Assignment 2 EV355 Ayush Tandon 2K22/CO/123

• Electric Vehicles •

Q.1.) 60 KWh battery, charger Cap = 1.4 KWh

time needed = Battery Capacity / Power

Time = 60 KWh / 1.4 KW

time = 42.86 hrs

Q.3.) Rate = 0.25 KWh / mile., Battery = 60 KWh.

Charger 7.2 KWh. 0 to 100 %.

Range of Vehicle. = Battery Capacity / Rate of Consumption = 60 / 0.25 = 240 mile

Range of Vehicle = 240 miles

Q.2) 0.10 $ per KWh, 40 KWh from 20% to 100 %.

charger = 7.2 KW.

charge required = 40 × 0.8 = 32 KWh.

Cost = 0.10 × 32 = 3.2 $

Q.4.) Efficiency = 90%. , Output power = 10 KW.

Input Power = $\frac{10}{0.9}$ = 11.11 KW

Q.5.) 50 kwh, 20% to 100%. 3 electric Vehicles.

Total Energy = $3 \times 50 \times (1-0.2)$ kwh.

= 150×0.8 = 120 kwh

Total Energy = 120 kwh

Q.6.) 10% to 90%. DC fast charger. output power = 150 kW

Battery Capacity = 75 kwh.

time = $\frac{75 \times (0.8)}{150}$ = 0.4 hrs = 0.4×60 min

= 24 mins

Time = $\frac{\text{Capacity to be charged}}{\text{output of charger}}$

24 mins will be required.

Q.7.) Capacity = 60 kwh, 15% lost in 5 yrs

New Capacity = 0.85×60 = 51 kwh

Effective Capacity = (51 kwh).

Q.8.) 80 kwh capacity, efficiency = 95%., 50 kwh charge required.

Input Energy = $\frac{\text{Output Energy}}{\text{Efficiency}}$ = $\frac{50}{0.95}$ = 52.63 kwh

Energy Drawn from Grid = 52.63 kwh

Q.9.) 5 (level 2) chargers, each 7.2 Kw

Total power Output = chargers Numbers × Power of 1 charger

= 5 × 7.2 KW = 36KW

Total power output is 36KWH

Q.10.) 6KWH / day solar panel (EV) → 0.2 KWH/mile

Range of EV per day = 6KWH / 0.2 KWH/mil = 30 mile

EV can be driven 30 miles in one day.