GOVERNMENT DEGREE COLLEGE (MEN)
ACCREDITED BY NAAC WITH B++ (CGPA 2.90)
Srikakulam - 532001, Andhra Pradesh, India
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ICT BASED LESSON PLAN

Date and Time (duration)	22.12.2022
Class:	I MPC
No. of students attended	41
Name of the Class Teacher	R.Ravi Kumar, Lecturer in Physics,GDC(M),Srikakulam
Title:	Different modes and velocity of transverse wave along a stretched string
Objectives	1. Define String? 2. What is tension ? 3. Is tension is force? 4. What is velocity? 5. Velocity of the string depends on what factors? 6. Define Harmonic and overtone frequencies? 7. What is the relation between Harmonic frequency and Overtone frequency? 8. What is fundamental frequency?
Materials used	1. Computer with projector 2. Internet access 3. Access videos from YouTube 4. Whiteboard and markers 5. Printed handouts with diagrams of Ruby and He-Ne Laser
Introduction (5 minutes) Begin with a captivating video or images.	1. Did you see the strings earlier? 2 .Where did you see strings earlier? 3. How we increase the tension of the string in lab? 4. Is frequency affected with tension? 5. Tell me some applications?
Virtual Insect Exploration (10 minutes)	Students were visualized the YouTube videoand analyze the various modes of frequencies. https://www.youtube.com/watch?v=MrPTt3pv6xk https://www.youtube.com/watch?v=klN2-bCzJb4 https://www.youtube.com/watch?v=AUBAMlMol1g https://www.youtube.com/watch?v=LNPQmna4xqQ https://www.youtube.com/watch?v=cnH2ltfW48U

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Presentation and Discussion (20 minutes)	The velocity of transverse waves on a stretched string is influenced by the tension and the linear mass density of the string. When you increase the tension in the string, the velocity of the wave also increases. Conversely, if you increase the linear mass density (e.g., by using a thicker or denser string), the velocity of the wave decreases. Factors Affecting Velocity • Tension (T): Increasing tension in the string increases the velocity of the wave. Tension is the force applied to stretch the string, and it is usually measured in newtons (N). • Linear Mass Density (μ): Increasing the linear mass density of the string (by using a thicker or denser string) decreases the velocity of the wave. Linear mass density is the mass per unit length and is usually measured in kg/m. • String Material: The material of the string can also affect the velocity of the wave. Different materials have different properties, such as elasticity, which can influence wave propagation. Transverse waves on a stretched string can exist in various modes or patterns of oscillation, each with distinct characteristics. These modes are a result of the different vibrational patterns that the string can exhibit. • Different modes of transverse waves on a stretched string correspond to different harmonics, with the fundamental mode being the simplest. • Each mode has a unique pattern of nodes and antinodes and a specific frequency and wavelength. • The harmonics or overtones are integer multiples of the fundamental frequency . • The choice of mode depends on the initial conditions and the boundary conditions of the string, such as how it is plucked or anchored.
Conclusion (5 minutes)	The velocity of a transverse wave on a stretched string is determined by the tension in the string and the linear mass density of the string. By adjusting these factors, you can control the speed at which transverse waves travel along the string. When a string is plucked or vibrated, it can support multiple modes of transverse waves simultaneously, each with its own characteristic pattern and frequency. These modes are integral to understanding the behavior of musical instruments, such as guitars and violins, where the manipulation of these modes produces different musical notes and tones.

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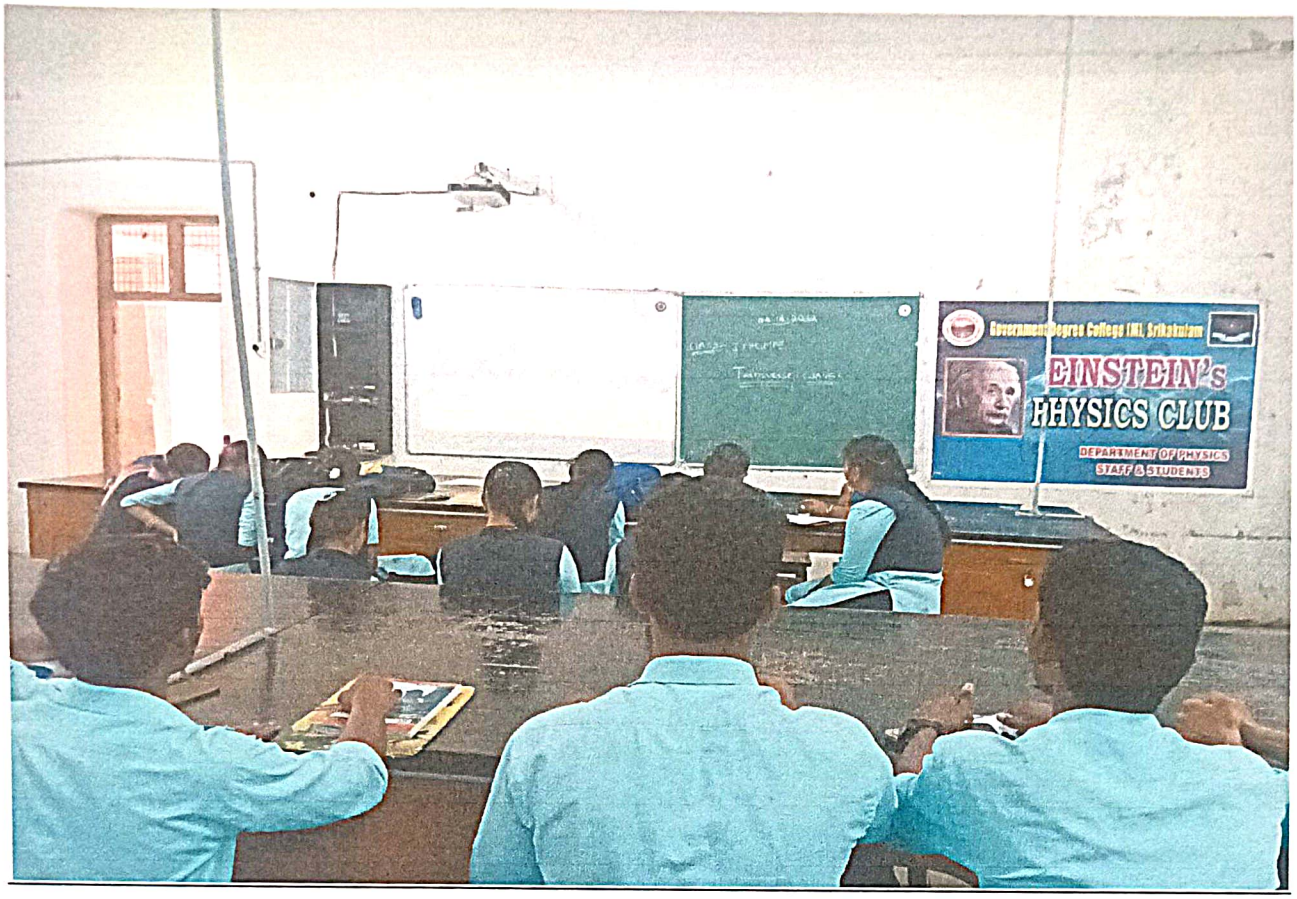
Activity photos



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ICT BASED LESSON PLAN

Date and Time (duration)	28.03.2023
Class:	I MPCS
No. of students attended	32
Name of the Class Teacher	R.Ravi Kumar, Lecturer in Physics,GDC(M),Srikakulam
Title:	He-Ne Laser and Ruby Laser
Objectives	1. Define Laser and understand the concept of Pumping and population Inversion in both Ruby and He-Ne Lasers. 2. Describe the stages of acquiring population inversion. 3. Pulsed laser output and continuous output of laser beams. 4. Applications and importance of these lasers
Materials used	1. Computer with projector 2. Internet access 3. Access videos from Youtube 4. Whiteboard and markers 5. Printed handouts with diagrams of Ruby and He-Ne Laser
Introduction (5 minutes) Begin with a captivating video or images.	1. Did you see the Lasers/Laser show earlier? 2 .What you observed in the laser show? 3. Full form of LASER? 4. Who Explained principle of laser first theoretically? 5. Who constructed laser first? 6. What is first Laser? 7. Do you know the applications of Laser? 8. Tell me some applications?
Virtual Insect Exploration (10 minutes)	Students were visualized the YouTube videoand analyze the various stages of population inversion process and working of the laser. https://www.youtube.com/watch?v=yQ0lMSNuj_o https://www.youtube.com/watch?v=xsg9Yqwrh2w https://www.youtube.com/watch?v=1LmcUaWuYao&t=18s

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	https://www.youtube.com/watch?v=2Oswmij538Q https://www.youtube.com/watch?v=07rnnkkw9ts&t=235s
Presentation and Discussion (20 minutes)	Explain Working principles and components advantages, limitations and applications of both Ruby and He-Ne Lasers are explained by using white board and neat diagram. The Ruby laser stands as a pivotal point in the history of laser technology, showcasing the feasibility of creating coherent light using a solid-state medium. While its use in practical applications has diminished over time, its historical importance and contributions to laser science and technology remain highly regarded. We will explain the medium, pumping ,stimulated emission, characteristics like wavelength, stability, coherence, power etc for both lasers.
Conclusion (5 minutes)	The Ruby laser is a historic milestone in laser technology, serving as a foundation for subsequent laser innovations and contributing to numerous scientific and practical applications. The helium-neon (He-Ne) laser, with its stable and coherent red output, has played a significant role in both educational and scientific applications. While its use has declined in some areas due to advances in laser technology, it remains a noteworthy example of a gas laser and continues to find relevance in specific applications that require its unique characteristics.

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ICT BASED LESSON PLAN

Date and Time (duration)	25.04.2023
Class:	III B.SC MPCS
No. of students attended	27
Name of the Class Teacher	R.Ravi Kumar, Lecturer in Physics,GDC(M),Srikakulam
Title:	Vapour compression refrigeration system
Objectives	The objectives of a vapour compression refrigeration system are to efficiently transfer heat from the refrigerated space, enabling precise temperature control and effective cooling. It emphasizes energy efficiency, utilizing environmentally responsible refrigerants and sustainable practices. The system aims for reliability, adaptability to diverse needs, cost-effectiveness, and a reduced environmental footprint, prioritizing safety and compliance with regulations. Ultimately, it strives to provide efficient, tailored cooling solutions across different applications, ensuring comfort, preservation, and industrial processes are optimally managed.
Materials used	1.Computer with projector 2.Internet access 3. Access videos from YouTube 4.Whiteboard and markers
Introduction (5 minutes) Begin with a captivating video or images.	1. What is Refrigeration? 2. How does Your Fridge Work? 3. What is the Role of Heat in Refrigeration? 4. Can You Name the Key Components? 5. Environmental Impact of Refrigerants? 6.Can you name some everyday applications or industries that heavily rely on vapour compression refrigeration systems? 7.What safety precautions do you think are important when dealing with refrigeration systems? Why are they necessary?
	Students were visualized the YouTube videoand principle, working of Vapor compression refrigeration system.

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Virtual Insect Exploration (10 minutes)	https://www.youtube.com/watch?v=PjcdqAkP0UA https://www.youtube.com/watch?v=-Wj_MO4BqtA https://www.youtube.com/watch?v=c9_ryuPCTRA
Presentation and Discussion (20 minutes)	The vapour compression refrigeration system is a common method used for refrigeration and air conditioning. Basics of Refrigeration: Explanation of the need for refrigeration. Temperature control, preservation, and comfort as primary objectives. Components of a Vapour Compression Refrigeration System • Overview of the main components: compressor, condenser, expansion valve, and evaporator. • Explain the function and purpose of each component. Compressor • Detailed explanation of the compressor's role in the system. • Mention the types of compressors (e.g., reciprocating, rotary, screw) and their applications. Condenser • Detailed explanation of the condenser's function. • Discuss types of condensers (e.g., air-cooled, water-cooled) and their efficiency. Expansion Valve • Explanation of the expansion valve's role in regulating refrigerant flow. • Discuss the types of expansion valves and their operation. Evaporator • Detailed explanation of the evaporator's function. • Discuss types of evaporators (e.g., flooded, dry expansion) and their applications. Refrigerant Explanation of the importance of refrigerants in the system. Discuss types of refrigerants and their environmental impact (mention transition to environmentally friendly refrigerants) Working Cycle of a Vapour Compression Refrigeration System • Diagram and explanation of the basic vapour compression cycle (e.g., pressure-enthalpy diagram). • Discuss the four main processes: compression, condensation, expansion, and evaporation.

	Energy Efficiency and Improvements • Discuss energy efficiency considerations in a vapour compression system. • Mention advancements and innovations to improve efficiency (e.g., variable speed compressors, heat recovery). Applications • Discuss various applications of vapour compression refrigeration systems (e.g., household refrigeration, air conditioning, industrial processes). Advantages and Disadvantages • Present the advantages and disadvantages of using a vapour compression refrigeration system.
Conclusion (5 minutes)	The vapour compression refrigeration system stands as a cornerstone of modern cooling technology, exemplifying efficiency and reliability. Its essential components - compressor, condenser, expansion valve, and evaporator - work in harmony to create a continuous refrigeration cycle. The careful selection of refrigerants is vital, considering both efficiency and environmental impact, steering the industry towards eco-friendly options. This versatile system finds applications in diverse sectors, from household refrigeration to industrial processes. Ongoing efforts are directed at enhancing energy efficiency, ensuring a sustainable future by minimizing the ecological footprint. As we move forward, the industry will strive for a delicate balance between providing optimum comfort to users and adopting eco-conscious practices, requiring continuous adaptation and innovation to meet evolving needs.

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ICT BASED LESSON PLAN

Date and Time (duration)	20.11.2023 , 12:30 pm to 1: 20 pm
Class:	III B.SC MPCS
No. of students attended	21
Name of the Class Teacher	R.Ravi Kumar, Lecturer in Physics, GDC(M), Srikakulam
Title:	Vapour Absorption refrigeration system
Objectives	The objectives of a vapour absroption refrigeration system are to efficiently transfer heat from the refrigerated space, enabling precise temperature control and effective cooling. It emphasizes energy efficiency, utilizing environmentally responsible refrigerants and sustainable practices. The system aims for reliability, adaptability to diverse needs, cost-effectiveness, and a reduced environmental footprint, prioritizing safety and compliance with regulations. Ultimately, it strives to provide efficient, tailored cooling solutions across different applications, ensuring comfort, preservation, and industrial processes are optimally managed.
Materials used	1.Computer with projector 2.Internet access 3. Access videos from YouTube 4.Whiteboard and markers
Introduction (5 minutes) Begin with a captivating video or images.	1. What is Refrigeration? 2. How does Your Fridge Work? 3. What is the Role of Heat in Refrigeration? 4. Can You Name the Key Components? 5. Environmental Impact of Refrigerants? 6.Can you name some everyday applications or industries that heavily rely on vapour compression refrigeration systems? 7.What safety precautions do you think are important when dealing with refrigeration systems? Why are they necessary?

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Virtual Insect Exploration (10 minutes)	Students were visualized the YouTube videoand principle, working of Vapor absorption refrigeration system https://www.youtube.com/watch?v=1p6dgGVnS2w **https://www.youtube.com/watch?v=rCMLJfV86mI**
Presentation and Discussion (20 minutes)	A vapour absorption refrigeration system is an alternative to the more common vapour compression refrigeration system. It operates on a similar principle of removing heat from a space and rejecting it elsewhere, but it uses a different method to achieve this. The basic components of a vapor absorption refrigeration system include the absorber, generator, pump, and evaporator. Basics of Refrigeration: Explanation of the need for refrigeration. Temperature control, preservation, and comfort as primary objectives. Components of a Vapour Absorption Refrigeration System • Overview of the main components: compressor, condenser, expansion valve, and evaporator. • Explain the function and purpose of each component. Basic Components • Evaporator: • The component where the refrigerant absorbs heat from the space to be cooled, causing it to evaporate. Absorber: • A device where the refrigerant vapor is absorbed by a liquid absorbent. This releases heat, and the absorbent takes on the refrigerant in solution. Generator: • The high-temperature component where the absorbed refrigerant is separated from the absorbent. This is usually accomplished by applying heat. Condenser: • The component where the refrigerant vapor, now separated from the absorbent, is condensed back into a liquid, releasing heat to the external environment. Pump: • A pump to circulate the absorbent solution between the absorber and the generator. Slide 4: Working Principle • Evaporation: • Refrigerant evaporates in the evaporator, absorbing heat from the surroundings. Absorption: The vapor is absorbed by the absorbent in the absorber, releasing heat.Pumping:

	• The pump circulates the absorbent solution to the generator. Generation: • Heat is applied to the absorbent solution in the generator, causing the refrigerant to vaporize and separate from the absorbent. Condensation: • The refrigerant vapor is condensed in the condenser, releasing heat to the environment. Working Cycle of a Vapour absorption Refrigeration System • The working of a vapour absorption refrigerator involves a cyclic process with four main components: the evaporator, absorber, generator, and condenser. Here's a step-by-step explanation of the working principle. Energy Efficiency and Improvements • Discuss energy efficiency considerations in a vapour compression system. • Mention advancements and innovations to improve efficiency (e.g., variable speed compressors, heat recovery). Applications • Discuss various applications of vapour compression refrigeration systems (e.g., household refrigeration, air conditioning, industrial processes). Advantages and Disadvantages • Present the advantages and disadvantages of using a vapour compression refrigeration system.
Conclusion (5 minutes)	• Highlight specific applications where vapour absorption refrigeration systems are commonly used, such as in industrial processes, district heating, and solar cooling. • The liquid refrigerant, now at high pressure, returns to the evaporator to repeat the cycle. • The absorbent solution, now depleted of refrigerant, returns to the absorber to continue absorbing vapour. This process continues in a cyclic fashion, and the absorption of heat in the evaporator and the release of heat in the absorber and condenser drive the refrigeration cycle. Unlike vapour compression refrigeration systems that use a compressor to circulate the refrigerant, vapour absorption refrigeration systems use heat and the absorbent to achieve the same result, making them suitable for applications where electricity is limited or expensive. It's worth noting that vapour absorption refrigeration systems are often used in applications where waste heat or a low-grade heat source is available, making them more energy-efficient in certain scenarios.

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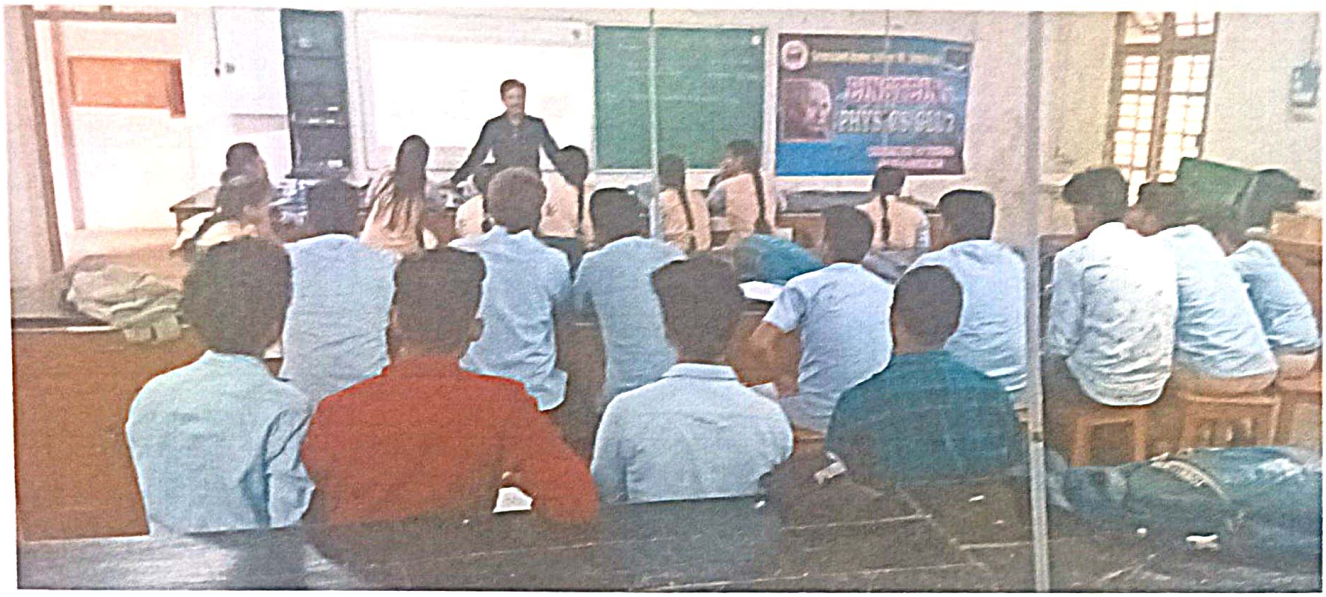

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ICT BASED LESSON PLAN

Date and Time (duration)	31.10.2023 11.40 am to 12.30 pm
Class:	III B.SC MPCS
No. of students attended	21
Name of the Class Teacher	R.Ravi Kumar, Lecturer in Physics,GDC(M),Srikakulam
Title:	Constant gas volume thermometer
Objectives	1.Understanding Temperature Measurement 2.Appreciating the Ideal Gas Law 3.Exploring Gas Behaviour at Constant Volume 4.Learning Thermodynamic Principles 5.Enhancing Experimental and Analytical Skills 6.Applying in Scientific Research 7.Exploring Practical Applications 8.Analyzing Advantages and Limitations
Materials used	1.Computer with projector 2.Internet access 3. Access videos from YouTube 4.Whiteboard and markers
Introduction (5 minutes) Begin with a captivating video or images.	1. What is the fundamental purpose of a thermometer? 2. Can you name different types of thermometers that you're familiar with? 3. How do gases respond to changes in temperature and pressure, based on what you know about gas laws? 4. Why is it important to maintain a constant volume in certain thermometers? 5. Can you think of situations where high sensitivity in temperature measurement is Crucial? 6. How might a constant gas volume thermometer be useful in scientific experiments or industrial processes? 7. What are some challenges or potential sources of error associated with using a constant gas volume thermometer?

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Virtual Insect Exploration (10 minutes)	Students were visualized the YouTube videoand analyze constant gas volume thermometer. https://www.youtube.com/watch?v=AB57wg8qkIE https://www.youtube.com/watch?v=n0xAQXL905c https://www.youtube.com/shorts/LXvytAK09f0

Presentation and Discussion (20 minutes)	A constant gas volume thermometer is a specific type of thermometer used to measure temperature by keeping the volume of a gas constant. This type of thermometer operates on the principle that the pressure of a gas is directly proportional to its temperature at constant volume.
	
	Gas Laws and Thermometry
	• Boyle's Law: States that at constant temperature, the pressure and volume of a gas are inversely proportional.
	• Charles's Law: At constant pressure, the volume and temperature of a gas are directly proportional.
	
	Concept of Constant Volume Thermometry
	• Definition: A constant gas volume thermometer maintains the volume of a gas at a constant value throughout the temperature measurement process.
	• Working Principle: Relies on the pressure-temperature relationship of a gas under constant volume conditions.
	
	The Ideal Gas Equation
	• Equation: PV = nRT (where P is pressure, V is volume, n is the number of moles, R is the gas constant, and T is temperature in Kelvin).
	• Application: Utilized in constant gas volume thermometry to establish the relationship between pressure and temperature.
	
	Construction of a Constant Gas Volume Thermometer
	• Components:
	  • A fixed volume container (to maintain constant volume).
	  • A pressure-measuring device (e.g., pressure gauge).
	  • Gas (typically an ideal gas, like nitrogen or helium).

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	Temperature Measurement Process • Step 1: The gas is enclosed in the fixed volume container. • Step 2: The pressure of the gas is measured using the pressure gauge. • Step 3: The pressure reading is related to temperature using the ideal gas equation. Advantages of Constant Gas Volume Thermometers • High Sensitivity: Small temperature changes result in significant pressure changes due to constant volume. • Wide Range: Can measure a wide range of temperatures accurately. Applications • Scientific Research: Particularly useful in precise experimental conditions where accurate temperature measurement is crucial. • Industrial Applications: In settings where accurate and sensitive temperature measurements are required. Limitations and Challenges • Sensitivity to Volume Changes: Changes in volume due to leaks or other factors can affect measurements. • Maintenance and Calibration: Requires regular maintenance and calibration to ensure accuracy.
Conclusion (5 minutes)	• Constant gas volume thermometers offer high sensitivity and accuracy by maintaining gas volume constant during temperature measurements. • Significance: Valuable tools in scientific research and various industrial applications. This presentation provides an overview of a constant gas volume thermometer, including its working principle, construction, applications, and limitations. Feel free to tailor the content based on your audience and specific requirements.

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ICT BASED LESSON PLAN

Date and Time (duration)	07.11.2023
Class:	III B.SC MPCS
No. of students attended	26
Name of the Class Teacher	R.Ravi Kumar, Lecturer in Physics,GDC(M),Srikakulam
Title:	Vapour compression refrigeration system
Objectives	The objectives of a vapour compression refrigeration system are to efficiently transfer heat from the refrigerated space, enabling precise temperature control and effective cooling. It emphasizes energy efficiency, utilizing environmentally responsible refrigerants and sustainable practices. The system aims for reliability, adaptability to diverse needs, cost-effectiveness, and a reduced environmental footprint, prioritizing safety and compliance with regulations. Ultimately, it strives to provide efficient, tailored cooling solutions across different applications, ensuring comfort, preservation, and industrial processes are optimally managed.
Materials used	1.Computer with projector 2.Internet access 3. Access videos from YouTube 4.Whiteboard and markers
Introduction (5 minutes) Begin with a captivating video or images.	1. What is Refrigeration? 2. How does Your Fridge Work? 3. What is the Role of Heat in Refrigeration? 4. Can You Name the Key Components? 5. Environmental Impact of Refrigerants? 6.Can you name some everyday applications or industries that heavily rely on vapour compression refrigeration systems? 7.What safety precautions do you think are important when dealing with refrigeration systems? Why are they necessary?
	Students were visualized the YouTube videoand principle, working of Vapor compression refrigeration system

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Virtual Insect Exploration (10 minutes)	https://www.youtube.com/watch?v=PjcdqAkP0UA https://www.youtube.com/watch?v=-Wj_MO4BqtA https://www.youtube.com/watch?v=c9_ryuPCTRA
Presentation and Discussion (20 minutes)	The vapour compression refrigeration system is a common method used for refrigeration and air conditioning. Basics of Refrigeration: Explanation of the need for refrigeration. Temperature control, preservation, and comfort as primary objectives. Components of a Vapour Compression Refrigeration System • Overview of the main components: compressor, condenser, expansion valve, and evaporator. • Explain the function and purpose of each component. Compressor • Detailed explanation of the compressor's role in the system. • Mention the types of compressors (e.g., reciprocating, rotary, screw) and their applications. Condenser • Detailed explanation of the condenser's function. • Discuss types of condensers (e.g., air-cooled, water-cooled) and their efficiency. Expansion Valve • Explanation of the expansion valve's role in regulating refrigerant flow. • Discuss the types of expansion valves and their operation. Evaporator • Detailed explanation of the evaporator's function. • Discuss types of evaporators (e.g., flooded, dry expansion) and their applications. Refrigerant Explanation of the importance of refrigerants in the system. Discuss types of refrigerants and their environmental impact (mention transition to environmentally friendly refrigerants) Working Cycle of a Vapour Compression Refrigeration System • Diagram and explanation of the basic vapour compression cycle (e.g., pressure-enthalpy diagram) • Discuss the four main processes: compression, condensation, expansion, and evaporation

	Energy Efficiency and Improvements • Discuss energy efficiency considerations in a vapour compression system. • Mention advancements and innovations to improve efficiency (e.g., variable speed compressors, heat recovery). Applications • Discuss various applications of vapour compression refrigeration systems (e.g., household refrigeration, air conditioning, industrial processes). Advantages and Disadvantages • Present the advantages and disadvantages of using a vapour compression refrigeration system.
Conclusion (5 minutes)	The vapour compression refrigeration system stands as a cornerstone of modern cooling technology, exemplifying efficiency and reliability. Its essential components - compressor, condenser, expansion valve, and evaporator - work in harmony to create a continuous refrigeration cycle. The careful selection of refrigerants is vital, considering both efficiency and environmental impact, steering the industry towards eco-friendly options. This versatile system finds applications in diverse sectors, from household refrigeration to industrial processes. Ongoing efforts are directed at enhancing energy efficiency, ensuring a sustainable future by minimizing the ecological footprint. As we move forward, the industry will strive for a delicate balance between providing optimum comfort to users and adopting eco-conscious practices, requiring continuous adaptation and innovation to meet evolving needs.

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