



**KINGS**

COLLEGE OF ENGINEERING



**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**QUESTION BANK**

**NAME OF THE SUBJECT: EE 1451 RENEWABLE ENERGY SOURCES  
YEAR / SEM : IV / VIII**

**UNIT- I**

**ENERGY SCENARIO**

**PART –A (2 Marks)**

1. List three non – conventional energy sources of electric energy in India.
2. Mention the present contribution of different types of plants in India.
3. List any two renewable sources of energy.
4. What is the approximate amount of total power generation in India?
5. Write any four differences between renewable and non renewable sources.
6. A force of 250N is used for pushing a 100Kg box through a distance of 5m along a horizontal floor. Calculate the work done and energy transformed.
7. Define energy.
8. What are the different forms of energy?
9. What are the compounds present in the coal.
10. Name the products that can be obtained from crude oil.
11. What are conventional sources of energy?
12. Name at least three green house gases responsible for global warming.

**PART-B (16 Marks)**

1. Write about the availability energy consumption pattern and growth rate in India. (16)
2. Explain why it is necessary to develop non-conventional method of generating electrical energy. (16)
3. (a) Discuss energy requirement of rural consumers and state the possible alternative source of energy to meet the demand. (8)  
(b) What are the prospects of renewable energy sources in India? (8)
4. Discuss the following (a) Obstacle to the implementation of renewable energy sources. (8)  
(b) Advantages of renewable energy sources. (8)
5. What are the conventional sources of energy and explain briefly? (16)
6. What are the non-conventional sources of energy and explain briefly? (16)
7. Explain the following in briefly.  
(i) Global environmental crisis  
(ii) Kyoto protocol

- (iii) CDM
- (iv) Prototype carbon funds (16)
- 8. (a) What is Kyoto protocol and what are its implications for developed and developing countries. (8)
- (b) Explain CDM and its objectives. (8)
- 9. (a) What are the uses of prototype carbon fund (8)
- (b) Explain ozone layer depletion problem. (8)

## **UNIT – II**

### **SOLAR ENERGY**

#### **PART –A (2 Marks)**

1. Write a note on total solar energy received in India.
2. Give three types of solar energy collectors.
3. Mention any two applications of solar energy.
4. Define solar insolation.
5. Define solar constant.
6. Define solar attitude angle.
7. Define incident angle.
8. Define collector efficiency.
9. Define solar energy.
10. What is diffuse radiation?
11. What are the instruments used for measuring solar radiation and sunshine?
12. What are the components of solar water heater?
13. Define PV effect.
14. What are the different applications of solar PV system in rural area?

#### **PART-B (16 Marks)**

1. Write short notes on different types of solar energy collectors with neat diagrams. (16)
2. Write short notes on (a) Solar radiation
- (b) Power generation using solar tower concept. (16)
3. (a) Explain the principle of conversion of solar energy into heat. (8)
- (b) What are the main components of a flat plate solar collector, explain the function of each? (8)
4. (a) Enumerate the different types of concentrating type collectors. (10)
- (b) Why orientation is needed in concentrating type collectors? (6)
5. With the help of a neat sketch describe a solar heating system using water heating solar collectors. What are the advantages and disadvantages of this method? (16)
6. What is the principle of solar photovoltaic power generation? What are the main elements of a PV system? (16)
7. (a) What are the advantages and disadvantages of PV solar energy conversion? (8)
- (b) Write short notes on
- (i) Solar pumping
- (ii) Solar Cooking
- (iii) Solar arrays. (8)
8. Explain the principle of building integrated PV system with suitable sketch. (16)

9. (a) Explain the equivalent circuit for solar PV panel. (8)  
(b) Explain the different characteristics of PV system. (8)
10. Explain with a neat sketch the working principle of standalone and grid Connected solar system. (16)
11. (a) Explain about the applications of solar PV system in rural areas. (10)  
(b) Describe briefly about PV system. (6)

## UNIT – III

### WIND ENERGY PART –A (2 Marks)

1. What is wind power?
2. Mention two important wind turbine generator installations in India.
3. Write and explain wind power equation.
4. What is the type of generator used in wind power plant?
5. Define Tip speed ratio.
6. What are wind farms?
7. How the wind mills are classified?
8. What are the advantages of wind power?
9. What are the disadvantages of wind power?
10. Define Vertical Axis Wind Turbine (VAWT).
11. What is meant by pitch angle?
12. What is meant by pitch control?
13. What is called teethering?

### PART-B (16 Marks)

1. Explain briefly about the horizontal wind mills with neat sketch? (16)
2. Explain briefly about the vertical wind mills with neat sketch? (16)
3. (a) State the essential features of a probable site for a wind form. (8)  
(b) Explain the terms
  - i. Yaw control
  - ii. Pitch control
  - iii. Teethering control (8)
4. Distinguish clearly between
  - (a) Constant speed constant frequency WTG unit.
  - (b) Variable speed constant frequency WTG system.
  - (c) Nearly constant speed constant frequency system. (16)
5. (a) Why a tall tower is essential for mounting a horizontal axis wind turbine ? (8)  
(b) Describe the electrical layout of a typical wind form by means of single line diagram.  
State the essential equipment. (8)
6. With a neat diagram, explain how wind energy can be converted into electrical energy.(16)
7. Explain the principle and application of wind electric system. State the basic Components and their working in wind electric system. (16)
8. Explain with a neat diagram the working of various types of wind generators. (16)

## UNIT IV

### OTHER ENERGY SOURCES

#### PART –A (2 Marks)

1. Name a few projects harnessing tidal power.
2. What is geothermal power?
3. Discuss the disadvantages of geothermal plant.
4. Discuss the advantages of geothermal plant.
5. What are the special problems in construction of barriers for tidal scheme?
6. Give the advantages of tidal power plant.
7. Mention the type of tidal power turbine.
8. Mention some organic materials used in bio-mass plant.
9. Write any two items used as biomass fuels.
10. Differentiate tide and wave.
11. Classify the geothermal sources.
12. What are the spring and neap tides?
13. What are the constituents of biogas?

#### PART-B (16 Marks)

1. (a) Explain how ocean tides are generated and how the power can be tapped?  
Discuss the limitations of this method. (10)  
(b) Describe the construction and principle of operation of a turbine used for tidal power. (6)
2. Explain with neat sketches, the operation of a geothermal power plant. (16)
3. (a) Write short note on bio energy from agriculture waste. (8)  
(b) Write short note on bio energy by burning plants. (8)
4. Explain with neat sketch, the methods of operation of tidal power generation. (16)
5. What is geothermal energy? How can geothermal energy are utilized for electric power Generation? (16)
6. (a) Write about energy from biomass. (8)  
(b) Write about energy from biogas. (8)
7. (a) What are the factors affecting biogas generation. (8)  
(b) Describe the single basin arrangement in tidal power generation. (8)
8. (a) What are the advantages and limitations of wave energy conversion? (8)  
(b) Write short notes on wave energy conversion machines. (8)
9. (a) Describe the different types of turbines in use for small scale hydroelectric Power Plants. (8)  
(b) What are the advantages and limitations of small scale hydroelectric power? (8)
10. What are the main types of OTEC power plants? Describe their working in brief. (16)
11. (a) How are the gasifiers classified? What is pyrolysis? (8)  
(b) What are the potential applications of the gasifier? (8)

## UNIT-V

### ENERGY STORAGE AND HYBRID SYSTEM CONFIGURATIONS

**PART –A (2 Marks)**

1. List some applications of fuel cells.
2. List the types of fuel cells.
3. What are the main components of fuel cell?
4. What do you mean by flywheel energy storage?
5. List out different methods of energy storage.
6. Give the classification of batteries.
7. Define energy efficiency.
8. Define life cycle of the battery.
9. What do you mean by power capacity?
10. What is specific power?
11. What are the advantages of flywheel over batteries?
12. What is the principle of ultracapacitor?
13. Draw the equivalent circuit of a battery.

**PART-B (16 Marks)**

1. Explain the performance characteristics of battery and its equivalent circuit. (16)
2. Explain the procedure for designing a battery. (16)
3. Explain energy storage using flywheels. (16)
4. Explain fuel cell energy storage. (16)
5. Explain storage systems using ultra capacitors. (16)
6. What is a fuel cell? Describe the principle of working of a fuel cell with reference to H<sub>2</sub> – O<sub>2</sub> cell. (16)
7. (a) What is polarization? List the different types of polarizations that occur in fuel cells. Show how does the electrode structure help in reducing the polarization? (10)  
(b) What are the advantages and disadvantages of a fuel cell? (6)
8. a) Explain the working principle of batteries. (8)  
b) Explain the various types of batteries (8)
9. a) Explain the different methods of battery charging. (8)  
b) Explain the various types of charge regulators for batteries. (8)
10. a) Explain the principle of fly wheel operation and derive the energy relation equation.(10)  
b) What are the advantages of fly wheel over batteries? (6)
11. a) Explain the construction and working principle of fuel cell with neat sketch. (10)  
b) What are the advantages and disadvantages of fuel cell? (6)
12. a) Explain the working principle of ultra capacitors with a neat sketch. (10)  
b) What are the advantages and disadvantages of ultra capacitors? (6)

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