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Continuing Education Course #404
Tiny Houses Part 4
Mechanical, Electrical, and Plumbing Systems

1. How many states have adopted the National Electric Code?
- a. 45
- b. 48
- c. 49
- d. 50

2. What does it mean when an appliance is a 2-way or 3-way appliance?
- a. The appliance performs more than one function
- b. The appliance is able to operate when held or placed vertically or horizontally
- c. The appliance is able to run on more than one energy source
- d. The appliance is able to heat and cool or the appliance is able to heat, cool, and provide ventilation

3. According to the course text, what voltages are direct current refrigerators widely available in?
- a. 9 and 12 volts
- b. 9, 12, and 24 volts
- c. 12 and 24 volts
- d. 12, 24, and 48 volts

4. According to the author, why is an electric tankless water heater not practical for a tiny house on wheels (THOW)?
- a. It uses too many amps of electricity
- b. It takes up too much space
- c. It could never produce enough hot water
- d. It costs too much compared to the overall cost of a tiny house

5. What is not one of the problems listed for oversized heating and cooling equipment?
- a. Higher operating costs
- b. Frequent evaporator short circuiting
- c. More frequent cycling on and off
- d. Reduced equipment life

6. Air-source heat pumps are the only heating and cooling equipment mentioned that can provide both heating and cooling using either alternating current or direct current models.
- a. True
- b. False

7. Heating and cooling loads for houses are usually calculated by what Air Conditioning Contractors of America manual?
- a. Manual D
- b. Manual E

○ c. Manual J
○ d. Manual S

8. Heating and cooling equipment capacities are given in various different units of measure. To help with conversions you should know 1,000 watts equals _____ BTU/hour and 1 ton refrigeration equals _____ BTU/hour.
○ a. 1,706, 12,000
○ b. 3,412, 12,000
○ c. 1,706, 18,000
○ d. 3,412, 18,000

9. The two most abundant combustion byproducts of propane and natural gas are _____.
○ a. carbon monoxide and nitrogen oxide
○ b. carbon dioxide and nitrogen oxide
○ c. carbon monoxide and water vapor
○ d. carbon dioxide and water vapor

10. What is required for ventilation in every bathroom by the International Residential Code (IRC)?
○ a. Both a minimum sized window and a minimum 50 CFM intermittent rate exhaust fan
○ b. Either a minimum sized window or a minimum 50 CFM intermittent rate exhaust fan
○ c. Both a minimum sized window and a minimum 100 CFM intermittent rate exhaust fan
○ d. Either a minimum sized window or a minimum 100 CFM intermittent rate exhaust fan

11. What are the two most common propane piping/tubing materials used in a THOW?
○ a. Black steel and copper
○ b. Cast iron and black steel
○ c. Stainless steel and copper
○ d. PVC and copper

12. Composting toilets cost _____ while flush toilets cost _____.
○ a. around $200, about the same
○ b. $900 or more, around $100 or more
○ c. $1,500 or more, less than $100
○ d. at least $2,000, at minimum $500

13. What currently are the three most commonly used potable water distribution pipe/tubing materials for residential structures?
○ a. HDPE, CPVC, and PEX
○ b. HDPE, PVC, and PEX
○ c. PEX, PVC, and copper
○ d. PEX, CPVC, and copper

14. Why is PVC pipe not allowed as a potable water pipe distribution material inside buildings?
○ a. It leaches compounds into any water it comes in contact with.
○ b. Higher temperatures negatively impact several of PVC’s material properties.
○ c. PVC works well for about 50 years, but after that it degrades quickly.
○ d. It reacts when in contact with pressure treated wood and is susceptible to leaks as a result.

15. What are the two pieces of information you must know when selecting a tankless water heater?
○ a. First hour delivery flowrate and recovery rate
○ b. The number of plumbing fixtures and the temperature of incoming water

○ c. The number of occupants and the hot water heater temperature setting
○ d. Temperature rise and hot water flow demand

16. What is the difference between a dry vent and a wet vent in a drain-waste-vent system?
○ a. A dry vent is only a vent pipe. A wet vent is both a drain pipe and a vent pipe.
○ b. A dry vent is only inside the building envelope. A wet vent is only outside the building envelope.
○ c. A dry vent is only a vent pipe. A wet vent is always submerged in water.
○ d. A dry vent is used to only vent toilets. A wet vent is always submerged in water.

17. What are two potentially complicating issues for THOW drain-waste-vent systems identified by the course author?
○ a. Vents and loft spaces often conflict and composting toilet vents often require electrical power for fans
○ b. Vents and loft spaces often conflict and conflicts between drain pipes and main trailer structural members
○ c. Axles may get in the way of running drain piping and access to mixing valves is limited
○ d. Axles may get in the way of running drain piping and conflicts between drain pipes and main trailer structural members

18. What is the biggest stated issue related to plumbing fixtures located along THOW perimeter walls?
○ a. The walls receive water damage since they are not protected by backsplashes or tub surrounds.
○ b. Access to the back side of mixing valves requires removal of exterior sheathing.
○ c. The normal method of drilling a hole through the bottom plate of the wall framing can't be followed.
○ d. Nothing, it is recommended to place plumbing fixtures along perimeter walls.

19. What is the drainage fixture unit (d.f.u.) value for a half-bath group with a 1.6 gallon per flush toilet?
○ a. 1
○ b. 2
○ c. 3
○ d. 4

20. According to the IRC, what is the maximum number of fixture units allowed for a 2 inch diameter vertical stack or drain?
○ a. 6
○ b. 10
○ c. 12
○ d. 20

21. At a ½ inch per foot slope, what is the maximum number of fixture units allowed to be connected to a 2 inch diameter building drain?
○ a. 21
○ b. 27
○ c. 24
○ d. 31

22. What is the biggest difference between a main circuit breaker panelboard and a main lug panelboard?
○ a. A main lug panelboard doesn't require grounding
○ b. A main lug panelboard doesn't have a hot bus bar
○ c. A main lug panelboard doesn't have an integral main circuit breaker
○ d. A main lug panelboard doesn't have a neutral bus bar

23. What is the minimum number of 20 amp small appliance branch circuits required by the IRC?
○ a. 0
○ b. 1

○ c. 2
○ d. 3

24. What does the author recommend for receptacle spacing in a THOW?
○ a. No recommendation was made
○ b. Less than 3 feet apart
○ c. No further than about 5 feet apart
○ d. No further than about 12 feet apart

25. What type of light fixture is recommended in lofts instead of recessed cans?
○ a. Low-profile LED lights
○ b. Track lighting
○ c. Sconces
○ d. A ceiling fan with integral light fixture