

Time: 03 Hours

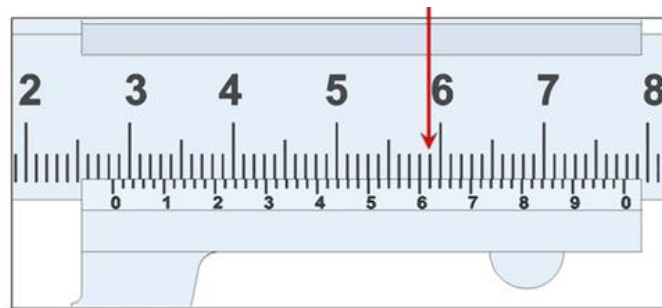
Instructions for the Candidates

- This Question Paper Comprises of 2 sections as Part 1 & 2
- This paper consists of Multiple Choice Questions (MCQ) and short answer questions
- Choose the most suitable answer from the given four answers of each questions in Part 1 and mark as “X” in the appropriate places of the answer sheet
- Answer all questions in Part 2
- This question paper consists of 13 pages

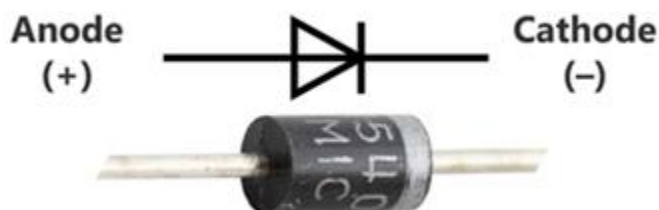
Part - 1

1. Following is the measurement taken from a Vernier Caliper. What is the value of it?

Coincidental Value



- a. 25.64 mm b. 28.64 mm c. 25.32 mm d. 28.32 mm
2. The purpose of below accessory used in an electric circuit is,



- a. To stop the flow of the electric current
- b. To reduce the Voltage
- c. To help the electric current to flow in one direction
- d. To reduce the frequency

3. The initial activity to be done, after the completion of preparation of estimate for some work is,
 - a. To request for an advance
 - b. To commence the work as soon as possible
 - c. To commence the procurement of raw materials
 - d. To get the approval of the customer
4. The purpose of installing a “U” type terminal to the Drainage Water pipe of the Air Conditioning Unit is,
 - a. To make the water flow out gradually
 - b. To prevent the breeding of mosquitoes
 - c. To prevent the mixing of impure material across water
 - d. To prevent the mixing of impure air across the pipelines
5. On which of the following occasions refrigerant passes exceedingly across the Heat Static Expansion Valve
 - a. The reduction of the value of superheat in the evaporator
 - b. The reduction of sub coolant in the liquefier
 - c. The increase of the value of superheat in the evaporator
 - d. The increase of sub coolant in the liquefier
6. Following is the name plate of an Electrical Motor. The bearing number of the Motor is,

3~MOT MG 90SA2-24FF165-C2			
50 Hz	P ₂ 1,50 kW	No85807906	
	U 220-240D/380-415Y		V
Eff. % 82	I _{1/1} 5.90/3.40	A	
	I _{max} 6.50/3.75	A	
n 2860-2890 min ⁻¹		cosφ 0.85-0.79	
CL F	IP 55	0346	
DE 6305.2Z.C4 NDE 6205.2Z.C3			
<div><div><div>EFF 2</div></div><div><div>CE</div><div>GRUNDFOS</div><div>Made in Hungary</div></div></div>			

- a. 2860
 - b. 2890
 - c. 6305
 - d. 6205
7. When charging refrigerant to a new refrigerator the accessory that is needed to be installed is
 - a. Evaporator
 - b. Suction Accumulator
 - c. Filter
 - d. Capillary Tube

8. The reason for extensively using copper tubes within the refrigeration and air conditioning unit is
 - a. It is a good thermal insulator
 - b. It is a good thermal conductor
 - c. It is not easier to shape
 - d. Comparatively cheaper

9. In a central air conditioning unit, the temperature of the Chilled water is Celsius 6^0 . How much is the Fahrenheit equivalent of it ?
 - a. 35.3
 - b. 38.0
 - c. 42.8
 - d. 50

10. Which one is the chemical formula for Refrigerant R-22 from the following?
 - a. CCL_2F_2
 - b. CHCLF_2
 - c. CCLF_3
 - d. CHCL_3

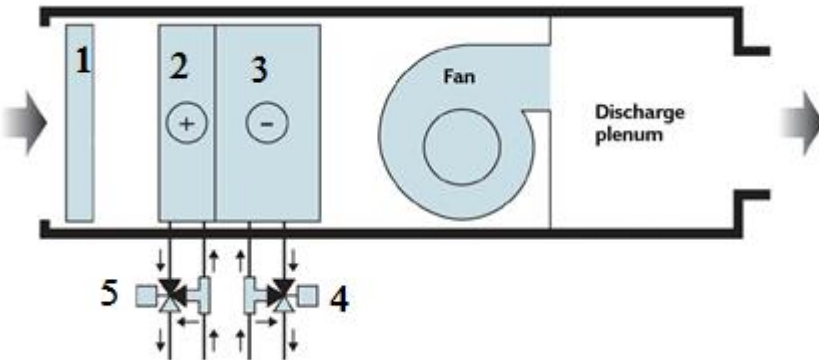
11. The technique to be used to make the refrigerant of a refrigerator to function the sub coolant better
 - a. Install an electric fan to the evaporator
 - b. Arrange the suction tube and the capillary tube to have contact with each other
 - c. Arrange the suction tube and the capillary tube not to have contact with each other
 - d. Connect the liquefier to the body of the Refrigerator

12. The condition of the refrigerant when it flow through from Liquid storage to the expansion valve is
 - a. Stays as vapor in superheated stage
 - b. Thermal is low, in superheated stage
 - c. Thermal High in sub coolant stage
 - d. Stays as saturated vapor

13. When preparing an estimate the method to calculate the amount of profit to the organization is,
 - a. To pay Government Taxes
 - b. To cover the machinery expenses
 - c. According the total amount
 - d. To cover the expenses of raw materials

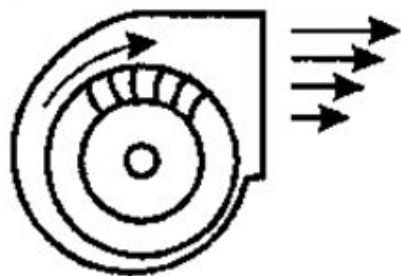
14. Which one is the the correct start-up order of a Central Air Conditioning Unit is ,
 - a. Compressor - Cooling Tower - liquefier Pump - Cooling water Pump
 - b. Compressor - liquefier Pump - Cooling water Pump - Cooling Tower
 - c. liquefier Pump - Cooling water Pump - Compressor - Cooling Tower
 - d. Cooling Tower - liquefier Pump - Cooling water Pump - Compressor

16. The following is a diagram of an Air Handling Unit. What is indicated in this equipment as *No. 5*



17. When an Air Conditioner is operated, the compressor which also operates simultaneously, the power supply is disconnected due to a trip switch. The reason for this occurrence is,
 - a. The burnt out of the primary coil of the compressor
 - b. Refrigerant is not available
 - c. The running coil of the compressor is burnt
 - d. The compressor coil lying underground
18. When the Micro farad 35 and Microfarad 15 capacitors are connected in a series, the equivalent capacity gained is
 - a. Micro Farad 35
 - b. Micro Farad 15
 - c. Micro Farad 50
 - d. Micro Farad 10.5
19. When the Micro farad 30 and Microfarad 15 capacitors are connected in a series, the equivalent capacity gained is
 - a. Micro Farad 10
 - b. Micro Farad 15
 - c. Micro Farad 45
 - d. Micro Farad 50

20. Name the type of Blower Wheel as shown below,



- a. Radial Blade b. Backward Inclined c. Backward Curved d. Forward Curved

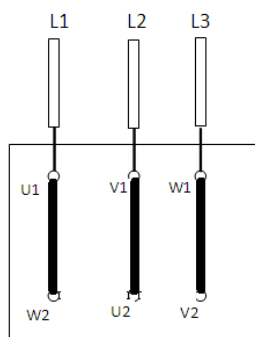
21. When three resistors 10Ω , 20Ω and 40Ω are connected in parallel what is the equivalent resistor is gained

- a. 2.8Ω b. 5.7Ω c. 70Ω d. 40Ω

22. When connecting a $2760W$ powered Room Refrigeration unit to a $230V$ power supply the current that obtained is,

- a. $6.0A$ b. $8.0A$ c. $10A$ d. $12A$

23.



When Three Phase power supply of the above mentioned L1, L2, and L3 is given to U1, V1 and W1 terminals, it functions as -

- a. Functions in a star manner.
b. Functions in a Delta manner.
c. Initially in a star manner and subsequently in a Delta manner
d. Initially in a Delta manner and subsequently in a Star manner

24. The terminals of power supply of a compressor are A, B and C. When measuring them the results were $AB = 100\Omega$, $AC = 50\Omega$, $BC = 150\Omega$. The common terminal of them is,

- a. A b. B c. C d. Data insufficient

25. When three resistors 5Ω , 10Ω and 20Ω are connected in parallel what is the equivalent resistor is gained

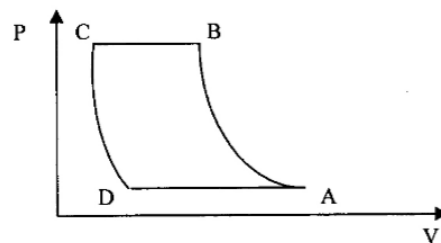
- a. 2.8Ω b. 5Ω c. 35Ω d. 10Ω

26. The frequency of domestic electrical supply in Sri Lanka is
 a. 50 Hertz b. 60 Hertz c. 75 Hertz d. 90 Hertz

27. When the Air Filter of an Air Conditioner is blocked,
 a. Ice forms in the exhaust pipe
 b. Ice forms in the liquid pipe
 c. Ice forms in the in evaporator
 d. Ice forms in the liquefier

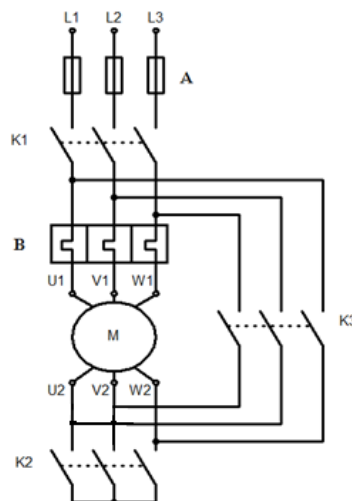
28. The boiling point of water as indicated in Fahrenheit is
 a. 100°F b. 32°F c. 212°F d. 460°F

29. The below drawing shows the activity of a piston type compressor as positioned in a pressure capacity graph. CD indicates,



a. air expansion b. air suction c. air pressure d. air exhaust

30. The follow diagram shows the electrical circuit of an electric equipment of a Central Air Conditioning System.



What is indicated by **B**

a. Delta Contactor b. Star contactor
 b. Thermal Overload d. Main Breaker

(1 x 30 = 30 Marks)

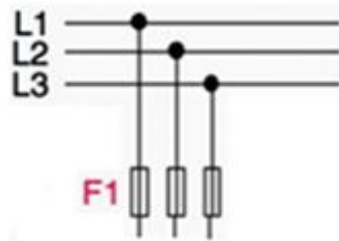
Part 2

Please answer All questions.

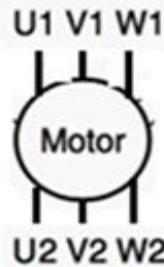
1. It took six hours for two technicians to fix a BTU 18000 Split type Air Conditioner from a room to another room. The location of this work for an organization which was situated 4 km away which spent Rs. 50 per Km. from a source to transport workers for this work. Rs. 7500.00 was spent on raw materials for this job. The organization paid Rs. 300.00 per worker as salary while it gained 20% profit from every service it made and the VAT it paid to the government also recovered from the consumers. Please prepare an estimate for the entire job considering the details accordingly. Please use only the data given.

(10 Marks)

2. Following is an accessory required for the Forward Reverse Motor Control Circuit. In order to operate the motor smoothly, draw the required Three Phase Power Circuit in this same diagram. (05 Marks)

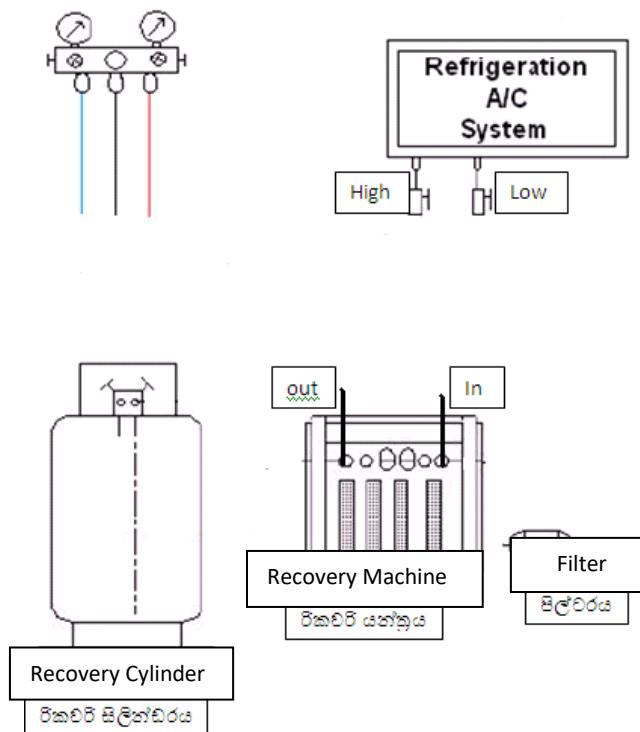


K1 = Main contactor
K2 = Reverse contactor
K3 = Forward contactor
F2 = Thermal overload
F1 = Fuse



- 3.
- What is the harm caused to the environment by using refrigerant belongs to the R-134a group. (02 Marks)

- b. Draw in the following diagram, the manner on how to connect the pipes to recover refrigerant from the refrigerant system by the Recovery Machine and other equipment as shown below. (03 Marks)

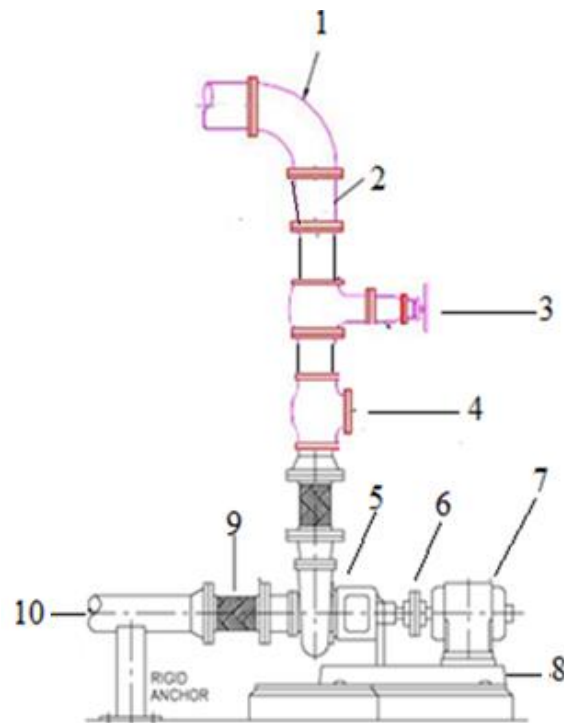


4. Complete the table with reference to the refrigerant as shown in the chart. (15 Marks)

	Refrigerant	Component Group	Chemical Formula	Boiling Point of the standard atmospheric pressure
01	R-12			
02	R-22			
03	R-134a			
04	R-600a			
05	R-410a			

5. Following is the diagram of a Central Air Conditioning unit and the components of a water pump attached to it. Name the parts of components as indicated in the drawing from 1 - 10 in the following table.

(05 Marks)








- | | |
|----|-----|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |
| 9. | 10. |

6. In a certain Water Cooler containing 100 kg of water with 25°C of heat the temperature was reduced up to 10°C temperature. What is the amount of heat that was evaporated from the water? (The Specific gravity of the water is 4.2 kJ/kgK)

(05 Marks)

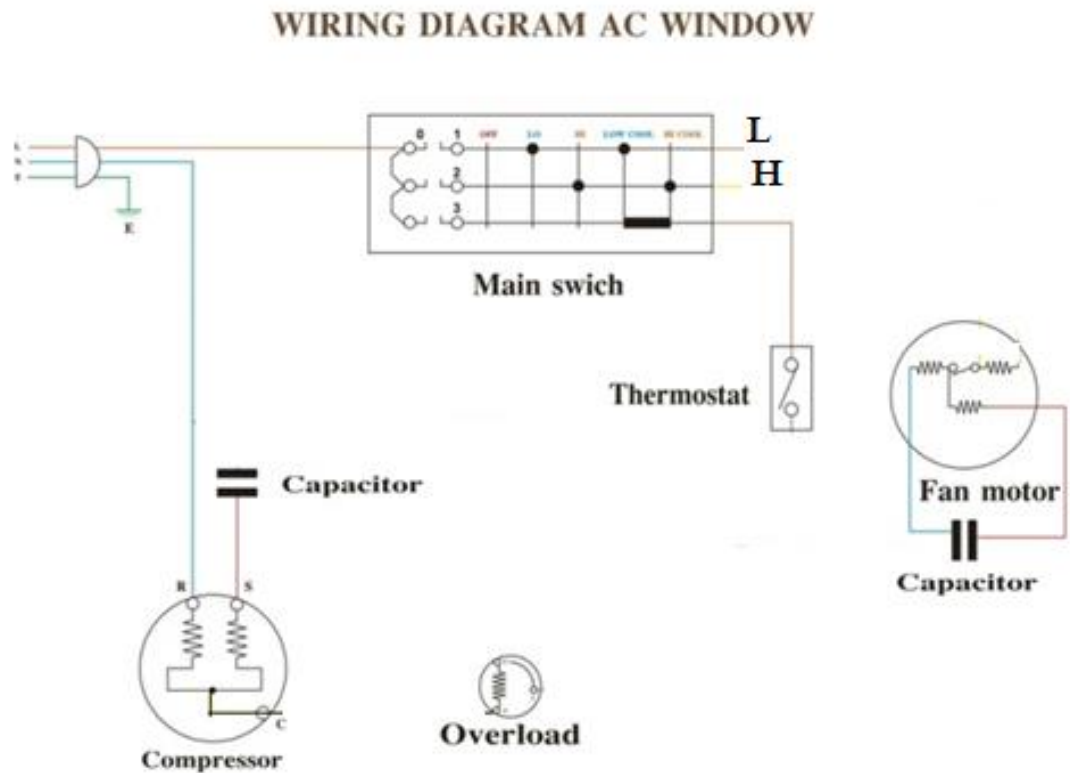
7. Following is the list of equipment used in Refrigeration and Air Conditioning. Name them accordingly in the following table as they appear.
(10 Marks)

1	2	3	4	5
				

No.	Name of the Equipment	Function of the equipment in the system
1		
2		
3		
4		
5		

8. Following is an incomplete circuit diagram of a Window type Air conditioner. Please complete the diagram accordingly.

(05 Marks)



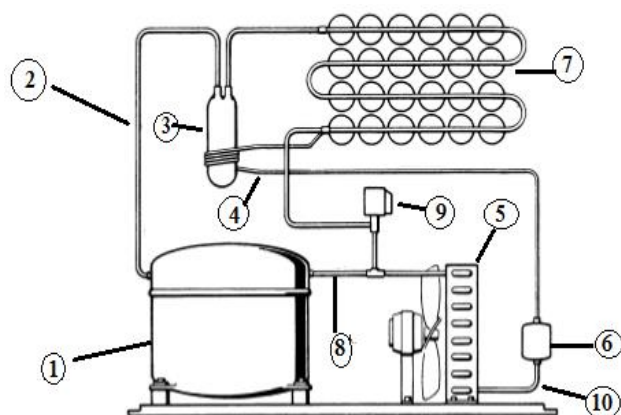
9. Name 5 types of metering devices as you aware used in the Refrigeration and Air Conditioning sector.

(05 Marks)

- 1.
- 2.
- 3.
- 4.
- 5.

10. Following is the drawing of the Refrigerant cycle of an Ice Cube Machine. Name the parts as indicated from 1 - 10

(05 Marks)



- | | |
|--------|---------|
| 1..... | 2..... |
| 3..... | 4..... |
| 5..... | 6..... |
| 7..... | 8..... |
| 9..... | 10..... |