CMGT 235 – Mechanical and Electrical Systems

|  |  |
| --- | --- |
| Homework #5 | Due: 9/8 |

**Show all work for full credit.**

20 pts total

Shape

Description automatically generated**Name**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

51 ft

Diagram, engineering drawing

Description automatically generated

3 ft

2 ft

(Unconditioned space)

2 ft

2 ft

22 ft

45 ft

30 ft

(18 ft x 22 ft)

1 ft

4 ft

18 ft

20 ft

(16 ft x 16 ft)

36 ft

16 ft

5 ft

|  |  |
| --- | --- |
| **Window Specifications**  All windows are Double Glass  Dining 5 ft x 4 ft  Family 8 ft x 5 ft  Bed 1 5 ft x 4 ft  Bed 2, Bed 3, and Bed 4 5 ft x 3 ft  Study/bed 5 5 ft x 4 ft  Bath 4 ft x 3 ft and 2 ft x 3 ft  Ens 3 ft x 3 ft and 2 ft x 3 ft  **Door Specifications**  Entry Door 7 ft x 3 ft (wood no storm door)  Garage Doors 7 ft x 3 ft (Wood no storm door)  Double Glass Patio Doors:  Sliding door 6 ft x 8 ft  Sliding door (l’dry) 4 ft x 8 ft | **Building Construction**  Floor SOG (edge insulation)  Walls R-19 (6” Insulation)  Ceilings R-30 (10” insulation)  Wood Frame Walls  Attic Space  Average Ceiling Height 10 ft  Porch 7 ft x 7 ft  Furnace 90% Efficiency Loss |

Note: Garage Area is unconditioned space

**SHOW ALL WORK FOR FULL CREDIT.**

**Part 1: Cooling Load (Heat gain)**

1. For the five-bedroom, two-bathroom house shown, write the square footage of each window along the outside of the window and the square footage of the entry door, garage doors, and sliding doors (patio) next to the doors on the floor plan. (See class example)
2. Determine the total wall perimeter:

|  |  |
| --- | --- |
| **Wall Side** | **Length (ft) [Show calculations]** |
| North |  |
| South |  |
| East |  |
| West |  |
| Total Wall Perimeter |  |

Determine the total Glass Area (Includes Sliding Doors):

|  |  |
| --- | --- |
| **Side** | **Glass Area (ft2) [Show calculations]** |
| North |  |
| South |  |
| East |  |
| West |  |
| Total Glass Area |  |

Determine the total Door Area:

|  |  |
| --- | --- |
| **Door** | **Door Area (ft2) [Show calculations]** |
| Wood No Storm Door |  |
| Total Door Area |  |

1. Determine the Net Wall Area.
2. Determine the Ceiling Area.

**Part 2: Heat Load (Heat Loss)**

|  |  |
| --- | --- |
| **Item** | **Area (ft2)** |
| Total sq. ft of Double Glass Windows |  |
| Total sq. ft. of Double Glass Patio (Sliding Doors) |  |
| Total sq. ft. of Wood No Storm Doors |  |

1. Using the attached Accu-Size Heating & Cooling Home Analysis Form complete the Cooling Load (heat gain) and the Heating Load (heat loss) for the home.