

UNIT 5

IMPORTANT QUESTIONS

Q1. Discuss in brief the different world energy scenario?

Ans. Majorly there are three world scenarios that are discussed as :

a. Modern Jazz:

1. It is a market-driven, digitally disrupted world with more rapid and uneven economic growth.
2. Recent indications indicate that this entrepreneurial future may speed sustainable energy availability on both the global and local levels, posing new system integration, cyber security, and data privacy challenges.

b. Unfinished Symphony:

1. It is a strong, coordinated, policy-led world with long-term planning and global action to address interconnected concerns such as inequitable access and cheap decarbonization.
2. Recent indications point to growing activity and commitment to addressing climate change at the sub-national level, as well as a shift away from climate change mitigation and toward a broader, socially inclusive, economically affordable, sustainable development agenda.

c. Hard Rock:

1. The globe is fractured, with inward-looking policies, reduced growth, and less global cooperation.
2. Recent indicators, such as the rise of populist leaders and uncertainty about the future of international collaboration, suggest that this picture is also turning into one of regionally stronger security foundations rather than total fragmentation and harder rocks.

Q2. Discuss data of energy consumption in India.

Ans.

1. In 1947, India's total power generation capacity was only 1360 MW, but by 1991, it had grown to 65,000 MW, with thermal plants accounting for 69% (45,000 MW).
2. The distribution of energy in various plants is as follows:

i. Hydro Plant:

1. The total Indian hydro-potential is 84,000 MW.

2. In March 1991, the installed capacity was 18,443 MW, compared to 200 kW in 1897 (Darjeeling) and 508 MW at the time of independence.

ii. Nuclear Power Plant: Currently, nuclear power accounts for around 2.3% of India's producing capacity. This equates to approximately 1,500 MW of installed capacity divided by 8 units.

iii. Coal Plant:

1. Because coal is abundant and the implementation period is relatively quick, coal power plants are receiving a lot of attention right now.

2. Thermal power generation capacity is 28,000 MW in the 8th Plan and 32,000 MW in the 9th Plan.

iv. Renewable Energy:

1. Renewable energy contributes very little to total energy output.

2. Construction on a 100 MW ocean thermal energy conversion (OTEC) project, on the other hand, has begun.

Q3. What do you understand by energy storage?

Ans.

1. Power systems cannot function without energy storage technologies.

2. They assure the continuity of energy supply and promote system reliability.

3. Energy storage devices come in a variety of shapes and sizes. The form of the stored energy has a large impact on the size, cost, and scalability of an energy storage system.

4. Potential, kinetic, chemical, electromagnetic, and thermal energy can all be stored.

5. Some types of energy storage are better suited for small-scale systems, while others are only suitable for large-scale storage systems.

6. Chemical batteries, for example, are well suited for small systems ranging from watches and laptops to building backup systems.

7. Pumped hydropower storage, on the other hand, can only be found in large power systems and stores massive amounts of energy in the form of potential energy of water.

Q4. What are the key responsibilities of an energy engineer?

Ans. Key responsibilities of an energy engineer are as follows:

1. Identifying regions with high energy use and creating and developing energy-efficient processes in those areas.
2. Introducing new energy-efficient procedures and implementing them throughout the organisation to achieve maximum energy efficiency.
3. Conducting on-site and outdoor observations, gathering energy efficiency data, and analysing the energy efficiency process in use.
4. Evaluating energy efficiency by reviewing the organization's architectural, mechanical, and electrical plans, consulting engineers for the installation of energy efficient systems such as climate control systems, day lighting design, and so on, and preparing technical reports for the implementation of energy efficient design.
5. Taking a lead role in raising knowledge about installed energy-efficient technologies and actively supporting the usage of alternative energy resources.
6. Managing the construction, design, and development of energy management projects in accordance with federal department norms and budget requirements, as well as executing energy modelling, verification, and commissioning on a large scale industrial process.
7. Coordination with the project management team for overall energy management system installation analysis.

Q5. What do you mean by energy related enterprises?

Ans.

1. The energy enterprise includes all industries involved in the production and sale of energy, such as fuel extraction, manufacturing, refining, and distribution.
2. Modern society consumes a lot of fuel, and the energy business is an important aspect of practically every country's infrastructure and upkeep.
3. In particular, the energy enterprise comprises:
 - i. Petroleum industries (oil firms, petroleum refiners, fuel delivery, and end-user sales at gas stations), coal industries (extraction and processing), and natural gas industries (natural gas extraction, and coal gas manufacture, as well as distribution and sales),
 - ii. The electrical power industry, which includes electricity generation, delivery, and sales,
 - iii. The nuclear power industry,
 - iv. The renewable energy sector, which includes alternative energy and sustainable energy enterprises, as well as hydroelectric power, wind power, and solar power generation, as well as the production, distribution, and sale of alternative fuels, and
 - v. Traditional energy sector focused on the gathering and distribution of firewood, which is especially popular in poorer nations for cooking and heating.

Q6. Discuss about the optimization of energy consumption.

Ans.

1. Although energy is vital to production systems, production planners have not been given the tools necessary to explicitly incorporate energy into resource allocation models for overall production efficiency.
2. Optimum energy usage (OEU) will shift this paradigm by enabling best practises in energy resource allocation by making energy data visible across all layers of the production domain.
3. The realisation of OEU necessitates three methods to typical industrial use cases, which are discussed below:

i. Awareness of Energy Usage:

OEU is built on an understanding of energy. It causes fundamental behavioural changes at all levels of the manufacturing realm.

Energy awareness is woven into the fabric of company culture, beginning with simple, often free or low-cost initiatives to reduce energy consumption.

Production planners will begin incorporating energy requirements into material bills of sale.

ii. Efficient Consumption of Energy:

Efficient energy consumption is the accelerant for OEU.

Industrial consumers can integrate energy information by leveraging automation and manufacturing execution systems in order to align overall power consumption levels and timing with individual production requirements.

Energy monitoring and management encourage efficient usage and multiply the benefits of energy awareness by automating energy-saving actions.

iii. Transacting Energy for the Best Result :

The integrator for OEU is responsible for transacting energy for the greatest possible outcome.

The industrial consumer can connect with the power grid domain to procure and exchange energy for the best results by using asset management and internal facility and process energy delivery systems.