

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086

(For candidates admitted during the academic year 2016-17& thereafter)

SUBJECT CODE: 16VS/VM/ST56

**B. Voc. DEGREE EXAMINATION, NOVEMBER 2021
SUSTAINABLE ENERGY MANAGEMENT**

COURSE : MAJOR CORE

PAPER : SOFTWARE TOOLS FOR ENERGY ANALYSIS

TIME : 3 Hours

MAX. MARKS: 100

SECTION – A

(20 Marks)

Answer all the questions

(10 X 1 = 10)

I. FILL IN THE BLANKS

1. Electrical Consumption in the eQUEST software is given by _____
2. The battery used for industrial purpose is _____ V.
3. Energy _____ helps the designers for the scope for improvements in energy saving.
4. _____ measures and verifies the actual performance of implemented projects in RETScreen.
5. The details of panels, battery, inverters are available in _____ of PVSyst Software

II Match the Following

- | | |
|-------------|---------------------|
| 6. PVSol | - Hydro Energy |
| 7. VVER1200 | - Solar energy |
| 8. GEOT | - Bio Energy |
| 9. QBLADE | - Nuclear energy |
| 10. BIOBIL | - Geothermal Energy |
| | - Renewable Energy |

Answer all the questions

(5 X 2 = 10)

III. ANSWER IN A SENTENCE OR TWO

11. Give an example for variant in a PVSYST software and its effect in the PV installation process.
12. What are the Wizards to create a new building description using eQUEST's
13. Mention 2 Wizards in 'General Information' in eQUEST software.
14. Colour codes in RETScreen
15. Role of Virtual Energy analyser

SECTION – B

Answer any TWO questions.

(2 X 15 = 30)

16. Give a short note on the softwares used to harness the Solar and Wind energy
17. Give the flow chart for a PVSYST project design

18. Identify the software used to generate the below report and how and why? Also analyse and write summary and conclusion

PARAMETER	PROJECT 1	PROJECT 2
Tilt	30 ⁰	30 ⁰
Location	Chennai	New Delhi
Battery	Li-ion	Li-ion
Building Type	Residential	Residential
Energy Need	793.1KW/Year	843.4KW/Year
Azimuth	0 ⁰	0 ⁰
Incident Global Radiation on Collector Plane	843KW/Year	843KW/Year
Variant	Chennai	New Delhi
Panel Capacity	60W _p	60W _p
Battery Capacity	540Ah	540Ah
Investment Cost	33880950	34321470
Energy Cost	57.91	58.24
Autonomy	4 Days	4 Days
Battery Voltage	26V 180 Ah	26V 180 Ah

19. Explain the Schematic Design Wizard and its necessity

SECTION – C

Answer any TWO questions.

(2 X 25 = 50)

20. Explain the five step Standard Analysis in RETScreen software

21. Analyse the below graphs fig 1 & 2 and write your observation for effective energy management and write a report by comparing the energy consumption data

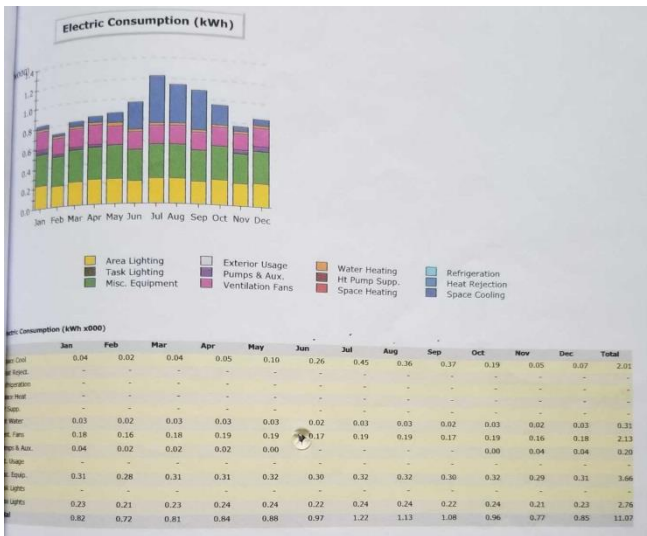


Figure 1 - Low e window

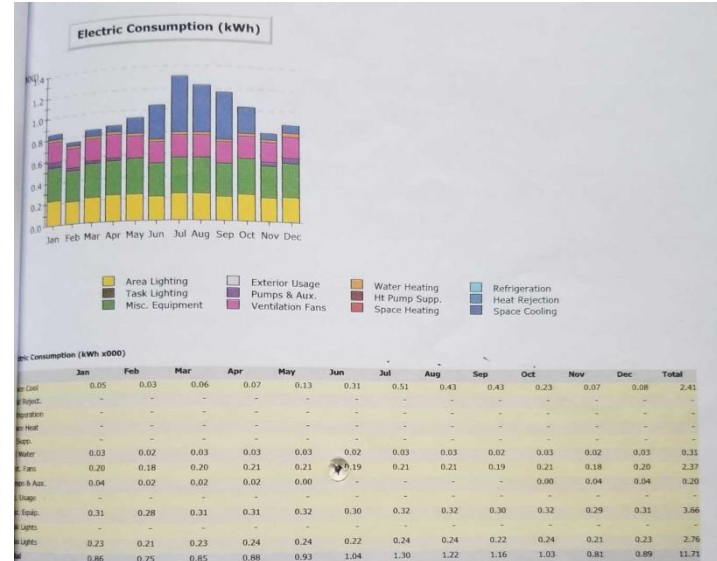
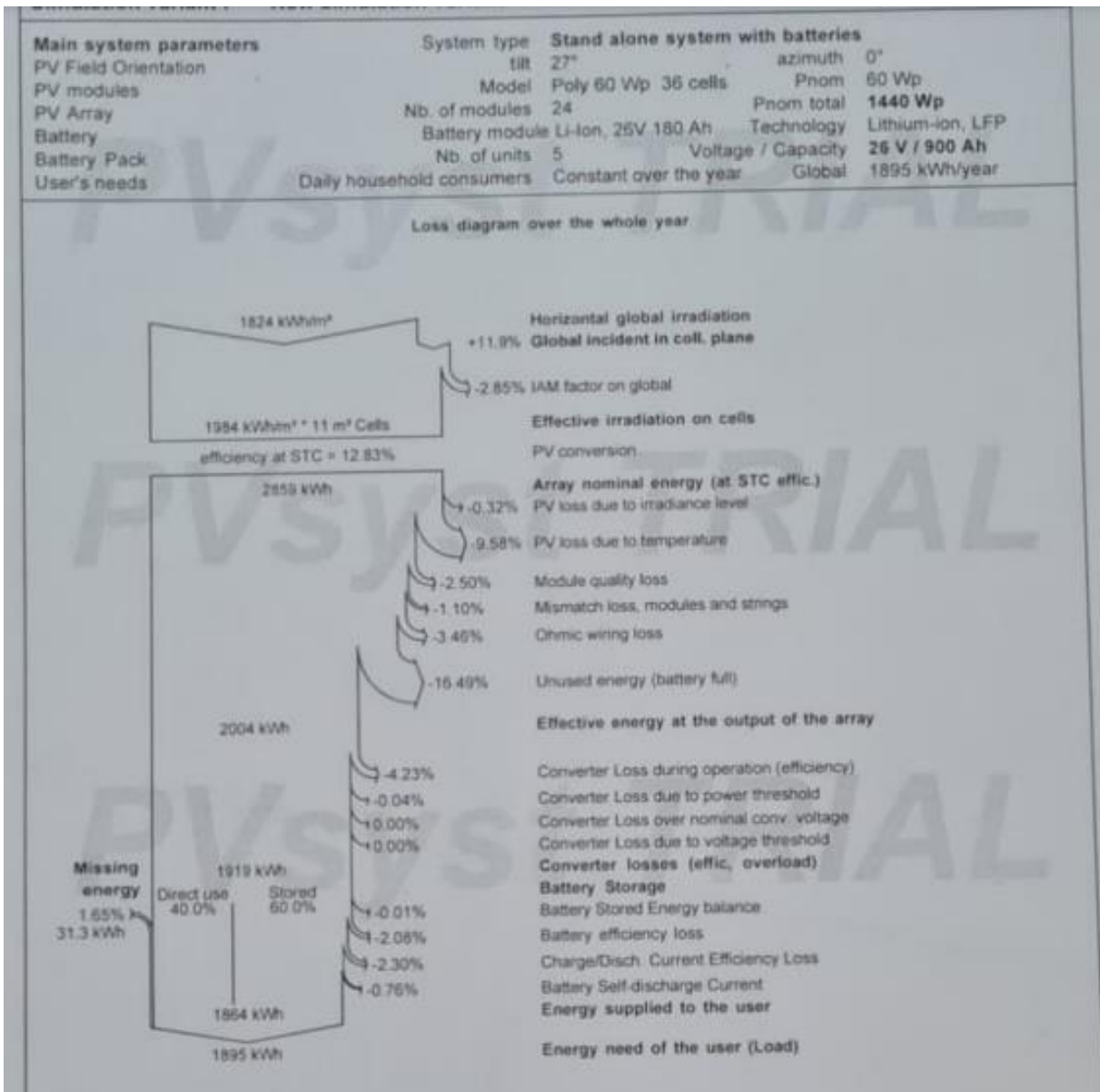


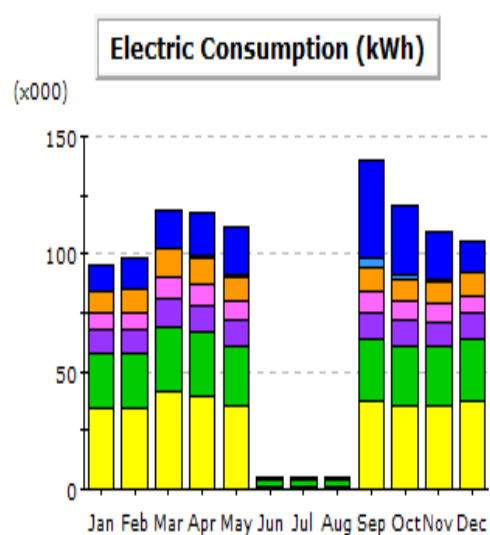
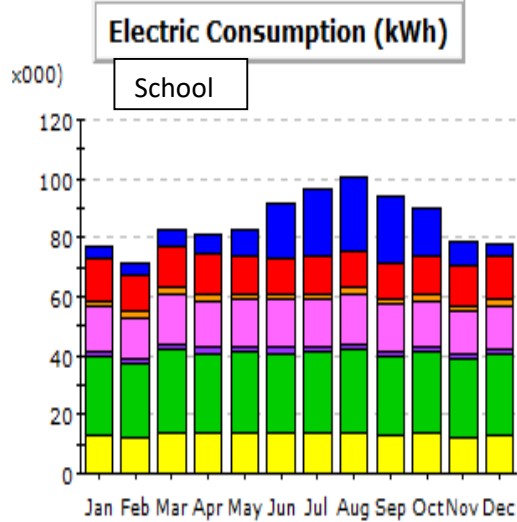
Figure 2 - tint Glass

22. Identify the losses from the report and submit a detailed report



23. Compare the monthly energy consumption of the below buildings with same orientation and building footprint by the end users. a. School b. Community Centre

Electric Consumption (kWh x000)		School											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	3.5	4.1	5.1	6.9	9.4	18.1	22.7	25.4	22.5	15.8	8.4	4.0	145.9
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	14.7	12.6	14.2	13.5	12.5	12.2	12.3	12.6	12.2	13.3	13.6	15.0	158.7
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	2.1	2.0	2.3	2.2	2.1	2.1	2.0	2.1	1.9	2.0	1.9	2.1	24.8
Vent. Fans	14.9	14.3	16.7	16.1	16.1	16.5	16.3	16.9	15.8	15.9	14.7	15.1	189.2
Pumps & Aux.	1.6	1.5	1.7	1.7	1.6	1.7	1.7	1.7	1.6	1.6	1.6	1.6	19.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	27.1	25.0	28.4	27.5	27.7	27.5	27.7	28.3	26.9	27.7	26.3	27.2	327.3
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	12.9	12.1	13.9	13.5	13.4	13.5	13.4	13.9	13.0	13.4	12.6	13.0	158.7
Total	76.8	71.6	82.4	81.3	82.9	91.4	96.2	100.9	93.9	89.7	79.0	77.9	1,024.2



- Area Lighting
- Task Lighting
- Misc. Equipment
- Exterior Usage
- Pumps & Aux.
- Ventilation Fans
- Water Heating
- Ht Pump Supp.
- Space Heating
- Refrigeration
- Heat Rejection
- Space Cooling

Electric Consumption (kWh x000)		Community Centre											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	11.1	13.0	15.9	18.4	19.9	-	-	-	41.6	29.6	19.9	12.7	182.1
Heat Reject.	0.2	0.3	0.5	0.7	1.0	-	-	-	4.0	2.3	0.9	0.2	10.0
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.2	-	-	-	-	-	-	-	-	-	-	0.0	0.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	9.5	9.5	11.5	10.9	9.8	0.6	0.6	0.6	9.6	9.3	9.5	10.2	91.6
Vent. Fans	6.6	7.6	9.0	9.2	9.1	-	-	-	9.6	8.5	7.4	7.4	74.4
Pumps & Aux.	10.0	10.0	12.1	11.6	10.6	-	-	-	11.1	10.6	10.6	11.1	97.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	24.0	23.6	28.3	27.1	25.0	3.3	3.4	3.4	26.0	25.0	24.9	26.1	240.2
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	34.1	34.0	41.1	39.3	35.9	0.9	0.9	0.9	37.6	35.9	35.9	37.6	334.3
Total	95.7	98.2	118.5	117.3	111.2	4.8	5.0	4.9	139.4	121.1	109.0	105.4	1,030.5