

FFA State Finals: 2024

Ag. Mechanics: Problem-Solving

Instructions: Examine each of the two sets of plans provided. Consider the questions pertaining to each and record your answers on the Scantron in the section entitled "Written Exam A." Scratch paper is provided for your calculations.

Electrical Plan:

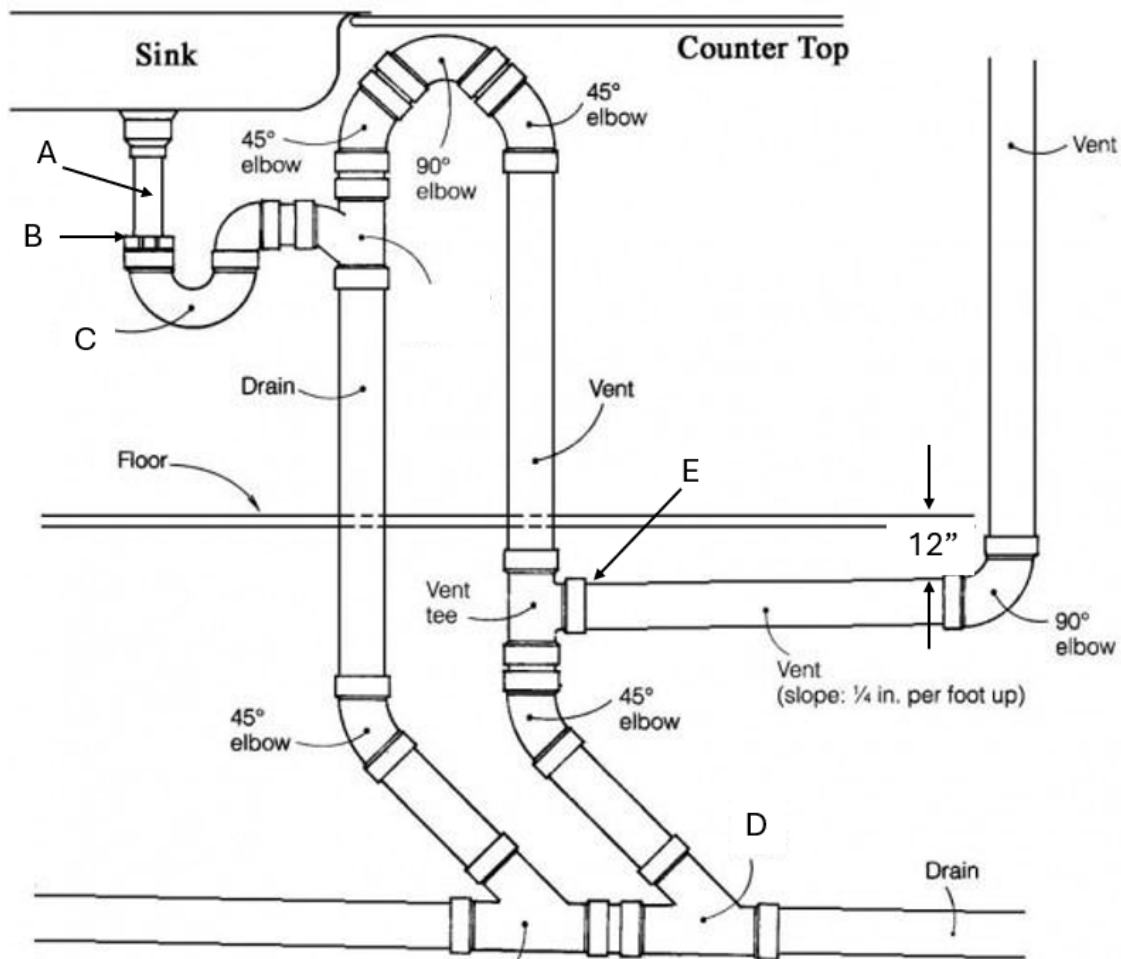
- What size wire is used for the bedroom lights and outlet circuit?
 - 8 AWG
 - 10 AWG
 - 12 AWG
 - 14 AWG
- How many fluorescent fixtures are to be installed in the garage?
 - 1
 - 2
 - 4
 - None
- What size wire is used for the Dryer plug?
 - 8 AWG
 - 10 AWG
 - 12 AWG
 - 14 AWG
- What size circuit breaker should be installed for the Dryer plug?
 - 20 A
 - 30 A
 - 40 A
 - 60 A
- How many duplex outlets are to be installed in the bedrooms on the upper floor?
 - 1
 - 2
 - 6
 - 8
- What conduit should be provided for the telephone service stub out?
 - E3
 - #7
 - E-20
 - 2" GRC
- What size is the main circuit breaker?
 - 20A
 - 150 A
 - 200 A
 - 14,998 VA
- What voltage is the furnace?
 - 120 V
 - 240 V
 - 20 V
 - 12 V
- What size feeder wire is running into the load center panel?
 - 12 AWG Copper
 - 10 AWG Copper
 - 8 AWG Copper
 - 3 AWG Copper

Steel Gate Plan Questions:

10. How long does the diagonal need to be?
a. 120.00" c. 122.64"
b. 192.24" d. 107.33"
11. To build 4 gates, how many 20' lengths of 1/8" x 1" H.R. flat would be required?
a. 1 c. 3
b. 2 d. 4
12. Neglecting saw kerf, how much 4" x 4" x 0.188" square tubing is required to construct **one** gate?
a. 15" c. 67-1/2"
b. 15' d. 6-3/4"
13. What is the length of the vertical bars (1" square tubing)?
a. 41-1/4" c. 36-3/4"
b. 48" d. 38-1/4"
14. To build 4 gates, how many 20' lengths of 1" square tubing would be required?
a. 15 c. 13
b. 9 d. 3
15. What is the length of the gate in centimeters?
a. 304.8 cm c. 30.48 cm
b. 3048.0 cm d. 3.048'
16. To build 4 gates, how many 20' lengths of 1-1/2" tubing would be required? Assume a saw kerf of 1/8".
a. 8 c. 5
b. 7 d. 3

Plumbing Diagram Questions

Use this plumbing diagram to answer questions 17 – 21



17. What is shown at location A?
 - a. Basin Drain
 - b. Sink Drain
 - c. Strainer Body
 - d. Sink Tailpiece

18. What type of connection is shown at location B?
 - a. Slip Joint Nut
 - b. Male Adaptor
 - c. Lock Nut
 - d. Solvent Weld




19. What is shown at location C?
 - a. Return
 - b. Double 90
 - c. Trap
 - d. Union

20. What is shown at location D?
 - a. Sanitary Tee
 - b. Double Wye Hub
 - c. Wye Hub
 - d. Long Sweep Tee

21. If the horizontal vent pipe is 7'- 6" long, how far is location E below the floor?
 - a. 12"
 - b. 12-1/4"
 - c. 13-7/8"
 - d. 10-1/8"

Motor Plate Questions:

Use this motor plate to answer the remaining questions.

		PREMIUM EFFICIENCY THREE PHASE INDUCTION MOTOR			
MODEL NATE1. 5-36-56CB		FRAME 56HC		Energy Verified CC-315B 256950	
Hz 60 50	ENCL TEFC		LOW VOLTAGE		
HP 1-1/2 1	PH 3		BLUE (T1) — LINE1 BROWN (T7) — LINE1 WHITE (T2) — LINE2 RED (T8) — LINE2 ORANGE (T3) — LINE3 YEL/BLA (T9) — LINE3 YELLOW (T4) — INS BLACK (T5) — INS GRAY (T6) — INS		
RPM 3500 2915	DUTY CONT		HIGH VOLTAGE		
VOLTS 230/460 190/380	CODE H		BLUE (T1) — LINE1 WHITE (T2) — LINE2 ORANGE (T3) — LINE3 BROWN (T7) — INS BLACK (T5) — INS RED (T8) — INS GRAY (T6) — INS YEL/BLA (T9) — INS		
AMPS 3.96/1.98 3.42/1.71	INS. F IP43		ACCEPTABLE FOR FIELD WIRING THERMALLY PROTECTED: NONE		
Useable at 60Hz 208Volt, 4.32Amps	DES. B				
S. F 1.15 1.15	LB/WT 30.5		MADE IN CHINA		
NOM. EFF 84% (60Hz)	DE/ODE BRG 6203/6203				
MAX. AMB. 40 °C	Date Code 12/2017		SERIAL NO. 2017121074		
WorldWide Electric Corporation				ISO9001	

22. At 60 Hz, if this motor was wired on for high voltage, it would pull:
 - a. 1.98 amps
 - b. 3.96 amps
 - c. 4.55 amps
 - d. 4.32 amps

23. At 60 Hz, if this motor was wired on for low voltage, what is the maximum current it should pull for short periods of time?
 - a. 1.98 amps
 - b. 3.96 amps
 - c. 4.55 amps
 - d. 4.32 amps

24. Which type of housing does this motor have?
 - a. Totally Encased For Capacitance
 - b. Thermally Efficient Fanametric Cooled
 - c. Totally Efficient Forced Cooled
 - d. Totally Enclosed Fan Cooled

25. At 60 Hz this motor will run on...
 - a. 230 volts
 - b. 460 volts
 - c. A & B
 - d. None of the above