

# CHARACTERISTICS OF R134A R410A CASCADE HEAT PUMP AND

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**What are the characteristics of R134a refrigerant?** Its chemical formula is  $\text{C}_2\text{H}_2\text{F}_6$ , and it can also be called 1,1,1,2-tetrafluoromethane or simply tetrafluoromethane. It's nontoxic, nonflammable, and non-corrosive. R134a has become one of the most widely used refrigerants globally thanks to its versatility across applications.

**What is the difference between R134a and R410A refrigerant?** The R-410A system operates more efficiently, reducing wear and tear on the compressor. R134a refrigerant is commonly used in various cooling and air conditioning applications. It was originally developed to replace R12 in car AC systems. It has also been used to replace refrigerants R12 and R500 in coolers.

**How a heat pump using refrigerant 134a heats a house?** A heat pump using refrigerant-134a heats a house by using underground water at 8 °C as the heat source. The house is losing heat at a rate of 60000 kJ/hr. The refrigerant enters the compressor at 280 kPa and 0 °C and it leaves at 1 MPa and 60 °C.

**How does a cascade heat pump work?** A cascaded heat pump system allows more than one heat pump unit to work together to meet a property's heating and hot water needs. Separate heat pump units can be designed to operate at the same time for different tasks (eg one for heating, another for hot water).

**What is R-410A refrigerant?** R-410A is often referred to as Puron, the main brand name associated with this type of refrigerant. It is a hydro-fluorocarbon (HFC) which does not hurt the ozone layer. Therefore, it is approved for new residential air conditioners and is on its way to becoming the standard in the U.S. by 2015.

**Why is R134a being phased out?** The Intergovernmental Panel on Climate Change has since added R-134A to its list of greenhouse gases, declaring definitively that this refrigerant is a poor choice for the future of the planet and its inhabitants. Under the European Union, R-134a phaseouts began in mid-2010 after deciding in 2006 to curtail its use.

**How can you tell the difference between R22 and R410A?** R-22 uses simple mineral oil, non-toxic, safe, stable, etc. while R-410a uses a somewhat exotic Poly o Ester (POE) oil typically found in jet turbine engines. The refrigerant used **MUST** match the oil present in the system, which is one reason why you can't replace the R-22 with R410a in a system.

**What is the advantage of R-32 or R410A?** Generally speaking, R-32 is more cost effective and can lower monthly energy bills. R-32 has a higher pressure ratio than R-410A. Basically, a higher pressure ratio means the refrigerant can cool more with less refrigerant, which also means less electricity is required for the system to cool your home.

**Is 410A refrigerant good or bad?** R-410A has an ODP of zero, but its Global Warming Potential is 1890, which is fairly high. For context, carbon dioxide's GWP is 1, and it's the standard by which other refrigerants are measured, meaning that R-410A contributes to global warming 1890 times as much as carbon dioxide.

**Can you use R134a in a heat pump?** Nowadays, the refrigerants R134a, R404a/R407a or R410A are widely used in the industrial refrigeration chillers and heat pump market.

**Can a heat pump cool a house as well as an air conditioner?** Does a heat pump work as an air conditioner? The short answer is yes, they do, and we'll get into the details below.

**Which refrigerant for heat pump?** Today, a mixture of chemicals referred to as R-410A is one of the most widely used refrigerants in heat pumps. In addition to being slightly less harmful for the ozone layer, R-410A has a lower boiling point than R-22, meaning it can absorb more heat at lower temperatures, boosting efficiency in the cold.

**What is a cascade pump?** The word “cascade” can mean a couple of different arrangements of heat pumps. 1) A series of heat pumps joined together to produce a great amount of heat. E.g. 4x 50KW for 200KW. This arrangement is also known as multiplex. 2) A series of heat pumps stacked together where one supplies the next etc.

**How does a cascade air system work?** In a cascade storage system, several large cylinders are used to bring a small cylinder up to the desired pressure, by always using the supply cylinder with the lowest usable pressure first, then the cylinder with the next lowest pressure, and so on.

**What is a cascade system HVAC?** Cascade Systems A cascade system uses one refrigerant to condense the other primary refrigerant that is operating at the desired evaporator temperature. This approach is usually used for temperature levels less than 78°F, when light hydrocarbon gases or other low boiling gases and vapors are being cooled.

**What are the technical specifications of R134a refrigerant?**

**What is the classification of R134a refrigerant?** R134a is a very safe refrigerant with an ASHRAE safety classification of A1. It is not flammable and has very low toxicity levels. Classified as A1, R134a has no flammability issues or whatsoever. R134a is not toxic, however like all refrigerants it does displace oxygen in a confined space.

**Why is 134a not used in residential?** HFC-134a: a Potent Greenhouse Gas It is the most abundant HFC in the atmosphere. The restriction of HFC-134a will occur under a broader prohibition of any substances with a Global Warming Potential (GWP) higher than 150 in the MVAC sector. HFC-134a will no longer be allowed in nonroad vehicles as of January 1, 2028.

**What are the disadvantages of R134a?** R-134a is a potent greenhouse gas with a GWP (global warming potential) value of 1,430. In other words, the greenhouse effect of the R-134a refrigerant is 1,430 times the 100-year warming potential of the same volume of carbon dioxide.

**How to write a research proposal in computer science?**

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**How do you write a computer science research paper?**

**What is the best topic for research paper in computer science?** Hot topics include 1) Data Warehousing, 2) Internet of Things (IoT), 3) Big data, 4) cloud computing, 5) semantic web, 6) MANET, 7) machine learning, 8) Artificial Intelligence, 9) data mining, 10) image processing, 11) bioinformatics, 12) quantum computing, and so on.

**Where can I find computer science research papers?**

**What is the structure of a CS research paper?** An abstract, introduction, literature review, methods, results, conclusion, and references are typical components of a research paper. Learning this structure is critical, so devote some effort to comprehending each of these sections.

**What are the 7 parts of a research proposal?**

**How do I start CS research?**

**How do you write a paper in CSE style?**

**How do you choose a research topic in computer science?**

**What are the top 5 hot topics in computer science?**

**What are the hardest topics in computer science?**

**Which topic is best for a thesis for computer science?**

**How do you start a computer science research paper?**

**Which country is best for computer science research?**

**Which field is best for research in computer science?**

**How do you format a CSE research paper?**

**What is a CS thesis?** Complete a Master's thesis: A thesis is the written result of a systematic study of a significant Computer Science problem.

**What format are computer science papers written in?** The IEEE referencing style is used in computing science. The IEEE style is a numeric system, where citations are numbered in your text within square brackets e.g. [1]. The citation in your text corresponds to a full reference in the list of references at the end of your work.

**What are the 5 elements of a good research proposal?**

**What are the 10 research titles for students?**

**How to write a good research proposal?**

**What are the 5 steps of writing a research proposal?**

**How do you start writing a research proposal?**

**How do you write a computer project proposal?**

**What is the format for a research proposal?** The format of a research proposal varies between fields and levels of study but most proposals should contain at least these elements: introduction, literature review, research design and reference list. Generally, research proposals can range from 500-1500 words or one to a few pages long.

**What are HVAC system interview questions?**

**What are the five general guidelines you need to follow as an HVAC technician?**

**What is basic HVAC knowledge?** The HVAC basics encompass the furnace, the air conditioner, and the ductwork that connects them throughout your home. While most people think of the HVAC fundamentals as heating or cooling, the ventilation component is essential. Your HVAC equipment forms a closed system.

**What is HVAC basic principle?** HVAC principles are based on thermodynamics, fluid mechanics, and heat transfer. Hence, it converts the outdoor air conditions according to the indoor state for the people's comfort.

**How to pass a HVAC interview?**

**What is Btu in AC?** BTU is an acronym that stands for British Thermal Unit, a measurement of how much energy an air conditioner uses to remove heat from indoor air. BTU typically shows how much heat an air conditioner can remove within one hour.

**What is HVAC checklist?** Preventive Maintenance Checklist for Your HVAC System Clean coils and condensers. Replace all of your unit's filters. Check the outside unit, clear any debris, and ensure the cabinet door is closed. Check the cabinet for leaks. To ensure proper airflow, clear any clogs in the drain lines.

**What are HVAC skills?** HVAC skills are talents and abilities that help someone working in the heating, ventilation and air conditioning (HVAC) industry perform common tasks effectively. These may include a combination of soft and technical skills that HVAC professionals use when performing their daily responsibilities.

**What are four areas that need to be checked during start up HVAC?**

**What is HVAC terminology?** HVAC (heating, ventilation, and air conditioning) is the technology of indoor and vehicular environmental comfort. Its goal is to provide thermal comfort and acceptable indoor air quality. Hydrocarbon refrigerant (HC) A family of chemicals containing only carbon & hydrogen that are suitable for use as a refrigerant.

**What is the basic theory of HVAC?** The heating and cooling systems in HVAC work on a principle: heat transfers from a warmer object to a cooler object. During the winter, a thermostat, which is a regulating device, uses fuels like oil, gas, or electricity to produce heat.

**How to calculate HVAC system?** HVAC Load Calculation Example To calculate the estimated HVAC load for a house with 2,500 square feet, 12 windows, and 3 exterior doors occupied by 4 people, simply plug it into this formula:  $2,500 \times 25 = 62,500$  base BTU.  $4 \text{ people} \times 400 = 1,600$ .  $12 \text{ windows} \times 1,000 = 12,000$ .

**What is on the thermostat?** The top number shows the current "set" temperature, or what your thermostat has been set to by you or someone else (such as an automatic setting). The bottom number indicates the actual room's ambient air temperature. To change your heating and cooling settings, use the arrows on the

CHARACTERISTICS OF R134A R410A CASCADE HEAT PUMP AND

display.

**What are the three components of HVAC?** HVAC stands for heating, ventilation, and air conditioning. Air conditioners, heaters, furnaces, and thermostats are all considered part of your HVAC system.

**What is HVAC explained simply?** What Does HVAC Stand For ? HVAC stands for heating, ventilation, and air conditioning. It refers to the systems that regulate and move heated and cooled air throughout residential and commercial buildings, from homes to offices to indoor stadiums.

**What are some HVAC interview questions?**

**Why should we hire you?** A: When answering, focus on your relevant skills, experience, and achievements that make you the best fit for the role. You should hire me because I am a hard worker who wants to help your company succeed. I have the skills and experience needed for the job, and I am eager to learn and grow with your team .

**How to crack HVAC interview?** It's important to be honest about what you know, what you're capable of, and what you feel confident to execute. Remember, you can always learn more on the job. If you show you're a good fit for the team and that you're committed to learning, companies will invest in you even if you have less experience.

**What is CFM in AC?** Cubic feet per minute (CFM) measures the volume of air that flows through a space in a minute. In HVAC, CFM airflow is important.

**How to calculate AC unit size?**

**What happens if BTU is too high?** If your air conditioner has a bigger BTU rating than the room size needs, it will cycle off too quickly, waste energy, and will not adequately dehumidify the space. So a higher BTU than needed is definitely not recommended.

**What does PM mean in HVAC?** Preventive maintenance on your HVAC system will not only ensure that the equipment is operating at maximum efficiency but it will also extend the life of that equipment.

## **How to do ppm of HVAC system?**

**How many cfm per ton heat pump?** Heat pumps can have problems with low airflow, leaky ducts, and incorrect refrigerant charge. There should be about 400 to 500 cubic feet per minute (cfm) airflow for each ton of the heat pump's air-conditioning capacity. Efficiency and performance deteriorate if airflow is much less than 350 cfm per ton.

## **What are the main points of HVAC?**

**Why are HVAC techs important?** The duties HVAC technicians perform are important because help maximizes efficiency of HVAC equipment, which ensures the optimal function of such systems throughout their respective buildings.

**What is HVAC role and responsibilities?** HVAC Technician responsibilities: Installing, maintaining, and repairing ventilation and air conditioning systems and equipment. Identifying maintenance risks on equipment. Diagnosing electrical and mechanical faults for HVAC systems. Cleaning, adjusting, and repairing systems, and performing warranty services.

## **What three 3 components are present in an HVAC system?**

**What is the basic concept of HVAC system?** HVAC is an acronym that stands for Heating, Ventilation, and Air Conditioning. A residential HVAC system is a complete home comfort system that can heat and cool your home, as well as provide improved indoor air quality and humidity control. There are many different types of HVAC systems.

**What is HVAC checklist?** Preventive Maintenance Checklist for Your HVAC System Clean coils and condensers. Replace all of your unit's filters. Check the outside unit, clear any debris, and ensure the cabinet door is closed. Check the cabinet for leaks. To ensure proper airflow, clear any clogs in the drain lines.

**What are the three main function of HVAC?** Heating, Ventilation and Air-Conditioning Systems, Part of Indoor Air Quality Design Tools for Schools. The main purposes of a Heating, Ventilation and Air-Conditioning (HVAC) system are to help maintain good indoor air quality (IAQ) through adequate ventilation with filtration and



provide thermal comfort.

**What part of HVAC blows air?** The blower motor sucks air into the furnace and blows the air over the outside walls of the heat exchanger. The air heats up quickly and circulates back into the home through the supply registers.

**What are the two main types of HVAC systems?** Each type of HVAC system falls into one of two categories: ducted or ductless. In a ducted system, the main unit pushes air through a series of air ducts to cool or heat a building. Ductless systems, on the other hand, lack air ducts and use alternative methods to distribute treated air throughout a space.

**What are the two major appliances of an HVAC system?** Traditional Split System: This system is split into two main parts for heating and cooling: a combustion furnace and an external AC unit.

**What is the basic theory of HVAC?** The heating and cooling systems in HVAC work on a principle: heat transfers from a warmer object to a cooler object. During the winter, a thermostat, which is a regulating device, uses fuels like oil, gas, or electricity to produce heat.

**Why is it called HVAC?** Defined: HVAC stands for Heating, Ventilation, and Air Conditioning. HVAC refers to the different systems used for moving air between indoor and outdoor areas, along with heating and cooling both residential and commercial buildings.

**What is the basic knowledge of HVAC?** An HVAC system works in principle by using the refrigerant to move heat from one part of the home to the outside atmosphere. This is the case in summers. For winters, the process is reversed, and the heat is extracted from the outside, and transferred indoors, to provide heating.

**What does PM mean in HVAC?** Preventive maintenance on your HVAC system will not only ensure that the equipment is operating at maximum efficiency but it will also extend the life of that equipment.

**How many cfm per ton heat pump?** Heat pumps can have problems with low airflow, leaky ducts, and incorrect refrigerant charge. There should be about 400 to 500 cubic feet per minute (cfm) airflow for each ton of the heat pump's air-

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conditioning capacity. Efficiency and performance deteriorate if airflow is much less than 350 cfm per ton.

### **How to do ppm of HVAC system?**

**What is the main duct in HVAC?** The main supply duct, known as the trunk, carries a high volume of air and is usually comprised of rectangular-shaped sheet metal ducts. Similarly, the return ducts that convey an equal volume of air back to the central unit are also usually rectangular sheet metal.

**What is the name of duct insulation?** Fiberglass insulation is the most common type of air duct insulation on the market. R-values range from R-4 to R-11 for ductwork. Fiberglass insulation comes in two distinct formats: flexible and rigid. Flexible fiberglass insulation for air ducts wraps around ductwork.

**What is the main unit of the HVAC system?** In most traditional HVAC systems, the main unit is usually the furnace or the air conditioner. But, in modern devices, a heat pump is what does all the work. It works to either heat or cool the air getting into your house. The heat pump works both as the furnace and the air conditioner.

**What is the passing score for the GAT general exam?** In the case of GAT Subject test ( <http://www.nts.org.pk/GAT/GATSubject.asp>) a minimum of 60% marks is required to pass the test.

**What type of questions are asked in the GAT test?** ? The Graduate Admission Test (GAT) is composed of three sections: Verbal Reasoning, (60 questions), Quantitative Reasoning (40 questions) and Analytical Reasoning (25 questions).

**How do I prepare for the GAT test?** Focus on enhancing your analytical and critical thinking skills, which are critical to GAT test preparation. Practice analysing data, interpreting maps, and drawing logical conclusions from diverse sources. This ability is especially valuable for the initial two sections of the GAT.

**What is the difference between NTS and GAT exams?** NAT is aimed at students seeking admission to colleges and universities, whereas GAT is aimed at graduates seeking admission to postgraduate education.

**What is a good score in NTS?** A quick search reveals that two-thirds of students score between 85 and 115. Almost everyone scores along the spectrum from 70 to 140. A score of 100 is apparently considered average.

**What is a good score in the GAT?** The raw scores are out of 40 for written communication, 35 for mathematics, science and technology, and 35 for humanities, the arts and social sciences. Standardised scores are calculated using the same scale as Study Scores from 0 to 50 with a mean of 30 and with a standard deviation of 7.

**How hard is GAT?** The GAT paper was divided into two parts-English and General Knowledge. According to the NDA 2 exam analysis 2024 for GAT, the overall difficulty level of the paper was moderate. For the correct answer, candidates score four marks in GAT paper. 1.33 marks are deducted as a penalty for wrong answers.

**What are the tips for GAT?** Tips for GAT section A writing task: The way they give information to you is quite spread out, organise it before writing. You can break and categorise the information into chunks and order it following your own logic. Always choose creative writing if you can. The key is perspective.

**Is a calculator allowed in GAT General?** Never use a calculator while taking the GAT mock test or practicing any GAT questions. A lot of time when we are preparing for the NTS GAT, we tend to simply use a calculator for deriving the answer. Never do those – you will only do harm to yourself rather than benefit from it.

**How many questions are in NTS?** All NTS (NAT) tests conducted by COMSATS University Lahore Campus are of 100 marks despite having 90 questions. Final score will be based on the evaluation of all question attempted, totaling 100 marks.

**What is the GAT general format?** GAT General Test Pattern There are 4 different categories of GAT General, each of which comprises several disciplines. That is why GAT General test pattern differs in each of the 4 categories. Basically, GAT General covers three sections: Quantitative reasoning, Verbal reasoning, and Analytical reasoning.

**What is the highest score in GAT?** The GAT test is scored on a scale of 0-100. This is called the raw score.

**What is the passing marks for Gat general exam?** In the case of GAT Subject test ( <http://www.nts.org.pk/GAT/GATSubject.asp>) a minimum of 60% marks is required to pass the test.

**Is 60% a good score for an aptitude test?** If a perfect aptitude test score is 100% or 100 points, and your score is 80% or above, it is considered a good score. A minimum acceptable score is considered to be from 70% to 80%.

**Does NTS do negative marking?** answer the candidate will get 1 mark. (ii) There will be no negative marking.

**What happens if you don't do the GAT?** Student who do not sit the GAT will have it reported on their VCE certificate. To get an ATAR students must also do Section B of the GAT, and the results are reported as a standardised score out of 50, as with other externally assessed VCE studies.

**What is the main purpose of GAT?**

**Is the GAT multiple choice?** The multiple-choice questions cover numeracy and literacy (reading). Questions are based on a range of contexts including those you may encounter in daily life. Each part is allocated 45 minutes.

**What is the average score for GAT test?** GAT Standardized Score Calculation Method The standardized score are calculated and reported using the scale from 0 to 50 with a mean of 30 and a standard deviation of 7.

**What is the highest score in GAT?** The GAT test is scored on a scale of 0-100. This is called the raw score.

**What is the passing score for general knowledge?** For General Knowledge (GK) Essay, the passing score is at least 8 out of 12 points.

**What is the GAT scale?** The GAT primarily consists of scales that measure psychosocial wellbeing (or "fitness") in four core domains: emotional, social, spiritual, and family fitness. ... physical health dimension were added later. Measures on the GAT were developed by Seligman et al.

**What happens if you don't do the GAT?** Student who do not sit the GAT will have it reported on their VCE certificate. To get an ATAR students must also do Section B of the GAT, and the results are reported as a standardised score out of 50, as with other externally assessed VCE studies.

**Do you need a calculator for the GAT?** A scientific calculator is permitted for both sections of the GAT. You will need pens, pencils and an eraser to complete the GAT. Do I need to study for the GAT? You don't need to do any special study for the GAT.

**Is the GAT multiple choice?** The multiple-choice questions cover numeracy and literacy (reading). Questions are based on a range of contexts including those you may encounter in daily life. Each part is allocated 45 minutes.

**What type of questions are asked in GAT?** The test has three sections (verbal reasoning, quantitative reasoning, and analytical reasoning) totaling 125 multiple choice questions. Candidates have 3 hours to complete all sections, while visually impaired candidates have 1 hour to complete the verbal reasoning section only.

**What is the passing marks for GAT general exam?** In the case of GAT Subject test ( <http://www.nts.org.pk/GAT/GATSubject.asp>) a minimum of 60% marks is required to pass the test.

**How many questions are on the GAT?** GAT UG candidates are given 100 questions to be solved GAT PG candidates are required to answer 200 questions.

**Is 70 a passing grade on a quiz?** The passing percentage for quizzes varies depending on the type of quiz. For Reading Practice Quizzes, Other Reading Quizzes, and Article Quizzes, the default passing scores are 60% to pass a 3-, 5-, or 10-question quiz and 70% to pass a 20-question quiz. (These requirements apply to Teacher-Made Quizzes as well.)

**What is the passing general average?**

**What is the easiest subject area exam in Florida?** The General Knowledge Reading test and Engineering and Technology Education 6-12 test are known to be the two easiest FTCE exams.

**Is the GAT an IQ test?** The General Achievement Test (GAT) is a test of general knowledge and skills in the areas of English, Maths and Humanities.

**What is the main purpose of GAT?**

**How long is the GAT test?** The GAT test by NTS is approximately 2 hours long i.e. 120 minutes. However it takes more than 2 hours to finish the GAT test. This is because you have to do a bunch of other stuff such as input some personal information. And of course you also have to check-in at the test center and then leave as well.

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