

PSN COLLEGE OF ENGINEERING AND TECHNOLOGY  
(An Autonomous Institution)  
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Department of Mechanical Engineering

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**501803 - ENERGY STUDIES QBank**

## UNIT - I ENERGY SOURCES

Fossil fuels – Nuclear Fuels – hydel – solar – wind – and bio fuels in India- Energy conservation- Nuclear energy through fission and fusion process.

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### PART A

1. What are the environmental impacts of burning fossil fuels?
2. What are some alternatives to fossil fuels for energy production?
3. What is the primary nuclear fuel used in nuclear reactors?
4. How is nuclear fuel processed before use in reactors?
5. What is hydropower?
6. What are the main components of a hydropower plant?
7. What role does a turbine play in hydropower generation?
8. How does small-scale hydropower benefit rural communities?
9. Name three types of renewable energy sources.
10. What are the environmental benefits of renewable energy compared to fossil fuels?
11. What are the environmental benefits of using biomass compared to fossil fuels?
12. What are the advantages of using agricultural residues as biomass feedstocks?
13. How can industries reduce energy consumption through efficiency measures?
14. How does biomass contribute to rural development and poverty alleviation?
15. What technological innovations are driving advancements in biomass energy?
16. Name two isotopes commonly used in nuclear fission reactors.
17. What role do control rods play in nuclear fission reactors?
18. How is nuclear fusion different from nuclear fission?
19. What conditions are required to achieve nuclear fusion?
20. What is the fuel used for nuclear fusion reactions?

### PART B

1. What are fossil fuels? How are fossil fuels formed?
2. What is nuclear fuel? Explain the different stages of the nuclear fuel cycle?
3. What are the main components of a hydropower plant? How does a dam contribute to hydropower generation?
4. What is renewable energy? How does solar energy contribute to electricity generation?
5. What is biomass? What role does biomass play in renewable energy production?
6. Why is energy conservation important? List the Best Ways to Conserve Energy in Daily Life.
7. What is nuclear energy? How does nuclear fission and fusion produce energy?

## **UNIT - II ENERGY CONVERSION**

Energy conversion from source to utility – Energy conversion of solar – Energy conversion of nuclear – Energy conversion of geothermal – Energy conversion of tide – and Energy conversion of wind energies- Energy conversion in Fuel cell (Hydrogen and PEM)

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### **PART A**

1. What is the role of a solar collector in solar thermal systems?
2. How do solar tracking systems improve energy conversion efficiency?
3. What is the efficiency range of typical solar photovoltaic panels?
4. Explain net metering in the context of solar energy conversion.
5. How is nuclear fuel utilized in energy conversion processes?
6. What safety measures are implemented in nuclear power plants for energy conversion?
7. Name two types of geothermal power plants used for energy conversion.
8. What is the role of geothermal heat pumps in energy conversion?
9. How does geothermal energy contribute to district heating systems?
10. What are the advantages of using PEM fuel cells in energy conversion?
11. Compare the energy conversion efficiency of solar PV cells and wind turbines.
12. Explain the concept of a smart grid and its role in energy conversion.
13. Discuss the role of energy storage systems in renewable energy conversion.
14. What are feed-in tariffs, and how do they support renewable energy conversion?
15. What is the the concept of energy return on investment (EROI) and its significance in energy conversion.
16. How does the lifecycle carbon footprint of a solar PV system compare to that of a coal-fired power plant?
17. What are the potential environmental impacts of large-scale wind farms?
18. What are floating wind turbines, and what advantages do they offer over traditional offshore wind turbines?
19. How tidal stream generators work and their potential for energy conversion.
20. How does a wind turbine convert wind energy into electrical energy?

## **PART B**

1. Write short notes on energy conversion
2. Explain in detail the process of energy conversion in solar photovoltaic (PV) systems
3. Explain the process of energy conversion in nuclear power plants, focusing on nuclear fission. Discuss the key components of a nuclear reactor.
4. Explain the process of energy conversion in geothermal power plants.
5. Explain the process of Energy conversion of tide
6. Explain the process of Energy conversion of wind energies-

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## **UNIT – III GLOBAL ENERGY SCENARIO**

Role of energy in economic development – social transformation – overall energy demand availability and consumption – depletion of energy resources and its impact on economy.

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1. How does energy access impact industrial growth?
2. What role does energy infrastructure play in attracting foreign investment?
3. How does energy efficiency contribute to economic growth?
4. What is the significance of energy diversification in economic resilience?
5. How does energy pricing affect economic development?
6. In what way does energy access impact education?
7. How does energy influence healthcare delivery?
8. What is the relationship between energy access and gender equality?
9. How does rural electrification contribute to social transformation?
10. What role does energy play in urbanization?
11. How does economic growth affect energy demand?
12. What is the impact of population growth on energy consumption?
13. What factors influence energy availability?
14. How does energy consumption impact environmental sustainability?

15. What are the economic consequences of depleting fossil fuels?
16. How does the depletion of energy resources affect energy security?
17. What is the impact of energy resource depletion on global markets?
18. How does energy scarcity affect poverty levels?
19. What role do renewable energy sources play in addressing the depletion of traditional energy resources?
20. How does energy consumption differ between developed and developing countries?

## **PART B**

1. Discuss the role of energy in driving economic development and explain how energy availability and infrastructure influence the economic growth of a nation.
2. Discuss the Trends in Sectoral Share of Commercial Energy Consumption
3. How does access to reliable and affordable energy contribute to social
4. What factors influence overall energy demand, availability, and consumption in a country,
5. Discuss about depletion of energy resources and its impact on economy.
6. What are the natural resources being depleted and what are the consequences?

## **UNIT – IV INDIAN ENERGY SCENARIO**

Commercial forms of energy - non commercial forms of energy – utilization pattern in past - utilization pattern in present - utilization pattern in future prediction- sector wise energy consumption.

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1. What are some examples of commercial forms of energy?
2. How is commercial energy typically traded and supplied?
3. What are non-commercial forms of energy?
4. How is non-commercial energy usually utilized in rural areas?
5. What was the primary source of energy for industrial activities in the 19th century?
6. How was energy utilized for transportation in the early 20th century?
7. What is the current primary source of electricity generation worldwide?
8. How has the use of renewable energy sources changed in recent years?
9. What is a major trend predicted for future energy consumption?
10. How is the role of electric vehicles expected to impact future energy consumption?
11. What sector is the largest consumer of energy globally?
12. How does the residential sector typically consume energy?
13. What energy sources are commonly used in the commercial sector?

14. How does the transportation sector contribute to energy consumption?
15. What changes are expected in the energy consumption patterns of the agricultural sector?
16. What role does energy efficiency play in reducing sector-wise energy consumption?
17. How has the energy consumption pattern in the residential sector evolved with the rise of smart technologies?
18. What impact do government policies have on sector-wise energy consumption?
19. How does the energy consumption pattern in developing countries differ from that in developed countries?
20. What future trends are anticipated in the utilization of energy across different sectors?

## **PART B**

1. What are commercial forms of energy, and how are they utilized?
2. What are non-commercial forms of energy, and how are they utilized?
3. Discuss the predicted utilization patterns of energy in the Past
4. Discuss the predicted utilization patterns of energy in the present.
5. Discuss the predicted utilization patterns of energy in the future
6. Examine the sector-wise energy consumption patterns.

## **UNIT – V ENERGY POLICY**

Energy policy issues at global level - Energy policy issues at national level- Energy policy issues at state level- electricity act 2003 – energy conversion act 2001.

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### **PART A**

1. What is a major global challenge in energy policy related to climate change?
2. How do international agreements, such as the Paris Agreement, influence global energy policies?
3. What role do global energy markets play in shaping energy policies?
4. How does energy access disparity between developed and developing countries impact global energy policy?
5. What is the significance of international energy cooperation for global energy security?
6. What are common objectives of national energy policies?

7. How do national policies address the challenge of transitioning from fossil fuels to renewable energy?
8. What role does energy efficiency play in national energy policies?
9. How do national energy policies address the issue of energy affordability?
10. What are the challenges of integrating decentralized energy sources into a national energy grid?
11. How do state energy policies differ from national policies?
12. What is the role of state governments in promoting renewable energy?
13. How do state-level policies address energy conservation?
14. What are the challenges faced by states in managing energy infrastructure?
15. How do state energy policies impact local economic development?
16. What is the primary objective of the Electricity Act 2003 in India?
17. How does the Electricity Act 2003 address the issue of power sector reforms?
18. What role does the Electricity Act 2003 play in consumer protection?
19. How does the Electricity Act 2003 support the development of renewable energy?
20. What is the significance of the State Electricity Regulatory Commissions (SERCs) under the Electricity Act 2003?

## **PART B**

1. What are the key energy policy issues at the global level, and how do they impact international efforts
2. What are the primary energy policy issues at the national level, and how do they affect
3. What are the key energy policy issues at the global level, and how do they impact international efforts
4. What are the main objectives of the Energy Conservation Act 2001 in India, and how does it promote energy efficiency across different sectors?

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