:</p> <ul style="list-style-type: none"> <li>A. Contaminated mechanical filter of the expansion valve</li> <li>B. Too high quantity of cooling agent in the system</li> <li>C. Drops of water that have frozen on the expansion valve, immobilizing it in open position</li> <li>D. Expansion valve leak</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;">A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	A			
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21.	<p>The compressor suction line frosting indicates:</p> <ul style="list-style-type: none"> <li>A. Incorrect operation of the compressor</li> <li>B. Damage to the low pressure switch</li> <li>C. Incorrect operation of the expansion valve</li> <li>D. Damage to the differential pressure switch</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td style="text-align: center;">C</td></tr> <tr><td> </td></tr> </table>			C	
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22.	<p>Vapour bubbles observed in the sight glass indicate:</p> <ul style="list-style-type: none"> <li>A. Humidification of the installation</li> <li>B. Insufficient filling of the system with cooling agent</li> <li>C. Air block of the installation</li> <li>D. Contamination of the installation with oil</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%; text-align: center;">B</div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> </div>	
23.	<p>The oil separator is usually installed:</p> <ul style="list-style-type: none"> <li>A. On the compressor discharge line</li> <li>B. On the compressor suction line</li> <li>C. After the condenser</li> <li>D. After the expansion valve</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="border: 1px solid black; height: 15px; width: 100%; text-align: center;">A</div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> </div>	
24.	<p>The cooling agent vapours separator shall be mounted:</p> <ul style="list-style-type: none"> <li>A. On the compressor discharge line</li> <li>B. On the compressor suction line</li> <li>C. After the condenser</li> <li>D. After the expansion valve</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%; text-align: center;">B</div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> </div>	
25.	<p>The cause of differential pressure switch activation is:</p> <ul style="list-style-type: none"> <li>A. No or too little oil in the compressor</li> <li>B. Compressor discharge valves leaking</li> <li>C. Suction of liquid cooling agent by the compressor</li> <li>D. Too little cooling agent in the installation</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="border: 1px solid black; height: 15px; width: 100%; text-align: center;">A</div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> </div>	
26.	<p>The reason for too short operating cycles of the pump-motor unit may be:</p> <ul style="list-style-type: none"> <li>A. Incorrect adjustment of the low pressure switch</li> <li>B. Expansion valve incorrectly adjusted</li> <li>C. Excessive filling of the system with a cooling agent</li> <li>D. Air block of the cooling installation</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="border: 1px solid black; height: 15px; width: 100%; text-align: center;">A</div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> </div>	
27.	<p>In subtropical climates, the temperature difference between the outdoor environment and the air-conditioned space shall be:</p> <ul style="list-style-type: none"> <li>A. 15K</li> <li>B. 12K</li> <li>C. 10K</li> <li>D. 6K</li> </ul>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%;"></div> <div style="border: 1px solid black; height: 15px; width: 100%; text-align: center;">D</div> </div>	

28.	<p>The lowering of air output in the ship's air-conditioning unit may be caused by:</p> <ul style="list-style-type: none"> <li>A. Excessive contamination of the filter mat</li> <li>B. Too high supply air temperature</li> <li>C. Closing of the air damper</li> <li>D. Fan shutdown</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="text-align: center;">A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	A			
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29.	<p>Defrosting with hot gas is based on:</p> <ul style="list-style-type: none"> <li>A. Spraying of hot steam onto the evaporator surface</li> <li>B. Injection of hot steam into an evaporator</li> <li>C. Injecting of hot cooling agent gas into the evaporator</li> <li>D. Spraying of hot saline on the surface of the evaporator</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td style="text-align: center;">C</td></tr> <tr><td> </td></tr> </table>			C	
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30.	<p>The moistened litmus test, when exposed to ammonia, becomes coloured on:</p> <ul style="list-style-type: none"> <li>A. Blue</li> <li>B. Red</li> <li>C. White</li> <li>D. Green</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td style="text-align: center;">B</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		B		
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31	<p>The pressure relief valve's function is:</p> <ul style="list-style-type: none"> <li>A. Maintaining a constant air temperature in the chamber</li> <li>B. Maintaining a constant evaporation pressure regardless of the evaporator's instantaneous load</li> <li>C. Delivering to the evaporator liquid cooling agent in a quantity corresponding to its instantaneous heat load</li> <li>D. Maintaining a constant pressure differential in the installation</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td style="text-align: center;">B</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		B		
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32.	<p>The operating pressure of the 2.5 bar compressor and the difference of 1.2 bar was read out on the scale of the low pressure switch. At what pressure the pressure switch shuts down the compressor:</p> <ul style="list-style-type: none"> <li>A. 1,2 bar</li> <li>B. 1,3 bar</li> <li>C. 1,5 bar</li> <li>D. 1,7 bar</li> </ul>	<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td></tr> <tr><td style="text-align: center;">B</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		B		
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33.	<p>The operating pressure of the 2.5 bar compressor and the difference of 0.7 bar was read out on the scale of the low pressure switch. At what pressure the pressure switch shuts down the compressor:</p> <p>A. 1,9 bar  B. 1,2 bar  C. 2,0 bar  D. 1,5 bar</p>	<table border="1"> <tr><td>A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	A			
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34	<p>How much does the cooling agent overheat if the temperature in the evaporator is equal to -10°C and the temperature of the pipe at the point of installation of the thermostatic expansion valve is -3°C:</p> <p>A. 13K  B. 3K  C. 7K  D. 10K</p>	<table border="1"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>C</td></tr> <tr><td> </td></tr> </table>			C	
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35	<p>A situation where the evaporator is unevenly frosted indicates a malfunction of the expansion valve caused by:</p> <p>A. Incorrectly adjusted valve - excessive overheating  B. Incorrectly adjusted valve - too little overheating  C. The sensor of the thermostatic expansion valve does not fit the suction pipe over its entire length.  D. Drops of water which have frozen on the expansion valve, immobilising it in open position</p>	<table border="1"> <tr><td>A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	A			
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36	<p>The constant pressure valve has the task of:</p> <p>A. Maintaining a constant evaporator pressure  B. Maintaining a constant air temperature in the chamber, irrespective of the momentary heat load  C. Preventing the evaporator pressure from dropping below the preset value  D. Preventing the evaporator pressure from rising above a preset value</p>	<table border="1"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>C</td></tr> <tr><td> </td></tr> </table>			C	
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37	<p>Filling the installation with cooling agent can be realised:</p> <ul style="list-style-type: none"> <li>A. Supplying the compressor discharge side with a cooling agent steam</li> <li>B. Supplying the compressor suction side with a cooling agent steam</li> <li>C. Supplying the compressor suction side with a cooling agent liquid</li> <li>D. Supplying the condenser with a cooling agent steam</li> </ul>	<table border="1" style="width: 100%; height: 100%; text-align: center;"> <tr><td> </td></tr> <tr><td>B</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		B		
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38	<p>The task of the liquid separator is to:</p> <ul style="list-style-type: none"> <li>A. Separation of the liquid and gaseous cooling agent phases</li> <li>B. Dehumidification of the cooling agent</li> <li>C. Separation of air from liquid cooling agent</li> <li>D. Separation of oil from liquid cooling agent</li> </ul>	<table border="1" style="width: 100%; height: 100%; text-align: center;"> <tr><td>A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	A			
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39	<p>Cooling agent pumps shall be used:</p> <ul style="list-style-type: none"> <li>A. In pump systems for cooling equipment for supplying evaporators</li> <li>B. In pressure systems for cooling equipment for supplying evaporators</li> <li>C. In pump systems for cooling equipment for supplying condensers</li> <li>D. In pressurised cooling equipment for supplying condensers</li> </ul>	<table border="1" style="width: 100%; height: 100%; text-align: center;"> <tr><td>A</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	A			
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40	<p>Continuous capacity control of the reciprocating compressor can be achieved by:</p> <ul style="list-style-type: none"> <li>A. Switching off individual cylinders from operation</li> <li>B. Use of multi-speed motors</li> <li>C. Use of automatic relief valves</li> <li>D. Throttling of the suctioned cooling agent steam in a special valve</li> </ul>	<table border="1" style="width: 100%; height: 100%; text-align: center;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>D</td></tr> </table>				D
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41	<p>The reason for the high air temperature at the outlet of the air-conditioning unit may be caused by:</p> <ul style="list-style-type: none"><li>A. Air cooler oil contamination</li><li>B. Excessive soiling of the filter mat</li><li>C. Excessive airflow</li><li>D. Fan damage</li></ul>	<table border="1"><tr><td data-bbox="1899 244 1995 279">A</td></tr><tr><td data-bbox="1899 279 1995 314"> </td></tr><tr><td data-bbox="1899 314 1995 349"> </td></tr><tr><td data-bbox="1899 349 1995 384"> </td></tr></table>	A			
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