

Energy Resources & Utilization

Session: 2k9 - 6th term

Open Book Paper

Max. Marks = 60

Note: Attach Excel Work Sheet with your answer book. Submit the Answer Book on-line by writing Paper-09-ME-ABC in subject of your e-mail. Use Winzip/Winrar to zip all your answers in one folder and name it as 09-ME-ABC. You have 72 hours to do this work. Try to solve with clarity and also be precise. Each Paper consists of 4 Questions and accommodates 24 students (06 groups). Try to solve the paper individually as copying is strictly forbidden and may liable to cancel the paper. You must follow the announced 'Layout' and 'rules' as information were provided in advance.

Question#01

ABC Company of power generation started production by newly built biomass plant of 40 MWe. The Company faces generation cost of $C(q) = q^3 - 9q^2 + 60q + 80$. The power price for each MWh sold of electricity is $P = \$60$.

Which output level q^* does the firm choose to maximize profit?

Derive the first and second order conditions.

What is the firm's marginal revenue?

What are the firm's marginal and average cost functions?

What is the producer's profit and his revenue?

Graphical representation:

- 1) Plot profit in one graph;
- 2) Plot marginal cost, price and average cost in 2nd graph;
- 3) Plot total cost and revenue in a third graph

Use Excel to plot the graph. Also attach the excel sheet containing the data and graph in your answer book.

Question#02

A monopolist faces production cost of $C(q) = 0.25q^2$. The electricity producer acts as a monopolist, i.e., there are no competitors in the market. The monopolist faces demand, given by the inverse demand function $p(q) = 100 - 2q$.

Which output level q^* does the firm choose to maximize profit?

Derive the first and second order conditions.

What is the firm's marginal revenue?

What are the firm's marginal and average cost functions?

What is the producer's profit and his revenue?

Graphical representation:

- 1) Plot profit in one graph;
- 2) Plot marginal cost, price and average cost in 2nd graph;
- 3) Plot total cost and revenue in a third graph

Use Excel to plot the graph. Also attach the excel sheet containing the data and graph in your answer book.

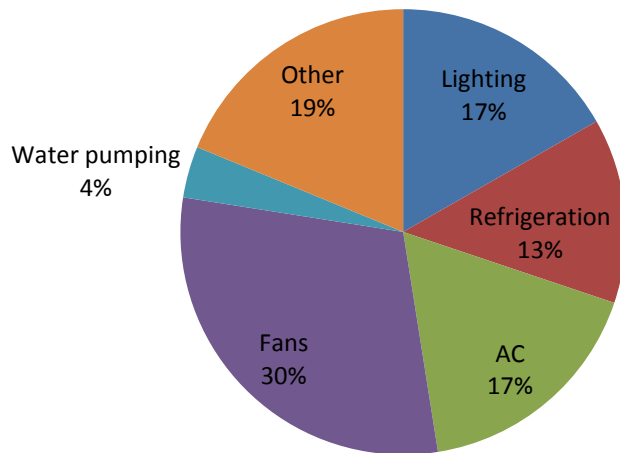
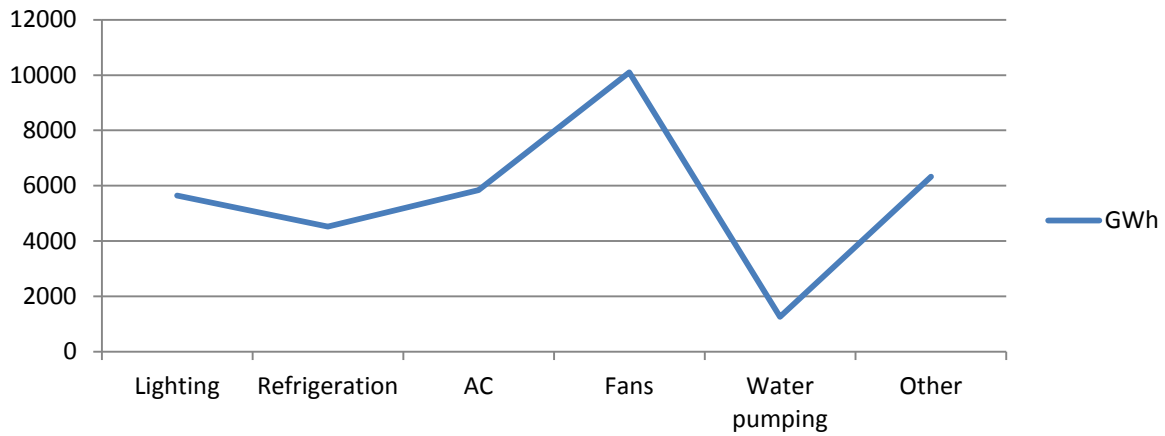
Question#03

The graph below shows the consumption for electricity in residential sector of Pakistan during summer season mainly comprises of 07 months of a year. The pie chart shows how electricity is used by average for a residential sector.

Summarize the information by selecting and reporting the main features and make comparisons where relevant.

You should write at least 250 words.

Electricity Consumption in Residential Sector (Summer)



Question#04

Prioritize the list of energy conservation strategies for home appliances and search the new technologies available locally; retrofitting scheme for cooling, lighting, cooking, water/space heaters and other home appliances. How much reduction may be inferred by using the efficient technologies? Draw a conclusion based upon your experience of daily energy use by graphing and interpreting the energy requirement for devices.