ADVANCES MATHEMATICS, PHYSICAL & CHEMICAL SCIENCES

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SEM I OBJECTIVE QUESTION BANK physics

Advances and Mathematics and Physical and Chemical Sciences

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

Renewable energy generation

1. Solar Energy:What is the primary source of energy in solar power generation?
    i. Wind
    ii. Sun
    iii. Fossil Fuels
    iv. Geothermal

2. Wind Energy: How does a wind turbine convert wind energy into electricity?
    i. Solar Panels
    ii. Gearbox
    iii. Generator
    iv. Battery

3. Hydropower: What is the main principle behind hydropower generation?
    i. Solar Heat
    ii. Wind Movement
    iii. Flowing Water
    iv. Biomass Combustion

4. Biomass Energy: What is a common biomass feedstock for energy production?
    i. Coal
    ii. Natural Gas
    iii. Wood
    iv. Nuclear Fuel

5. Geothermal Energy: How is geothermal energy primarily harnessed for electricity generation?
    i. Wind Turbines
    ii. Steam Turbines
    iii. Photovoltaic Cells
    iv. Tidal Generators

6. Tidal and Wave Energy: What is the main difference between tidal energy and wave energy?
    i. Source of Energy
    ii. Location of Power Plants

iii. Technology Used
iv. Environmental Impact

7. Energy Storage: Why is energy storage crucial for renewable energy integration?
i. To Reduce Carbon Emissions
ii. To Store Excess Energy
iii. To Increase Energy Production
iv. To Minimize Cost

8. Renewable Energy Policy: What is the purpose of a Renewable Portfolio Standard (RPS)?
i. To Limit Renewable Energy Production
ii. To Set Standards for Energy Efficiency
iii. To Promote Renewable Energy Adoption
iv. To Tax Fossil Fuel Consumption

9. Global Renewable Trends: Which countries are among the top leaders in solar energy capacity?
i. China and India
ii. USA and Russia
iii. Brazil and Mexico
iv. Germany and Japan

10. Challenges and Future Prospects: What is a common challenge associated with the intermittent nature of renewable energy?
i. Overproduction
ii. Energy Storage
iii. Consistent Supply
iv. Low Initial Costs

Energy storage

11. What is the primary purpose of energy storage systems?
A. Electricity generation
B. Energy conservation
C. Energy distribution
D. Managing energy supply-demand balance

12. Which of the following is a commonly used technology for grid-scale energy storage?
A. Lithium-ion batteries
B. Flywheels
C. Supercapacitors
D. All of the above

13. What is the round-trip efficiency of a typical lithium-ion battery?

A. 50-60%
B. 70-80%
C. 90-95%
D. 100%

14. Which energy storage technology stores energy by lifting heavy objects against gravity?
A. Pumped hydro storage
B. Compressed air energy storage
C. Flywheel energy storage
D. Thermal energy storage

15. What is the key advantage of redox flow batteries over conventional batteries?
A. Higher energy density
B. Longer lifespan
C. Scalability
D. Faster charging times

16. What role do supercapacitors play in energy storage systems?
A. Long-term energy storage
B. Peak power support
C. Energy conversion
D. Thermal management

17. Which form of energy storage is often used for short-duration, high-power applications such as uninterruptible power supplies (UPS)?
A. Lithium-ion batteries
B. Supercapacitors
C. Pumped hydro storage
D. Flywheel energy storage

18. What is the primary challenge associated with the intermittency of renewable energy sources, and how does energy storage help address it?
A. Overproduction of energy; storage prevents wastage
B. Inconsistency in energy supply; storage provides a buffer
C. High cost of renewable energy; storage reduces expenses
D. Lack of public interest; storage increases awareness

19. In the context of thermal energy storage, what is sensible heat storage?
A. Storing heat through a change in temperature
B. Storing heat through a phase change (e.g., melting ice)
C. Storing heat in chemical reactions
D. Storing heat in magnetic fields

20. Which of the following is an example of distributed energy storage?

A. Utility-scale pumped hydro storage
B. Residential solar panels
C. Large-scale compressed air energy storage
D. Grid-connected flow battery system

Energy efficient materials

21. What are the key characteristics of energy-efficient materials?
A. High thermal conductivity
B. Low thermal conductivity
C. High electrical conductivity
D. Low electrical conductivity

22. Which of the following materials is commonly used for insulation in energy-efficient buildings?
A. Aluminum
B. Copper
C. Fiberglass
D. PVC

23. What is the purpose of low-emissivity (low-e) coatings on windows in terms of energy efficiency?
A. To reduce heat absorption
B. To enhance visible light transmission
C. To minimize heat loss
D. To increase solar heat gain

24. Which type of roofing material is known for its high reflectivity and heat emissivity, contributing to energy efficiency in buildings?
A. Asphalt shingles
B. Metal roofing
C. Clay tiles
D. Concrete tiles

25. What property makes LED lighting more energy-efficient compared to traditional incandescent bulbs?
A. Higher luminous efficacy
B. Lower luminous efficacy
C. Higher heat emission
D. Lower color rendering index

26. In the context of energy-efficient HVAC systems, what is the role of programmable thermostats?

A. Maintaining constant temperature
B. Allowing manual temperature adjustments
C. Automatically adjusting temperature based on a schedule
D. Controlling humidity levels only

27. Which material is commonly used for energy storage in solar thermal systems?
A. Lithium-ion
B. Concrete
C. Phase-change materials
D. Copper

28. What is the purpose of cool roof materials in energy-efficient building design?
A. To absorb and retain heat
B. To reflect sunlight and reduce heat absorption
C. To increase thermal conductivity
D. To enhance insulation properties

29. What characteristic makes double-glazed windows more energy-efficient than single-glazed windows?
A. Increased solar heat gain
B. Higher visible light transmission
C. Reduced air leakage
D. Enhanced thermal insulation

30. Which of the following is an example of a sustainable and energy-efficient building material?
A. Traditional timber
B. Recycled steel
C. Conventional concrete
D. PVC pipes

Energy efficient devices

31. What is the primary goal of energy-efficient devices?
a. To consume more energy
b. To waste energy
c. To minimize energy consumption
d. To maximize energy production

32. Which of the following is a common feature of energy-efficient appliances?
a. High energy consumption
b. Low energy consumption
c. No impact on energy usage
d. Variable energy consumption

33. What does the term "standby power" refer to in the context of energy-efficient devices?
a. Power consumed when the device is in active use
b. Power consumed when the device is turned off but still plugged in
c. Power generated by renewable sources
d. Power consumed during maintenance of the device

34. Which certification label is often used to identify energy-efficient products in the United States?
a. ISO 9001
b. ENERGY STAR
c. CE Mark
d. UL Listed

35. What technology is commonly employed in energy-efficient lighting?
a. Incandescent bulbs
b. Compact fluorescent lamps (CFL)
c. Traditional halogen bulbs
d. Neon lights

36. What does the term "EER" stand for in the context of energy-efficient air conditioners?
a. Energy Efficiency Ratio
b. Efficient Energy Reservoir
c. Eco-friendly Emission Rate
d. Electrical Efficiency Register

37. Which of the following is an example of a smart energy-efficient device?
a. Traditional thermostat
b. Smart thermostat with scheduling capabilities
c. Incandescent light bulb
d. Conventional electric heater

38. What is the purpose of variable-speed drives in energy-efficient systems?
a. To maintain a constant speed
b. To adjust the speed based on demand
c. To increase energy consumption
d. To control temperature only

39. Which of the following materials is commonly used for insulation in energy-efficient buildings?
a. Aluminum
b. Concrete
c. Fiberglass
d. Copper

40. What is the significance of the EnergyGuide label on appliances?
a. It provides information on energy consumption and estimated operating costs.
b. It indicates the brand name of the product.
c. It certifies that the product is made from recycled materials.
d. It signifies the product's color options.

Quantum dot

41. What are quantum dots?
A. Subatomic particles
B. Nanoscale semiconductor particles
C. Quantum mechanical equations
D. Magnetic resonance imaging agents

42. Which property of quantum dots can be tuned by changing their size?
A. Color of emitted light
B. Electrical conductivity
C. Magnetic moment
D. Density

43. What is the typical size range of quantum dots in nanometers?**
A. 1-10 nm
B. 50-100 nm
C. 500-1000 nm
D. 1000-5000 nm

44. Which semiconductor materials are commonly used in the fabrication of quantum dots?
A. Silicon
B. Gallium arsenide
C. Both A and B
D. Neither A nor B

45. How do quantum dots emit light?
A. Thermoluminescence
B. Electroluminescence
C. Photoluminescence
D. Chemiluminescence

46. What application is NOT associated with quantum dots?
A. Solar cells
B. Quantum computing
C. Gene editing

D. Biological imaging

47. Which phenomenon allows quantum dots to exhibit quantum confinement?
A. Photoelectric effect
B. Quantum tunneling
C. Quantum entanglement
D. Quantum confinement effect

48. In quantum dot displays, what advantage do quantum dots provide over traditional LED displays?
A. Higher power consumption
B. Narrower color spectrum
C. Improved color accuracy
D. Lower resolution

49. What is the term for the ability of quantum dots to absorb light at one wavelength and emit it at another?
A. Photoluminescence
B. Quantum entanglement
C. Stokes shift
D. Fermi resonance

50. Which scientist is credited with the discovery of quantum dots?
A. Albert Einstein
B. Richard Feynman
C. Charles Townes
D. Linus Pauling

Quantum communications

51. What is quantum communication?
A. Communication using classical signals
B. Communication using quantum states
C. Communication using radio waves
D. Communication using Morse code

52. What is the fundamental principle of quantum communication?
A. Entanglement
B. Superposition
C. Classical determinism
D. Quantum tunneling

53. Which quantum property allows for secure communication?

A. Uncertainty principle
B. Quantum entanglement
C. Superposition
D. Quantum teleportation

54. What is the term for the process of encoding information onto quantum states?
A. Quantum entanglement
B. Quantum encoding
C. Quantum key distribution
D. Quantum modulation

55. Which quantum communication protocol is commonly used for secure key exchange?
A. Quantum tunneling
B. Quantum key distribution (QKD)
C. Quantum teleportation
D. Quantum encryption

56. What is quantum superposition in the context of quantum communication?
A. The simultaneous existence of multiple quantum states
B. The collapse of a quantum state to a single possibility
C. The uncertainty of quantum measurements
D. The speed of quantum communication

57. What is the significance of quantum entanglement in quantum communication?
A. It allows for faster-than-light communication.
B. It enables the secure distribution of cryptographic keys.
C. It enhances the reliability of classical communication.
D. It facilitates quantum teleportation.

58. Which quantum communication application aims to achieve teleportation of quantum information?
A. Quantum key distribution
B. Quantum teleportation
C. Quantum superposition
D. Quantum tunneling

59. What is the No-Cloning Theorem in quantum communication?
A. It prohibits the creation of identical copies of an arbitrary unknown quantum state.
B. It allows for unlimited copying of quantum information.
C. It restricts quantum communication to certain specific states.
D. It ensures the security of quantum encryption.

60. In quantum key distribution, what is the purpose of the quantum channel?
A. To transmit classical information

B. To transmit quantum states for key generation
C. To amplify quantum signals
D. To establish a classical communication link

Recent Advances in Biophysics

61. What is single-molecule biophysics, and how has it contributed to our understanding of biological systems?
a. Studying only one type of molecule
b. Investigating individual molecules to understand their behavior
c. Examining large populations of molecules simultaneously

62. How does cryo-electron microscopy (cryo-EM) contribute to the field of biophysics?
a. By using high temperatures to visualize biological structures
b. By freezing biological samples to obtain high-resolution images
c. By using X-rays to study the dynamics of biological molecules

63. What is the significance of optogenetics in biophysics research?
a. It involves the use of optical techniques to study geology
b. It allows researchers to control and manipulate cells using light
c. It focuses on studying the impact of gravity on biological systems

64. Which biophysical technique is used to study the interactions between biomolecules in real-time?
a. Nuclear Magnetic Resonance (NMR)
b. Fluorescence Resonance Energy Transfer (FRET)
c. X-ray crystallography

65. What is the main advantage of microscale thermophoresis in biophysics experiments?
a. High-resolution imaging
b. Label-free and minimal sample requirements
c. Simultaneous measurement of multiple parameters

66. How does atomic force microscopy (AFM) differ from other imaging techniques such as electron microscopy?
a. AFM uses electrons to image samples
b. AFM provides 3D images by scanning a probe over the sample surface
c. AFM relies on magnetic resonance for imaging

67. What is the role of computational biophysics in understanding biological systems?
a. Studying biological systems only in a laboratory setting
b. Using computer simulations to model and analyze biological processes
c. Analyzing biophysical parameters using statistical methods

68. How does fluorescence spectroscopy contribute to the study of protein folding?**
a. By measuring the absorbance of proteins
b. By detecting changes in fluorescence emission during folding
c. By studying the magnetic properties of proteins

69. What is the purpose of patch clamp electrophysiology in biophysics?
a. Measuring the electrical activity of a single ion channel
b. Studying the color changes in biological samples
c. Analyzing the mechanical properties of cells

70. In the context of biophysics, what is the significance of circular dichroism spectroscopy?
a. Studying the circular motion of biological molecules
b. Analyzing the absorption of circularly polarized light by chiral molecules
c. Examining the electrical conductivity of biological membranes

Medical Physics

71. Radiation Physics:What is the unit of measurement for absorbed dose in radiation therapy?
A) Roentgen
B) Gray (Gy)
C) Sievert (Sv)
D) Becquerel (Bq)

72. Which type of radiation has the highest linear energy transfer (LET)?
A) X-rays
B) Gamma rays
C) Alpha particles
D) Beta particles

73. What is the purpose of a bolus in radiation therapy?
A) To increase scatter radiation
B) To decrease skin dose
C) To reduce beam penetration
D) To enhance image contrast

74. Medical Imaging:What is the main principle behind magnetic resonance imaging (MRI)?
A) X-ray absorption
B) Nuclear decay
C) Magnetic resonance
D) Ultrasound reflection

75. In computed tomography (CT), what is the function of the gantry?

A) Generate X-rays
B) Rotate around the patient
C) Produce magnetic fields
D) Display images

76. Which imaging modality is based on the detection of emitted positrons?
A) CT
B) MRI
C) PET
D) Ultrasound

77. Nuclear Medicine:What is the purpose of a radiopharmaceutical in nuclear medicine?
A) To shield radiation
B) To enhance image resolution
C) To deliver therapeutic doses
D) To administer contrast in CT scans

78. Which radionuclide is commonly used in bone scans?
A) Technetium-99m
B) Iodine-131
C) Fluorine-18
D) Cobalt-60

79. What is the half-life of a radioactive isotope?
A) The time it takes for half of the atoms to decay
B) The time it takes for the activity to double
C) The time it takes for the radiation to reach equilibrium
D) The time it takes for the isotope to lose its radioactivity

80. Radiation Protection:What is the primary purpose of lead aprons in radiography?
A) Absorb scattered radiation
B) Shield against magnetic fields
C) Enhance image contrast
D) Reduce patient dose

81. What is the recommended annual occupational dose limit for radiation workers?
A) 1 mSv
B) 5 mSv
C) 50 mSv
D) 100 mSv

82. What is the concept of ALARA in radiation protection?
A) As Low As Reasonably Achievable
B) Absorbed Linear Attenuation Rate Assessment

C) Annual Limit of Absorption and Radiation Assessment
D) Achieving Lowest Allowable Radiation Accumulation

Shape memory materials

83. What is the primary characteristic of shape memory materials?
a. High thermal conductivity
b. Shape recovery
c. Brittleness
d. Low melting point

84. Which of the following is a common shape memory alloy?
a. Aluminum
b. Copper
c. Nitinol
d. Brass
85. What is the mechanism behind the shape memory effect in materials?
a. Elastic deformation
b. Plastic deformation
c. Martensitic transformation
d. Creep

86. At what temperature does the shape memory alloy typically undergo a reversible phase transformation?
a. Austenitic start temperature (As)
b. Martensitic start temperature (Ms)
c. Austenitic finish temperature (Af)
d. Martensitic finish temperature (Mf)

87. Which application is NOT commonly associated with shape memory alloys?
a. Biomedical devices
b. Actuators
c. Smart textiles
d. Insulation materials

88. What is the key advantage of using shape memory materials in biomedical applications?
a. Low cost
b. Corrosion resistance
c. Biocompatibility
d. High electrical conductivity

89. Which factor does NOT influence the shape memory effect in materials?
a. Alloy composition

b. Loading frequency
c. Heat treatment
d. Sample size

90. What is the role of stress in triggering the shape memory effect?
a. No role, stress is irrelevant
b. Stress stabilizes the high-temperature phase
c. Stress induces phase transformation
d. Stress decreases material stability

91. Which phase is stable at higher temperatures in a shape memory alloy?
a. Austenitic phase
b. Martensitic phase
c. Elastic phase
d. Plastic phase

92. What is the primary challenge associated with cyclic loading in shape memory materials?
a. Loss of biocompatibility
b. Fatigue failure
c. Decreased thermal conductivity
d. Enhanced shape recovery

Nanotechnology

93. What is nanotechnology?
A. Study of giant structures
B. Manipulation of matter at the nanoscale
C. Study of celestial bodies
D. Exploration of deep-sea organisms

94. What is the typical length scale associated with nanotechnology?
A. Millimeters
B. Centimeters
C. Nanometers
D. Meters

95. Which scientist is often credited with the concept of nanotechnology?
A. Albert Einstein
B. Richard Feynman
C. Marie Curie
D. Isaac Newton

96. What is a quantum dot?
A. Subatomic particle

B. Nanoscale semiconductor
C. Tiny robotic device
D. Microorganism

97. Which property makes carbon nanotubes unique?
A. High electrical conductivity
B. Extreme brittleness
C. Low melting point
D. Water solubility

98. What does the term "bottom-up approach" refer to in nanotechnology?
A. Starting with larger materials and breaking them down
B. Building structures atom by atom or molecule by molecule
C. Analyzing materials using scanning electron microscopy
D. None of the above

99. Which of the following is an application of nanotechnology in medicine?
A. Targeted drug delivery
B. Weather prediction
C. Bridge construction
D. Space exploration

100. What is the significance of the term "self-assembly" in nanotechnology?
A. Materials organizing themselves into specific structures
B. Automatic manufacturing of nanomachines
C. Nanoparticles disassembling on their own
D. None of the above

101. What is the potential environmental impact of nanotechnology?
A. Increased pollution
B. Improved waste management
C. Enhanced energy efficiency
D. None of the above

102. Which material is commonly used in nanoelectronics due to its semiconductor properties?
A. Gold
B. Silicon
C. Aluminum
D. Copper

Nano science

103. What is the size range typically associated with nanomaterials?

a. 1-10 micrometers
b. 1-100 nanometers
c. 100-1000 nanometers
d. 1-1000 micrometers

104. Which technique is commonly used for imaging and manipulating individual atoms on surfaces?

a. Scanning Electron Microscopy (SEM)
b. Transmission Electron Microscopy (TEM)
c. Atomic Force Microscopy (AFM)
d. X-ray Diffraction (XRD)

105. What is the term for the phenomenon where nanoparticles aggregate and form larger structures?

a. Nanotization
b. Agglomeration
c. Nanoassembly
d. Nanoclustering

106. Which property makes carbon nanotubes and graphene suitable for various applications in nanoscience?

a. Brittleness
b. Conductivity
c. Opacity
d. Insulation

107. What is the significance of the term "quantum dots" in nanoscience?

a. Nanoparticles with unique optical and electronic properties
b. Extremely small quantum computers
c. Quantum-sized black holes
d. Quantum mechanical equations for nanomaterials

108. Which of the following is not a bottom-up approach in nanofabrication?

a. Chemical Vapor Deposition (CVD)
b. Sol-Gel Method

c. Lithography
d. Self-Assembly

109. What is the primary driving force behind the enhanced reactivity of nanoparticles compared to bulk materials?

a. Increased mass
b. Larger surface area
c. Lower density
d. Reduced surface energy

110. Which Nobel Prize-winning discovery is associated with the development of scanning tunneling microscopy (STM)?

a. X-rays
b. DNA structure
c. Fullerenes
d. Quantum mechanics of solids

111. What is the term for the ability of certain materials to exhibit different properties at the nanoscale compared to the macroscale?

a. Quantum leap
b. Nanophase transition
c. Nanoscale effect
d. Size-dependent phenomena

112. In the context of nanotechnology, what does the acronym MEMS stand for?

a. Micro Energy Materials Science
b. Miniature Electronic Manufacturing Systems
c. Micro Electro Mechanical Systems
d. Molecular Engineering of Nanostructures

Advances Nanotechnology

113. What is nanotechnology?
A. Study of large-scale structures
B. Manipulation of matter at the nanoscale
C. Study of celestial bodies
D. Study of microbiology

114. Which is a characteristic length scale of nanotechnology?
A. Micrometer

B. Centimeter
C. Nanometer
D. Millimeter

115. What is the significance of quantum effects in nanotechnology?
A. They are not relevant at the nanoscale
B. Quantum effects become dominant at the nanoscale
C. They only affect biological systems
D. They are limited to macroscopic materials

116. Which material is often referred to as a carbon nanotube?
A. Silicon
B. Graphene
C. Buckminsterfullerene
D. Carbon fiber

117. What is the primary application of gold nanoparticles in medicine?
A. Energy storage
B. Drug delivery
C. Optical computing
D. Water purification

118. Which term is used to describe self-assembly at the nanoscale?
A. Microfabrication
B. Macroassembly
C. Bottom-up approach
D. Top-down approach

119. What is a quantum dot used for in nanotechnology?
A. Biological imaging
B. Mechanical engineering
C. Energy production
D. Structural analysis

120. Which technique allows the imaging of nanoscale structures using a sharp metal tip?
A. X-ray diffraction
B. Scanning tunneling microscopy (STM)
C. Atomic force microscopy (AFM)
D. Transmission electron microscopy (TEM)

121. What is the potential application of nanosensors?
A. Studying large organisms
B. Detecting and monitoring diseases
C. Agricultural irrigation

D. Space exploration

122. Which of the following is a concern in the field of nanotechnology safety?
A. Rapid progress
B. Lack of applications
C. Environmental impact
D. Limited funding

Fill in Blanks & Very Short Answer questions

Energy storage

1. The primary objective of energy storage systems is to _____.

The primary objective of energy storage systems is to store excess energy during periods of low demand and release it when demand is high, ensuring a reliable and stable power supply.

2. Energy storage helps address the challenge of intermittent renewable energy sources by _____.

Energy storage helps address the challenge of intermittent renewable energy sources by storing surplus energy generated during peak production periods and releasing it when renewable sources are not actively producing, ensuring a continuous and reliable power supply.

3. One key benefit of energy storage in grid management is _____.

One key benefit of energy storage in grid management is the ability to enhance grid stability by providing fast-response capabilities, balancing supply and demand fluctuations, and mitigating the impact of sudden power fluctuations.

4. How does energy storage contribute to reducing reliance on traditional fossil fuel-based power generation?

Energy storage contributes to reducing reliance on traditional fossil fuel-based power generation by enabling the integration of more renewable energy sources into the grid. It stores excess energy from renewables for later use, reducing the need for fossil fuel power plants during peak demand.

5. In the context of electric vehicles, energy storage objectives include _____.

In the context of electric vehicles, energy storage objectives include extending the driving range, enhancing vehicle performance, and facilitating rapid charging to improve the overall efficiency and appeal of electric transportation.

6. The role of energy storage in enhancing microgrid resilience involves _____.

The role of energy storage in enhancing microgrid resilience involves providing backup power during grid outages, optimizing the use of renewable energy within the microgrid, and supporting critical loads to maintain essential services.

7. How does energy storage contribute to reducing greenhouse gas emissions?

Energy storage contributes to reducing greenhouse gas emissions by promoting the use of renewable energy sources and enabling the integration of clean energy into the grid. It facilitates the transition away from fossil fuel-based power generation, thus lowering overall carbon emissions.

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15. Solar Energy:
a. The process of converting sunlight into electricity using photovoltaic cells is known as _____.
Photovoltaics

b. The angle at which solar panels should ideally be installed to maximize energy production is called the _____.
Tilt angle

16. Wind Energy: The device that captures wind energy and converts it into electrical power is called a _____.
Wind turbine

17. The term used to describe the average speed of the wind at a particular location is known as _____.
Wind speed

18. Hydropower: The energy derived from the movement of water is called _____.
Hydropower
19. The largest source of renewable electricity in the world is generated by harnessing the power of _____.
Hydroelectric dams
20. Biomass Energy: Biomass can be converted into biofuels through a process called _____.
Biomass conversion

21. The primary component of natural gas derived from the decay of organic matter is _____.

Methane

22. Geothermal Energy:Geothermal energy is harnessed by tapping into the Earth's _____.

Heat

23. The most common type of geothermal power plant is the _____.

Binary cycle

24. Renewable Energy Policy: The international agreement aimed at combating climate change and promoting renewable energy is called the _____.

Paris Agreement

25. The financial incentive provided by governments to encourage the use of renewable energy is known as a _____.

Feed-in tariff

26. Energy Storage:The process of storing excess energy for later use is known as _____.

Energy storage

27. One popular technology for large-scale energy storage is _____.

Lithium-ion batteries

28. Renewable Energy Integration: The term used to describe the combination of different renewable energy sources to meet energy demand is _____.

Hybrid energy systems

29. Smart grids use advanced technologies to optimize the generation and distribution of electricity, enhancing _____.

Energy efficiency