QUESTION BANK

Name of the Department : Computer Science Engineering

Subject Code & Name : OME551 Energy Conservation and Management

Year & Semester : III& V

UNIT I INTRODUCTION

PART-A

1. What is meant by primary and secondary energy sources?
   The primary energy sources are coal,crude oil and natural gases.
   The secondary energy sources are the electricity.

2. Define energy and power.
   The rate of doing work is called power.
   Total amount of workdone in the electrical circuit is called as energy.

3. Define energy auditing.
   It is defined as verification,monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency.

4. What are the effects of acid rain?
   i) Acidification of lake,soils
   ii) Killing of wild life
   iii) Decay of building materials
   iv) Health problems

5. What are the environmental aspects associated with energy utilization?
   i) Air pollution
   ii) Climate change
   iii) Green house effect
   iv) Acid rain

6. What are the effects of increase in earth temperature?
   i) Severe storms and flooding
   ii) Food shortages
   iii) Reduced fresh water supply

iv) Loss of biodiversity
v) Increased diseases

7. On what factor energy audit depends?
   i) Function and type of industry
   ii) Depth in which final audit needed
   iii) Potential and magnitude of cost reduction

8. What are the types of audit?
   i) Preliminary audit
   ii) Detailed audit

9. What are the three phases in a detailed audit?
   i) Phase-I-Pre audit phase
   ii) Phase-II-Audit phase
   iii) Phase-III-Post audit phase

10. What is the role of energy manager?
   i) Prepare an annual activity plan
   ii) Establish the energy conservation cell
   iii) Initiate activities to improve monitoring process control to reduce energy cost

11. What are the energy audit instruments?
   i) Electrical measuring instruments
   ii) Combustion analyses
   iii) Fuel efficiency monitor
   iv) Fyryte
   v) Contact thermometer

12. Distinguish between energy conservation and energy efficiency.
   Energy efficiency is using technology that requires less **energy** to perform **the** same function. ... **Energy conservation** is any behavior that results in **the** use of less **energy**. Turning **the** lights off when leaving **the** room and recycling aluminum cans are both ways of **conserving energy**.

13. What is the per capita electrical energy consumption of India?

During the 2018-19 fiscal year, the gross **electricity** generated by utilities in **India** was 1,372 TWh and the total **electricity generation** (utilities and non utilities) in the country was 1,547 TWh. The gross **electricity consumption** in 2018-19 was 1,181 **kWh per capita**.

14. How much energy do we use globally?

Worldwide, **humans used** about 575 quadrillion Btu of **energy** in 2015, according to estimates from the U.S. **Energy** Information Agency. With a **global** population of 7.3 billion, that works out to 78 million Btu per person, per year.

15. How do you calculate energy consumption?

- Device Wattage (watts) x Hours Used Per Day = Watt-hours (Wh) per Day.
- Device Usage (Wh) / 1000 (Wh/kWh) = Device Usage in kWh.
- Daily Usage (kWh) x 30 (Days) = Approximate Monthly Usage (kWh/Month)

16. What is the main source of energy?

Fossil fuels are the **largest sources of energy** for electricity generation. Natural gas was the **largest source**—about 38%—of U.S. electricity generation in 2019. Natural gas is used in steam turbines and gas turbines to generate electricity.

17. What is the safest form of energy?

Nuclear is the safest **source of energy**, producing only one-quarter the number of deaths per terrawatt hour as wind, which is the second safest. **Coal** is by far the most dangerous, producing deaths both in the mining and transportation and in its emissions of air pollution.

18. What is the purpose of energy audit?

The main **purpose** of an **energy audit** is to determine whether your home wastes **energy**, and to pinpoint where **energy** is being lost so you can evaluate what measures you can take to make your home more **energy** efficient.

19. What are the steps of energy audit?

The Energy Audit Process

- **Step** 1: Initial Meeting. The **energy auditor** will make contact with successful businesses to arrange a meeting to discuss the **audit** scope and arrange an inspection of your site. ...
- **Step** 2: Site Inspection. ...
- **Step** 3: Desktop Analysis. ...
- **Step** 4: The Report. ...
- **Step** 5: Implementation. ...
- **Step** 6: Support.

20. How do you prepare an energy audit report?

- Guidelines for **preparation** of **Energy Audit** Reports. Structure of the **Energy Audit Report**. ...
- Title Page. • **Report** title. ...
- Table of Contents. Executive Summary. ...
- Introduction. The Introduction should include: ...
- **Audit** Activity and Results. ...
- Recommendations. ...
- Appendices. ...
- General Points on **Report** Writing.

21. What are the primary objectives of energy management?

The primary objective of energy management is to maximize **profit** and minimize **costs** by optimizing energy procurement and utilization, throughout the organization to minimize energy **costs** without affecting production and quality and to minimize environmental effects.

PART-B

1. Tabulate the difference between the renewable and non renewable energy source.
2. Evaluate the energy conservation and its importance.
3. Explain the Indian scenario for renewable energy source.
4. Analyse the future strategies for meeting energy needs.
5. Write short notes on Energy conservation Act, 2003.
6. Describe the concept of energy planning.
7. Examine the energy security and energy policy.
8. Summarize the role of energy manager under energy conservation Act.
9. Integrate the need for energy audit and compose the types of energy audit.
10. Illustrate the various instruments used for energy auditing.
11. Explain the procedure of energy auditing.
12. Illustrate the baseline data should be collected for a detailed energy audit.

UNIT-II

Electrical Systems

PART-A

1. What is part of the electric bill?

A standard **electric bill** is divided into two parts: delivery and supply. Delivery rate is the fixed cost set by the **utility** to cover the transportation of energy from their generation site to the consumption site. This includes upkeep of **power** lines, natural gas pipelines, transformers, and other physical equipment.

2. What makes the electric bill high?
   In summary, the main **causes** of **high electricity bills** are:
   Electric water heaters. Other **electric** heaters. Ventilation fans. Water pumps.

3. How energy charges are calculated?
   Energy Charge: This is the per-unit **electricity charge** that you pay on your bill. ... 2) Fixed **Charge**: This is mostly dependent on the connected load that the utility provides you. Connected load is typically **calculated** as a sum of wattage of all the appliances that you have at your home.

4. Does inverter increase electricity bill?
   A typical **inverter** can have 80–85% efficiency , similarly the battery charger and the battery its self has losses , take it in the same level of 85%. This means ~ 30% is lost overall as losses. This will add in overall consumption and hence the **increase** in E-**bill**. **Inverter** adds its losses to the consumption.

5. How is home meter reading calculated?
   Choose clean energy and savings, now.

   Current **meter reading** – **Meter reading** reported from last month's bill = Total kWh used since last **reading**.

   Total kWh used since last **reading** x Charge per kWh = Total energy charge.

Total energy charge + Fixed monthly fees = Final bill.

6. What is transformer and its types?
There are three primary types of voltage transformers (VT): electromagnetic, capacitor, and optical. The electromagnetic **voltage transformer** is a wire-wound transformer. The capacitor **voltage transformer** uses a capacitance potential divider and is used at higher voltages due to a lower cost than an electromagnetic VT.

7. What are the classification of transformer?
Depending upon the type of construction used, the transformers are classified into two categories viz.: (i) Core type, and (ii) Shell type. Depending upon the type of service, in the field of power system, they are classified as: (i) Power transformers, and (ii) **Distribution** transformers.

8. Why the transformer rating is in kVA?
The copper and iron are the two type of losses occur in the **transformer**. The copper loss depends on the current (ampere) flows through the windings of the **transformer** while the iron loss depends on the voltage (volts). i.e., the **rating** of the **transformer** is in **kVA**.

9. Why motors are rated in kW?
That's why we are **rated Motor** in **kW** or HP (**kilowatts**/ Horsepower) instead of kVA. in more clear words, **Motor** only consume active power and provide mechanical power in HP or **kW** at **motor** shaft. ... Moreover, the **motor** power factor does not depend on the load and it works on any P.F because of its design.

10. What is the principle of capacitor?
A **capacitor** is a device that is used to store charges in an electrical circuit.
A **capacitor** works on the **principle** that the **capacitance** of a conductor increases appreciably when an earthed conductor is brought near it. Hence, a **capacitor** has two plates separated by a distance having equal and opposite charges.

11. What is the principle of charging and discharging of capacitor?
Charging (and discharging) of capacitors follows an exponential law. Consider the circuit which shows a **capacitor** connected to a d.c. source via a switch. The resistor represents the leakage resistance of the **capacitor**, resistance of external leads and connections and any deliberately introduced resistance.

12. What are the method of improving power factor?
Improving the PF can maximize current-carrying capacity, **improve** voltage to equipment, reduce **power** losses, and lower electric bills. The simplest way **to improve power factor** is to add PF correction capacitors to the electrical system. PF correction capacitors act as reactive current generators.

13. What is power factor?
POWER FACTOR is the ratio between the useful (true) **power** (kW) to the total (apparent) **power** (kVA) consumed by an item of a.c. electrical equipment or a

complete electrical installation. It is a measure of how efficiently electrical **power** is converted into useful work output. The ideal **power factor** is unity, or one.

14. What is harmonic in electrical?
Harmonics are created by electronic equipment with nonlinear loads drawing in current in abrupt short pulses. The short pulses cause distorted current waveforms, which in turn cause **harmonic** currents to flow back into other parts of the power system.

15. Why do harmonics occur?
It all has to **do** with overtones. In a nutshell, sound is a compression wave. ... Every pitch is at a set frequency, so the high point in the wave **occurs** every so often. An overtone, which is what a **harmonic** is, **happens** when you have two sound waves whose high points overlap at certain intervals.

16. What is 3rd 5th and 7th harmonics?
Harmonics are voltages or currents that operate at a frequency that is an integer (whole-number) multiple of the fundamental frequency. So given a 50Hz fundamental waveform, this means a 2nd **harmonic** frequency would be 100Hz (2 x 50Hz), a **3rd harmonic** would be 150Hz (**3** x 50Hz), a **5th** at 250Hz, a **7th** at 350Hz and so on.

17. What are the different types of electric motors?
Types of Electric Motors

AC Brushless **Motors**. AC brushless **motors** are some of the most popular in motion control. ...

DC Brushed **Motors**. In a DC brushed **motor**, brush orientation on the stator determines current flow. ...

DC Brushless **Motors**. ...

Direct Drive. ...

Linear **Motors**. ...

Servo **Motors**. ...

Stepper **Motors**.

18. What is energy efficient motor
Energy efficient motors use less electricity, run cooler, and often last longer than NEMA (National Electrical Manufacturers Association) B **motors** of the same size. ... Thus, a **motor** that is 85 percent **efficient** converts 85 percent of the electrical **energy** input into mechanical **energy**.

19. What illuminate means?
To supply or brighten with light; light up. to make lucid or clear; throw light on (a subject). to decorate with lights, as in celebration. to enlighten, as with knowledge. to make resplendent or illustrious.

20. What are the types of illumination?

Types of illumination

Halogen incandescent lamps.
LED **illumination**.
Fluorescent **light** (high frequency)
Metal halide **light** sources (as "cold **light**" sources with fibre optic transmission)
Xenon strobe lamps and metal halide lamps are used quite rarely in industrial machine vision.

21. What are the 3 types of lighting?
There are three basic types of lighting you should layer in a room in order to accomplish this:

Ambient or **general lighting**.
Accent lighting.
Task lighting.

22. What is the unit of luminous efficiency?
Luminous efficacy is a measure of how well a light source produces visible light. It is the ratio of luminous flux to **power**, measured in **lumens** per **watt** (**lm/w**) in the **International System of Units** (SI).

23. How do you calculate luminous flux?
Only in case of unidirectional radiation, which is approximately given for an ordinary **light** bulb, the **luminous** intensity from the **light** source can be **calculated** as the **luminous flux** divided by 4π sr, and the illuminance (measured in candela) in some distance d from the **light** source will be the **luminous flux.**

PART-B

1. Summarize the voltage levels in a power system.

2. Illustrate the components of Electricity Billing.

3. Explain the power factor improvement and benefits.

4. Give short notes on (i) Types of Transformers
(ii) Rating of Transformers (iii) Transformers Losses and Efficiency.

5. The contract demand of plant is 1000 kVA. The minimum billing demand is 75% of the contract demand. The basic tariff structure is as follows:

Demand charges : Rs. 180 per kVA / month Unit charges : Rs. 3.75 for the first one lakh units / month

Rs. 3.50 above one lakh units / month Fuel surcharge :

Rs. 0.20 per unit / month Service Tax :

Rs. 0.25 per unit / month

Meter rent : Rs 500 / month

The energy consumption is 3, 15,000 units and the maximum demand recorded is 600 kVA. Calculate the cost of monthly electricity consumption?

6. Describe the selection and location of capacitors.

7. Explain the Harmonic mitigation techniques used in Industry.

8. Estimate the annual cost saving if a motor of 20 kW with efficiency of 85% is replaced with that of 90%. Consider 8000 hours of operation and tariff of Rs.4 / unit.

9. A10 kW motor has full load efficiency of 85 %.Input at part loading is 415 V and 10 A. The power factor is 0.68.Find the motor loading in percentage.

10. Illustrate the Energy Efficient Motors and also mention the drawbacks of Energy Efficient Motors.

11. Examine the power loss for motors and improvement of motor efficiency.

12. Evaluate the basics parameters and terms in lighting system.

13. Summarize the Light Emitting Diode(LED) lamp.

UNIT-3
Thermal Systems
Part-A

1. How do you calculate stoichiometry?

Thus, to **calculate** the **stoichiometry** by mass, the number of molecules required for each reactant is expressed in moles and multiplied by the molar mass of each to give the mass of each reactant per mole of reaction. The mass ratios can be **calculated** by dividing each by the total in the whole reaction.

2. What is boiler efficiency formula?

Direct **efficiency**

In order to calculate **boiler efficiency** by this method, we divide the total energy output of a **boiler** by total energy input given to the **boiler**, multiplied by hundred. GCV= Gross calorific value of the fuel.

3. What is a good boiler efficiency?

A typical condensing **boiler** has a thermal **efficiency** of 92-95%, in comparison to non-condensing **boilers** which typically have **efficiencies** of around 85%. These higher **efficiencies** are achieved by using the waste heat in the flue gases to preheat the water entering the **boiler**.

4. What is operating temperature for thermic fluid application?

The product is manufactured from petroleum stocks produced by special refining process in which the thermally unstable components are removed. HYTHERM 500 is recommended in service involving a maximum bulk **oil temperature** of 290°C.

5. How does a thermic fluid heater work?

Thermal fluid heating is a type of indirect **heating** in which a liquid phase **heat transfer** medium is heated and circulated to one or more heat energy users within a closed loop system. **Thermal** oil, glycol, and water are common **heat transfer** mediums for these systems.

6. What is thermic fluid heating system?

Thermic Fluid Heaters: Fluidtherm

"**Thermic Fluid Heaters** are **heating equipment**, used in industry where **heat** transfers are primary need of process instead of pressure." Fluidthers are most efficient and highly effective **equipment** used in process **heating** which uses high viscous oil as a **heating** medium.

7. What is the difference between boiler and heater?

Service Experts Heating & Air Conditioning is here to help explain the **difference between** the two water heating systems. A water **heater** is a large tank that, you guessed it, heats water. ... A **boiler**, on the other hand, can **heat** water that is used to bring **heat** to the home and **heat** the water.

8. Does the furnace affect the water heater?

However, instead of having a heating mechanism inside the **tank**, it uses the heat from

your **furnace** or **boiler**. Your **furnace** or **boiler** will have a pipe attached to the **water heater**. ... This exchanger then heats the **water** in the **tank** and gives you anywhere from 30-100 gallons of **water** to use when you need it.

9. What is steam distribution?

An efficient **steam distribution** system is essential if **steam** of the right quality and pressure is to be supplied, in the right quantity, to the **steam** using equipment. Installation and maintenance of the **steam** system are important issues, and must be considered at the design stage.

10. What is steam trap used for?

Steam traps are a type of automatic valve that filters out condensate (i.e. condensed **steam**) and non-condensable gases such as air without letting **steam** escape. In industry, **steam** is **used** regularly for heating or as a driving force for mechanical power.

11. How many types of steam are there?

Part one will review three specific **types of steam**: Utility, Saturated and superheated **steam**. Utility **steam** is sometimes called live **steam**, plant **steam**, essential **steam**, generator **steam**, but it really means utility **steam**.

12. What is condensate recovery system?

Condensate recovery is a process to reuse the water and sensible heat contained in the discharged **condensate**. **Recovering condensate** instead of throwing it away can lead to significant savings of energy, chemical treatment and make-up water.

13. How does a condensate return system work?

In a pumped **condensate return system**, the flashing **condensate** is discharged into a vented tank, from which the flash steam is removed. The **condensate** must be pumped from the vented tank to the collecting tank, and then pumped from the collecting tank to the boiler.

14. Why is condensate considered a valuable resource?

Corrosion coupons are made of the same material as heat exchangers. Damage done to them is usually similar to the inside of pipes.

15. What is a flash steam?

Flash steam is a name given to the **steam** formed from hot condensate when the pressure is reduced. **Flash steam** is no different from normal **steam**, it is just a convenient name used to explain how the **steam** is formed. ... The result is that the excess energy causes a percentage of the condensate to **flash**.

16. What is flash steam recovery?

A **flash steam recovery** system releases **flash steam** into a vessel, rather than to atmosphere. This means it can be reintegrated into the **steam** system or used to feed low-pressure applications, such as space heating.

17. What is the difference between steam and condensate?

Condensate is the liquid formed when **steam** passes from the vapor to the liquid state. **In**

a heating process, **condensate** is the result of **steam** transferring a portion of its heat energy, known as latent heat, to the product, line, or equipment being heated.

18. What is refractory insulation?

Insulating refractories are used to reduce the rate of heat loss through furnace walls. These **refractories** have low thermal conductivity due to a high degree of porosity, with a desired porous structure of small, uniform pores evenly distributed throughout the **refractory** brick in order to minimize thermal conductivity.

19. What are the types of refractories?

Depending on temperatures and service conditions of the applications such as boilers, furnaces, kilns, ovens etc, different types of refractories are used.

Fireclay refractories. ...

Silica brick. ...

High **alumina** refractories. ...

Magnesite refractories. ...

Chromite refractories. ...

Zirconia refractories.

20. Why is alumina used in refractories?

High Temperature and Aggressive Environments

Its high free energy of formation makes **alumina** chemically stable and **refractory**, and hence it finds uses in containment of aggressive and high temperature environments.

21. What is a ceramic material?

A **ceramic** is a **material** that is neither metallic nor organic. It may be crystalline, glassy or both crystalline and glassy. **Ceramics** are typically hard and chemically non-reactive and can be formed or densified with heat.

PART-B

1. Explain the boiler types and classifications.
2. Evaluate the boiler system and draw the schematic diagram of boiler system.
3. Examine the performance evaluation of boilers.
4. Demonstrate the energy conservation opportunities in boiler system.
5. Analysis the Thermic Fluid Heaters.
6. Define furnace. Explain the types and classifications of different furnaces.
7. Discuss the energy efficiency measures in boilers.
8. Explain the steam distribution systems and draw its schematic diagram.
9. Integrate the steam traps and also explain the types of steam traps.
10. Examine the performance assessment of steam trap.
11. Describe the condensate recovery and also quote the advantages.
12. Demonstrate the flash steam utilization.

UNIT-4
Energy Conservation in Major Utilities
Part-A

1. What are ways to conserve energy?

Adjust your day-to-day behaviors.

Replace your **light** bulbs.

Use smart power strips.

Install a programmable or smart thermostat.

Purchase energy efficient **appliances**.

2. Which is the major energy conservation opportunity?

The use of telecommuting by **major** corporations is a significant **opportunity** to **conserve energy**, as many Americans now work in service jobs that enable them to work from home instead of commuting to work each day.

3. How can we save energy in industries?

Evaluate Compressed Air Systems for Leaks. ...

Upgrade your Equipment. ...

Install **Energy**-Efficient Lighting. ...

Power Down your Equipment. ...

Improve Process Heating. ...

Take Advantage of Consumption Periods. ...

Secure Employee Buy-In.

4. What are 5 ways to conserve energy?

Turn off the fan when you leave a room.

Close your drapes or drop your window shades during the day.

Wash your clothes in cold **water**.

Wrap or cover foods and drinks in the refrigerator.

Always use the cold **water** faucet, unless you really want hot **water**.

5. What are some examples of energy conservation?

Turning off the light when you leave the room, unplugging appliances when they're not in use and walking instead of driving are all **examples of energy conservation**. The two main reasons people **conserve energy** are to gain more control over their **energy** bill and reduce the demand on the earth's natural resources.

6. What is the importance of energy conservation?

Energy conservation plays a very important role because utilization of **non**-renewable resources also impacts our environment. Specially, usage of fossil fuels supplies to **air** and **water** pollution such as carbon dioxide is produced when oil, coal and gas combust in power stations, heating systems, and engines of car.

7. What is the problem with energy conservation?

Intended Consequences of Energy Conservation. In light of **air pollution**, the overuse of fossil fuels, and other issues efforts to conserve energy have been ramped up in the last few decades. Energy conservation can refer to reducing the amount of energy used or finding alternatives to traditional energy sources.

8. What is Energy Conservation Act?

The **Energy Conservation Act** empowers the government to specify norms and standards of **energy** efficiency to be followed by different industries (who are specified in a schedule to the **Act**) in their use of power. ... The **Act** empowers state governments to enforce its various provisions.

9. What are examples of energy efficiency?

Energy efficiency is using technology that requires less energy to perform the same function. Using a **light**-emitting diode (LED) **light** bulb or a compact fluorescent **light** (CFL) bulb that requires less energy than an incandescent **light** bulb to produce the same amount of **light** is an example of energy efficiency.

10. Which is the best example of the law of conservation of energy?

The **law of conservation of energy** can be seen in these everyday **examples** of **energy** transference: Water can produce electricity. Water falls from the sky, converting potential **energy** to kinetic **energy**. This **energy** is then used to rotate the turbine of a generator to produce electricity.

11. What are the salient features of Energy Conservation Act 2001?

Language

Act ID:	**200152**
Act Year:	**2001**
Short Title:	The **Energy Conservation Act**, **2001**
Long Title:	An **Act** to provide for efficient use of **energy** and its **conservation** and for matters connected therewith or incidental thereto.
Ministry:	Ministry of Power

12. Which state in India ranks first in renewable energy capacity?

Renewable energy firms in India love the western **state of Gujarat**. It has topped a ranking of states on the basis of ease of doing business for renewable energy firms in the country, according to a survey by the New Delhi-based Bridge to India consultancy.

13. Which state uses most solar energy?

California

Comfortably ahead of its rivals, California remains the undisputed leader when it comes

to **solar power** in the U.S., with almost 23 GW of installed **solar**. Nearly 17 percent of California's electricity comes from **solar**, with the sector there employing more than 86,000 people.

14. Which is the largest solar park in India?

Pavagada park

The **Pavagada** park was developed by the Karnataka Solar Park Development Corporation Limited (**KSPDCL**), a joint venture between the Solar Energy Corporation of India (SECI) and the Karnataka Renewable Energy (KREDL).

15. Which is Asia's largest solar plant?

The 750- megawatt **Rewa solar Power Plant** in Madhya Pradesh was dedicated to the nation by Prime Minister Narendra Modi on July 10. The plant consists of three solar power generating units that are located on a 500-hectare plot of land inside a 1,500-hectare solar park.

PART-B

1. Examine the factors affecting pump performance.
2. Describe the efficient pumping system operation.
3. Discuss the municipal water pumping system and sewage water pumps.
4. Examine the energy conservation opportunities in pumping systems.
5. Illustrate the fan design and selection criteria.
6. Examine the types of fans. Explain the characteristics and its applications.
7. Explain the efficient operation of compressed air system.
8. Generalize the air conditioning systems and types of refrigeration systems.
9. Discuss the selection of a suitable Refrigeration system.
10. Discuss the energy saving opportunities in cooling towers.
11. Explain the energy performance assessment of DG sets.

UNIT-5

Economics

Part-A

1. What does an energy economist do?

It's your job as an **Energy Economist** to research ways that natural gas has been used in the past, the rate of current consumption, the areas that use the highest quantity of the product, the future consumption rate, the cost of production, and its use in other areas/countries.

2. Why do we need energy in economics?

First, **energy is** an important sector of the **economy** that creates jobs and value by extracting, transforming and distributing **energy** goods and services throughout the **economy**. As an example, in 2009 the **energy** industry accounted for about 4% of GDP in the United States.

3. How Energy Economics is an applied economics discipline?

Energy is a pervasive and powerful force in the **economy**. **Energy economics is an applied** sub-**discipline** of **economics** covering all aspects of supply, demand, pricing, policy, and externalities associated with **energy** production and consumption. ... **Energy** and climate change are inextricably intertwined.

4. What is the role of energy?

All living organisms need **energy** to grow and reproduce, maintain their structures, and respond to their environments. Metabolism is the set of life-sustaining chemical processes that enables organisms transform the chemical **energy** stored in molecules into **energy** that can be used for cellular processes.

5. What happens to energy lost in living organisms?

Energy may be **lost in living** systems as it flows through them. ... **Energy** is only converted from one form into another. As **energy** moves between **living** things, some **energy**—in the form of heat—is **lost**. This thermal **energy** escapes into the environment and is no longer useful to **organisms**, but it is not destroyed.

6. How do you calculate discounted payback period?

There are two steps involved in calculating the **discounted payback period**. First, we must **discount** (i.e., bring to the present value) the net cash flows that will occur during each year of the project. Second, we must subtract the **discounted** cash flows.

7. Does payback period include discount rate?

The **discounted payback period is** a capital budgeting procedure used to determine the profitability of a project. A **discounted payback period** gives the number of years it takes to break even from undertaking the initial expenditure, by **discounting** future cash flows and recognizing the time value of money.

8. What is simple payback period?

The **payback period** refers to the amount of time it takes to recover the cost of an investment. Simply put, the **payback period** is the length of time an investment reaches a break-even point. The desirability of an investment is directly related to its **payback period**. Shorter paybacks mean more attractive investments.

9. How do you find a discount rate?

How to calculate discount rate. There are two primary **discount rate** formulas - the weighted average **cost** of capital (WACC) and adjusted present value (APV). The WACC **discount** formula is: WACC = E/V x Ce + D/V x Cd x (1-T), and the APV **discount** formula is: APV = NPV + PV of the impact of financing.

10. How do you calculate monthly payback period?

Divide the initial investment by the annuity: $100,000 ÷ $35,000 = 2.86 (or 10.32 **months**). The **payback period** for Alternative B is 2.86 years (i.e., 2 years plus 10.32 **months**).

11. What are the advantages and disadvantages of payback period?

Payback period advantages include the fact that it is very simple **method** to calculate the **period** required and because of its simplicity it does not involve much complexity and helps to analyze the reliability of project and **disadvantages of payback period** includes the fact that it completely ignores the time value of money.

12. What is the difference between interest rate and discount rate?

An **interest rate** is an amount charged by a lender to a borrower for the use of assets. **Discount Rate** is the **interest rate** that the Federal Reserve Banks charges to the depository institutions and to commercial banks on its overnight loans.

13. How does interest rate affect discount rate?

Setting a high **discount rate** tends to have the effect of raising other **interest rates** in the economy since it represents the **cost** of borrowing money for most major commercial banks and other depository institutions. ... When too few actors want to save money, banks entice them with higher **interest rates**.

14. What does internal rate of return mean?

The **internal rate of return** is a metric used in financial analysis to estimate the profitability of potential investments. The **internal rate of return** is a discount **rate** that makes the net present value (NPV) of all cash flows equal to zero in a discounted cash flow analysis.

15. How do you calculate the internal rate of return?

The **IRR Formula**

Broken down, each period's after-tax cash flow at time t is discounted by some **rate**, r. The sum of all these discounted cash flows is then offset by the initial investment, which equals the current NPV. To find the **IRR**, you would need to "reverse engineer" what r is required so that the NPV equals zero.

16. What is the formula for average rate of return?

The **formula** for an **average rate of return** is derived by dividing the **average** annual net earnings after taxes or **return** on the investment by the original investment or the **average** investment during the life of the project and then expressed in terms of **percentage**.

17. What is the average annual return?

The **average annual return** (AAR) is a percentage used when reporting the historical **return**, such as the three-, five-, and 10-year **average returns** of a mutual fund. ... In its simplest terms, the **average annual return** (AAR) measures the money made or lost by a mutual fund over a given period.

18. What does net present value mean?

Net present value (**NPV**) is the difference between the **present value** of cash inflows and the **present value** of cash outflows over a period of time. **NPV** is used in capital budgeting and investment planning to analyze the profitability of a projected investment or project.

19. How do you calculate net present value?

Formula for NPV

NPV = (Cash flows)/(1+r)^t.

Cash flows= Cash flows in the time period.

r = Discount rate.

t = time period.

20. What is future value of money?

Future value is the **value** of an asset at a specific date. It measures the nominal **future** sum of **money** that a given sum of **money** is "**worth**" at a specified time in the **future** assuming a certain interest rate, or more generally, rate of return; it is the present **value** multiplied by

the accumulation function.

21. What is the meaning of life cycle costing?

Life Cycle Costing (LCC) is an important economic analysis used in the selection of alternatives that impact both pending and future costs. It compares initial investment options and identifies the least **cost** alternatives for a twenty year period.

22. How do you calculate total life cycle cost?

Basic **Life-Cycle Cost** Analysis **Calculation**

Basically, LCCA consists of adding all the initial and ongoing **costs** of the structure, product, or component over the time you expect to be using it, subtracting the value you can get out of it at the end of that time, and adjusting for inflation.

23. What does an ESCO do?

Whether commercial, residential, or non-profit, an ESCO provides a wide variety of **energy** solutions. ESCOs may also help with designing and implementing projects that conserve **energy**, retrofitting, generating **power**, supplying **energy**, outsourcing **energy** infrastructure, and managing **energy** risks.

24. What is the full form of ESCOs?

An **energy service company** (**ESCO**) is a business that provides a broad range of energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management.

25. What is an ESCO in healthcare?

An "**ESCO**" or "ESRD Seamless Care Organization" is an Accountable Care Organization (ACO) comprised of providers and suppliers who voluntarily come together to form a legal entity that offers coordinated care to beneficiaries with ESRD through the Comprehensive ESRD Care model.

PART-B

1. Examine the parameters for energy economics.
2. Estimate the energy tariff.
3. Summarize the energy discount rate.
4. Describe the payback period.
5. Explain the simple payback method and also write the advantages.
6. Demonstrate the net present value and write the advantages.
7. Examine the return on investment (ROI).
8. Generalize the life cycle costing.
9. Explain the financing options for energy management.
10. Examine the self financing energy management and explain the advantages and disadvantages.
11. Estimate the energy service companies (ESCOs).
12. Generalize the energy performance contracting and role of ESCOs.

.