Unit I

Worksheet – Multiple Choice Questions (20)

1. Which characteristic of electricity requires generation and consumption to occur simultaneously?

a) Electricity can be stored indefinitely
b) Electricity is consumed when generated
c) Electricity is always renewable
d) Electricity is portable

Answer: b) Electricity is consumed when generated

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2. What happens if there is an imbalance between electricity supply and demand?

a) Lower fuel consumption
b) Increased storage capacity
c) Damage to power quality and stability
d) Reduced transmission losses

Answer: c) Damage to power quality and stability

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3. During peak demand periods, utilities often use:

a) Only solar plants
b) Pumped hydro only
c) Oil and gas-fired generators
d) Wind turbines only

Answer: c) Oil and gas-fired generators

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4. Time shifting with EES involves:

a) Increasing transmission voltage
b) Storing energy during off-peak hours and using it during peak hours
c) Building new power plants
d) Reducing renewable generation

Answer: b) Storing energy during off-peak hours and using it during peak hours

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5. Which energy source may provide surplus energy at no fuel cost?

a) Coal
b) Diesel
c) Nuclear
d) Solar and Wind

Answer: d) Solar and Wind

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6. The "kilowatt function" of a generator refers to:

a) Frequency control
b) Voltage regulation
c) Generating sufficient power when needed
d) Energy storage

Answer: c) Generating sufficient power when needed

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7. Which EES technology is widely used to provide large amounts of power during shortages?

a) Lead-acid battery
b) Pumped hydro storage
c) Flywheel
d) Capacitor

Answer: b) Pumped hydro storage

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8. A UPS system mainly protects against:

a) Fuel shortages
b) Voltage sag and power interruptions
c) Water shortages
d) High electricity prices

Answer: b) Voltage sag and power interruptions

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9. Congestion in power grids occurs when:

a) Demand is very low
b) Power flow exceeds transmission capability
c) Frequency is constant
d) Batteries are fully charged

Answer: b) Power flow exceeds transmission capability

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10. EES installed at substations can help:

a) Increase fossil fuel use
b) Eliminate generators
c) Mitigate congestion
d) Reduce electricity demand permanently

Answer: c) Mitigate congestion

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11. One major emerging need for EES is:

a) Increased coal consumption
b) More renewable energy integration
c) Elimination of transmission lines
d) Reduced electrification

Answer: b) More renewable energy integration

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12. Renewable energy output fluctuations mainly affect:

a) Fuel storage
b) System frequency control
c) Water supply
d) Building construction

Answer: b) System frequency control

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13. Which vehicle type relies heavily on EES technology?

a) Steam vehicle
b) Diesel vehicle
c) Electric vehicle (EV)
d) Bicycle

Answer: c) Electric vehicle (EV)

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14. In Smart Grids, EES can be used for:

a) Congestion mitigation
b) Voltage support
c) Load shifting
d) All of the above

Answer: d) All of the above

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15. Which system helps homeowners monitor and manage energy use?

a) SCADA
b) HEMS
c) GIS
d) GPS

Answer: b) HEMS

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16. Which role of EES requires high cycle stability and short duration?

a) Time shifting
b) Long-term storage
c) Voltage quality maintenance
d) Seasonal storage

Answer: c) Voltage quality maintenance

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17. Utilities use time shifting primarily to:

a) Increase peak demand
b) Reduce generation costs
c) Reduce renewable generation
d) Eliminate storage systems

Answer: b) Reduce generation costs

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18. Which industry is highly sensitive to momentary power interruptions?

a) Agriculture
b) Mining
c) Semiconductor manufacturing
d) Textile manufacturing

Answer: c) Semiconductor manufacturing

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19. V2G stands for:

a) Vehicle to Generator
b) Voltage to Grid
c) Vehicle to Grid
d) Vehicle to Garage

Answer: c) Vehicle to Grid

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20. Long-term storage for very high renewable penetration may require:

a) Coal storage
b) Hydrogen and SNG technologies
c) Diesel generators only
d) Nuclear batteries

Answer: b) Hydrogen and SNG technologies

Worksheet – Fill in the Blanks (20)

1. Electricity must be consumed at the same time it is _____.

Answer: generated

2. An imbalance between supply and demand affects voltage and _____.

Answer: frequency

3. Electricity prices are generally higher during _____ demand periods.

Answer: peak

4. EES can store electricity during _____ hours and use it during peak hours.

Answer: off-peak

5. Coal-fired and nuclear plants are considered _____ load power plants.

Answer: base

6. The ability to generate sufficient power when needed is called the _____ function.

Answer: kilowatt

7. Renewable sources such as solar and wind generally lack adequate _____ control capability.

Answer: frequency

8. _____ hydro storage is widely used for large-scale energy storage.

Answer: Pumped

9. A UPS protects equipment from voltage _____.

Answer: sag

10. Power flow concentration in transmission lines can cause _____.

Answer: congestion

11. EES can help postpone the reinforcement of power _____.

Answer: networks

12. The two major emerging needs for EES are renewable energy integration and the _____ Grid.

Answer: Smart

13. Thermal generators maintain system frequency by adjusting their _____.

Answer: output

14. Plugin Hybrid Electric Vehicles are abbreviated as _____.

Answer: PHEVs

15. Electric Vehicles are abbreviated as _____.

Answer: EVs

16. Home Energy Management System is abbreviated as _____.

Answer: HEMS

17. Utilities use EES for _____ shifting to reduce generation costs.

Answer: time

18. EES can improve power quality by supporting voltage and _____ control.

Answer: frequency

19. Vehicle-to-Home technology is abbreviated as _____.

Answer: V2H

20. Vehicle-to-Grid technology is abbreviated as _____.

Answer: V2G