Kentucky CTE

Construction: Heating and Humidification 460820 (2026–2027)

HVAC (Heating, Ventilation, and Air Conditioning) Principles, Terminology, and Safety: 1	**a** Define basic terminology used in the HVAC (Heating, Ventilation, and Air Conditioning) industry. 1.A
	b Discuss the relationship between heat, humidity, and human comfort. 1.B
	c Describe the various types of tools and equipment used in HVAC (Heating, Ventilation, and Air Conditioning) and their proper use. 1.C
	d Follow approved safety procedures. 1.D
HVAC (Heating, Ventilation, and Air Conditioning) Installation Requirements: 2	**a** Explain the relationship between mechanical codes and proper installation of HVAC (Heating, Ventilation, and Air Conditioning) equipment. 2.A
	b Discuss installation requirements for duct systems, piping, and condensate disposal. 2.B
	c Discuss techniques on the proper use of code books and reference manuals. 2.C
Gas Piping, Venting, Combustion Air: 3	**a** Explain the importance of the codes as they pertain to gas pipe safety. 3.A
	b Explain how the codes affect the installation of piping and gas fired equipment. 3.B
	c Identify the codes and standards applicable to proper venting techniques. 3.C
	d Identify the life safety hazards of improper venting. 3.D
	e Discuss and identify the codes related to determining proper combustion air. 3.E
Duct, Ventilation: 4	**a** Discuss the installation and safety considerations for the proper layout and construction of ducts and fittings. 4.A
	b Evaluate air distribution systems to determine proper airflow and duct eakage. 4.B

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	c Analyze and explain the importance of balancing a whole building's ventilation system. 4.C
	d Demonstrate knowledge of codes that relate to the installation of duct and ventilation systems. 4.D
Heating and Humidification Safety: 5	**a** Practice/observe safety procedures and techniques. 5.A
	b Perform safety lockout procedures for burners. 5.B
	c Test a fan/limit control to identify a set point of control. 5.C
	d Test all safety controls. 5.D
	e Check ignition systems while following all safety principles. 5.E
	f Use tools and test equipment appropriately while following safety practices. 5.F
Values: 6	**a** Check the coil resistance of a valve coil. 6.A
	b Test gas valve operation. 6.B
	c Check the voltage at the gas valve operator. 6.C
	d Check pressure at the inlet vs. the outlet of the gas valve. 6.D
	e Explain the operation of a solenoid valve. 6.E
	f Identify limited, non-adjustable and adjustable regulators. 6.F
	g Determine the application of gas valves. 6.G
	h Check the water-regulating valve operator. 6.H
	i Discuss TXV valves and their operation. 6.I
Pilot Devices: 7	**a** Differentiate between pilot proving devices. 7.A
	b Explain the operation of the flame rod, mercury flame switch, bimetal, and millivolt flame sensors. 7.B
	c Test and change a thermocouple flame sensor. 7.C
	d Clean the pilot assembly. 7.D
Thermostats: 8	**a** Identify and install residential heating and cooling thermostats. 8.A
	b Check and adjust the heat anticipator. 8.B

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	c Set aqua stat. 8.C
	d Identify and design the difference between Communications and Non-Communications Thermostats. 8.D
	e Set a Programmable Thermostat. 8.E
Furnace Gas System: 9	**a** Perform a regular conversion on a gas valve from natural gas to LP or reverse low, line voltage, redundant, two-stage, and modulating. 9.A
	b Test and adjust the fuel system of the furnace. 9.B
	c Measure gas pressure with a manometer. 9.C
	d Adjust the burner system to the recommended efficiency. 9.D
	e Perform pressure checks on the venting system. 9.E
	f Adjust the regulator. 9.F
	g Determine air velocity within a duct via Pilot tube/magnehelic. 9.G
	h Determine air velocity at grills and diffusers via vane style anemometer, hot wire anemometer, pilot tube, and digital anemometer. 9.H
	i Measure temperature difference across heating and cooling equipment. 9.I
	j Verify equipment air flow and distribution requirements. 9.J
	k Check the operation of gas train components and measurements. 9.K
	l Check for correct heating input and adjust to manufacturers' specifications. 9.L
	m Demonstrate an understanding of combustion theory. 9.M
	n Determine combustion air requirements. 9.N
	o Verify system operation. 9.O
Heating: 10	**a** Test spark ignition modules. 10.A
	b Wire a complete heating system – line and low voltage. 10.B
	c Identify controls for heating and cooling. 10.C
	d Check the ignition system. 10.D
	)e-rate or change over a gas burner. 10.E
	heck for proper temperature rise across the furnace. 10.F

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	g Set proper air distribution in-house. 10.G
	h Remove, install, and adjust the blower motor and/or belt. 10.H
	i Adjust individual register outlets to properly balance the system. 10.I
	j Demonstrate good customer relations in a classroom simulation. 10.J
	k Explain the importance of manufacturers' installation and operation requirements. 10.K
	l Determine equipment electrical requirements. 10.L
	m Check the operation of all electrical control components. 10.M
	n Demonstrate the use of tools and instruments. 10.N
	o Test for proper combustion. 10.O
	p Check electrical components for operation and wiring connections. 10.P
	q Read electrical wiring diagrams and demonstrate an understanding of wiring diagrams. 10.Q
	r Develop a systematic way to diagnose system problems and demonstrate them in class. 10.R
	s Determine the cause of failure in a heating system. 10.S
	t Identify and describe all possible causes of failure and how to eliminate causes. 10.T
	u Write a service report. 10.U
	v Demonstrate good customer relations. 10.V
Cooling and Heat Pump (Super-heat and Sub-Cooling): 11	**a** Determine what type of Freon is in the system. 11.A
	b Hook up the refrigeration manifold to the system. 11.B
	c Start the system and allow it to settle reading on gauges. 11.C
	d Install line temperature measurement probes. 11.D
	e Read gauge pressure and saturation temperature. 11.E
	f Read the line temperature from the thermometer on the high and low sides. 11.F
	g Determine superheat (suction) and sub-cooling liquid. 11.G

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	h Demonstrate proper shutdown. 11.H
	i Remove testing equipment properly. 11.I
	j Restart the equipment and put it in normal operation. 11.J
Humidification: 12	**a** Wire a humidistat into an electrical circuit. 12.A
	b Determine the relative humidity using a sling psychrometer. 12.B
Fuel Oil: 13	**a** Measure the resistance of a cad cell during operation. 13.A
	b Check safety control for proper timed operation on shut down. 13.B
	c Check oil burner components and measurements. 13.C
	d Evaluate fuel supply systems. 13.D
	e Change the fuel oil filter. 13.E
	f Clean oil pump strainer. 13.F
	g Measure the chimney draft with a draft gauge. 13.G
	h Determine the efficiency of an oil pump using a vacuum gauge and a pressure gauge. 13.H
	i Check for proper oil pressure at the fuel pump. 13.I
	j Remove drawer assembly, change nozzle, and adjust ignitors. 13.J
	k Change oil pump coupler. 13.K
	l Install delay fuel oil valve. 13.L
	m Perform an efficiency test on an oil-gas burner: smoke test, CO2 test, and O2 test. 13.M
	n Set over the fire draft. 13.N
	o Set breech draft. 13.O
Boilers: 14	**a** Oil motors and bearings. 14.A
	b Check the circulator for alignment and lubrication. 14.B
	c Check the system for any gasket leaks at tankless and circulators. 14.C
	d Remove air from the water system. 14.D

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	e Inspect/change zone valve operator. 14.E
	f Wire a multizone/multi-pump hydronic system. 14.F
	g Identify types of hydronic piping systems. 14.G
	h Observe proper draft conditions. 14.H
	i Test boiler efficiency and clean if necessary. 14.I
	j Set aqua stat. 14.J
Codes: 15	**a** Describe the reasons for codes. 15.A
	b Discuss three model codes: Boca, standard, and uniform. 15.B
	c Identify the codes and standards for the applicable area, locality, or state. 15.C
	d Discuss the relationship between codes and manufacturers' installation instructions. 15.D
	e Identify standards not covered by codes: AHRI (Air Conditioning, Heating, Refrigeration Institute), ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers), and SMACNA (Sheet Metal and Air Conditioning Contractors National Association). 15.E
	f Explain the importance of local licensing codes. 15.F
	g Explain how the codes affect the installation and operation of HVAC (Heating, Ventilation, and Air Conditioning) equipment. 15.G
	h Explain the relationship between manufacturers' suggested installation procedures and codes. 15.H
	i Explain the importance of codes as they pertain to safety. 15.I
	j Compare commercial codes and codes that pertain to residential applications. 15.J
	k Demonstrate knowledge of codes that relate to the installation of HVAC (Heating, Ventilation, and Air Conditioning) equipment. 15.K