

UNIT – 1

FUNDAMENTALS

PART – A (2 MARKS)

1. What is Green Computing?

The study and practice of designing, manufacturing, using and disposing of computing devices, servers and associated subsystems (such as monitors, printers, or storage devices) efficiently and effectively with minimal or no impact on the environment.

2. Define Green IT?

- Green IT is the study of using computing resources effectively. It includes,
- Environmental sustainability
- Energy Efficiency
- Cost of Ownership (making, disposal)

3. What is ERBS?

ERBS (Environmentally Responsible Business Strategies). Focus on to achieve a green enterprise and meet the needs of various stake holders.

4. Define Carbon Foot Print?

A Carbon Foot Print is the amount of greenhouse gases and specifically carbon dioxide emitted by something during a given period.

5. What is the information required for measuring the carbon foot print?

- Facilities
- Operations
- Transportation
- Travel
- Purchases

6. List out the need for Carbon Footprint?

- Helping company to improve its efficiencies.
- Reducing Costs.
- Getting public Recognition.
- Maintain link in the supply chain.
- Good impact on customer.

7. What are the categories of Green IT Drivers?

- I. Costs

- II. Regulatory and legal
- III. Sociocultural and Political
- IV. New market Opportunities
- V. Enlightened self-interest
- VI. A responsible business eco-system

8. What are the business dimensions of Green IT?

- Economy
- Technical
- Process
- People

9. What is the purpose of an organization to go green?

- Increasing energy consumption
- Growing consumer interest in environmentally friendly goods and services.
- Higher expectations by the public on enterprises.
- Environmental responsibilities and emerging stricter regulatory and compliance requirements.

10. What are the three Rs of Green IT?

- Reuse
- Refurbish
- Recycle

11. List out the most significant constituents of GHG's?

Carbon dioxide (CO₂), Methane, Nitrous Oxide, and Chlorofluorocarbon (CFC) gases.

12. What are the four dimensions of green Computing Strategies?

- Economic
- People
- Process
- Technology

13. What is Responsible Business Ecosystem (RBE)?

It is a large green organization which focuses on the environment; it consists of three major areas:

- Green processes
- Green data centers
- Green consortiums.

14. List some of the objectives of green business?

- Synergy between core business objectives and green objectives.

- Identify growth potential.
- Development of green HR

15. Define Green Governance?

Green governance combines EI with lean for data creation and maintenance. It measures the carbon emission of business.

16. List the situations in which the policies can be made?

- I. External pressure (Government)
- II. Internal Pressure (Inside Organization)

External

- Government policies
- Society pressure

Internal

- Internal energy consumption.
- Increased carbon footprint.

17. List the 5M's of Carbon Metrics?

- Measuring
- Monitoring
- Managing
- Mitigating
- Monetizing

18. List some of the green values in practice?

- Computing power management
- Use blank screen saver
- Limited printing
- Reuse and recycle of equipment
- Single machine to worker.

19. What is Green Sustainable Policy?

It is defined as a policy that incorporates a –greenll factor that helps business to sustain over a longer period of time.

20. What are the types of Emissions?

- Scope 1 (direct emission)
- Scope 2 (indirect usage of emissions)

- Scope 3 (organization supply chain).

21. List the steps in developing an ERBS?

- Green business objectives
- Strategy descriptions
- Policy based pre conditions
- Resource requirements
- Transformation plans.

22. Mention some renewable energy sources to be incorporated with green policies?

- Nuclear
- Thermal
- Wind
- Solar
- Biomass

23. Define Carbon Metrics?

- Measurements eventually provide benchmark at industry levels and vital comparison statistics.
- Measure through sensors, platforms, inventory and inference methods.

24. List the measures of balanced score card?

- Financial measures.
- Customer measures.
- Internal business processes.
- Learning and growth.

25. What is the role of Chief Green Officer (CGO)?

CGO is the most senior person in the organization responsible for green strategies. He/she is responsible for the development and maintenance of green policies.

UNIT – 1

FUNDAMENTALS

PART – B (16 MARKS)

1. Discuss in detail about Green IT fundamentals?
2. Explain in detail about Green IT business and environment ?
3. Discuss in detail about Carbon Footprint?
4. Write about carbon emissions in IT?
5. Write in detail about Green IT strategies?
6. Explain about Green IT Dimensions, Drivers, and Goals?
7. Explain in detail about Environmentally Responsible Business?
8. Explain in detail about policies, practices, and metrics of ERBS?

UNIT II

GREEN ASSETS AND MODELING

PART – A (2 MARKS)

1. Define Green assets?

Anything that has social, environmental and or economic value that is owned by an individual, business, family or community. It includes intangible, non-physical assets, resources and rights.

2. What are the three activities of Green assets?

- Establish (Procure)
- Operate (Run)
- Dispose (Demolish)

3. Define Green Data Centers?

A Green Data center or sustainable data center is a service facility which utilizes energy efficient technologies. They do not contain obsolete systems, and take advantage of newer more efficient technologies.

4. Which are the key elements of Green Data Center?

- Minimizing the footprints of the buildings.
- Sustainable landscaping.
- Waste recycling.
- The use of low-emission building materials carpets and paints.
- The use of hybrid or electric company vehicles.

5. Define Green Communication?

Green Communication is the practice of selecting energy efficient communications and networking technologies and products, minimizing resource used whenever possible in all branches of communication.

6. What is a mobile network in communication?

Mobile communication networks are a type of telecommunications networks with a collection of terminals, entities and nodes connected to each other through links that enable telecommunication between the users of the terminals.

7. Define Local Area Networks (LAN)?

The local networks of the organization that are made up of the physical connections among the machines and primarily the data center.

8. Define WAN?

The Wide Area Networks of an organization enables communication amongst its desktop and laptop machines with and beyond its data center.

9. What is Green Business Process Management (GBPM)?

Towards the sustainable enterprise consolidates the global state of the art knowledge about how business processes can be managed and improved in the light of sustainability objectives.

10. Define green reengineering?

A green reengineering framework is proposed that establishes a research agenda in the green. It improves business domain from the information systems, management perspective.

11. Write some of the uses of reengineering?

- Business process reengineering improves quality by reducing the fragmentation of work and establishing clear ownership of processes.
- The workers gain responsibility to their output and can measure their performance based on prompt feedback.

12. What are the categories of green processes?

- Individual
- Organizational
- Collaborative

13. Define functional requirements?

Functional requirements define the basic system behavior, essentially, they are what the system does or must not do, and can be thought of in terms of how the system responds to inputs.

14. Define enterprise?

An enterprise is a high-level, strategic view of the organization and -architecture implies a structural frame for the analysis, planning and development of resources.

15. List the categories of requirements?

- i. Green Business Architecture
- ii. Green Information Architecture

- iii. Green solution Architecture
- iv. Green Enterprise Architecture

16. Define environmental intelligence?

Environmental intelligence is a system through which information about a particular region or process is collected for the benefit of decision makers through the use of more than one inter-related source.

17. Define mobility?

Mobility can play a vital role for the sustainability of a business and sustainable business provides impetus for economic growth as well.

18. What are the technical areas for EI?

- i. Data warehouse.
- ii. Business Analytics.
- iii. Business performance management.
- iv. User interface.

19. Define Generic green information system (GIS)?

GIS is a system that is dedicated to management of carbon data. Therefore a GIS forms the basics for measuring, Monitoring and reporting on the carbon data of the organization.

20. What are the major phases of GIS?

-  Develop.
-  Configure.
-  Use.

21. What are the types of GIS subsystems?

- i. Green Organizational Portal (GOP).
- ii. Regulatory Standards Portal (RSP).

22. Define GOP and RSP?

Regulatory portal provides the standard emission value determined by the regulatory body for each emission type based on the industry and company.

Organizational portal focuses on the capture of emission data and its comparison with the emission standards.

UNIT II

GREEN ASSETS AND MODELING

PART – B (16 MARKS)

1. Explain in detail about Green Assets, Buildings and Facility management?
2. Discuss in detail about Green assets?
3. Write in detail about green data centers?
4. Explain about Green Enterprise Architecture (GEA) and Green Solution Architecture (GSA)?
5. Briefly explain about Environmental Intelligence Domain (EI Domain)?
6. Explain in detail about
 - i. EI Domain.
 - ii. Complexities.
 - iii. Web services.
 - iv. EI Mobility.
7. Describe the Green Supply Chain Management (SCM)?
8. Explain in detail about Green Information System (GIS)?
9. Briefly explain about GIS phases, Requirements design, Implementation and Testing?
10. Discuss the Green information System Requirements?
11. Explain in detail about GIS package Diagrams and system scope?
12. Discuss in detail about Green Organization Portal (GOP) and Regulatory Standard Portal (RSP)?

UNIT: III

GRID FRAMEWORK

It is the science of emulating a hardware functionality within a software system – creating a virtual version of a physical systems such as hardware platforms, storage and network resources.

1. What is the role of hypervisor?

The hypervisor isolates operating systems and applications from the underlying computer hardware so the host machine can run multiple virtual machines (VM) as guests that share the system's physical compute resources, such as processor cycles, memory space, network bandwidth and so on.

2. List out the benefits of Virtualization?

- Server Consolidation
- Energy consumption
- Better availability
- Disaster recovery

3. What are the basic concepts of consolidation and virtualization?

- Leveraging existing IT Assets like Servers, Storage and Network resources.
- Increasing the efficiency of IT Professionals through centralized simplified management.
- Improving Availability and Ensuring Business Continuity.
- Defeat Data Center sprawl and Infrastructure underutilization.

4. What are the benefits in consolidating servers?

- Decrease in cooling and electrical costs
- Reduction in server load growth and data center expansion
- Reduction in warranty and licensing costs
- Purchasing power of commodity hardware as opposed to specialized hardware
- Business agility with the ability to leverage cloud and shared infrastructure

5. List out the desirable features of storage consolidation?

Simplification of the storage infrastructure, centralized and efficient management, optimized resource utilization, and low operating cost.

6. What are the advantages of teleconferencing in promoting green environment?

- It increases worker satisfaction.
- Reduction of Green House Gas Emissions.
- Increased Profits Margins.

7. Define the term recycling?

Recycling is one of the most efficient ways to combat e-waste problem. Also, recycling helps in bringing down the greenhouse gas emissions caused by the manufacturing of new products.

8. Define Green Data Center?

Data centres are complex ecosystems that interconnect elements of the information and communication technology (ICT), electrical and mechanical fields of engineering, and, as identified within the much cited Global e-Sustainability Initiative, they represent the fastest growing contributor to the ICT sector's overall carbon footprint.

9. List out the key elements of data center IT elements infrastructure?

- Server design and server systems development in support of efficient data centre service provision and the range of service function.
- The role of networking within a data centre
- The role of storage and the types of storage provision.
- The changing shapes of data centre IT platforms through system innovation.

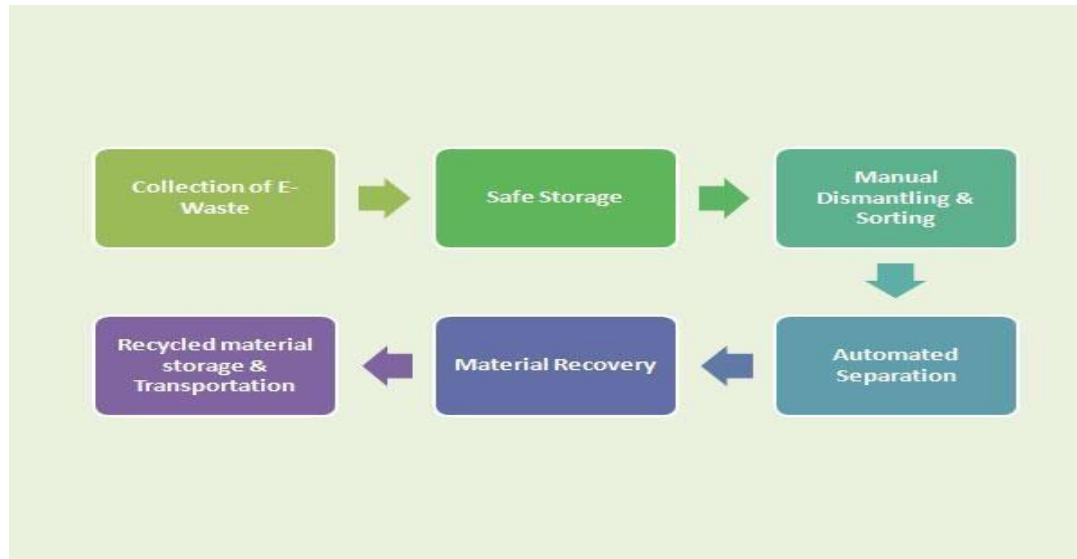
10. What needs to change for Green Grid to happen?

The grid will need to get a lot -smarter and more flexible, say researchers in America. A carbon-free power network will have to handle instantaneous shifts in both electricity supply and demand. That will require major upgrades (read investments) in grid communications and computer-based control systems to make sure everything works together.

11. Define the role of Grid Computing?

The core aim of grid computing was to integrate disparate resources across organizational domains into what became termed virtual organizations. For example, a database server in one domain may be integrated with a networked cluster in another domain, to form a powerful data analytics platform.

12. What are the six steps in recycling?



- Automatic Issuing Machines

13. State-of-the-art Recycling Technologies?

The state-of-the-art recycling of e-waste comprises three steps

- Detoxication
- Shredding
- Refining

14. What is the purpose of Smart Strip?

The Smart Strip actually senses how much power your computer peripherals use. And when the Smart Strip senses that you've turned your computer off, it automatically shuts off your peripherals, too, preventing them from drawing an idle current, which is the current drawn even after equipment is shut off.

PART-B(16 Marks):

UNIT: III GRID FRAMEWORK

1. Explain in detail about virtualizing of IT Systems?
2. Briefly explain the contribution of telecommuting, teleconferencing, and teleporting in conversion of Green IT?
3. Explain in Detail about material recycling?
4. Discuss the best ways to make your PC Greener?
5. Explain in detail about Green Grid framework?
6. Write in detail about the Green Data Centers?

UNIT: 4

GREEN COMPLIANCE

TWO MARKS

1. Define socio cultural aspect of Green IT?

The social dimension of green enterprise transformation {GET) is a subjective affair that needs to bring together the tacit knowledge and viewpoints of individuals including the explicit knowledge stored in database.

2. What are the different levels of GET?

- Society
- Government
- Industry
- Organization
- Business unit

3. What is decision making in Green IT?

The critical state of the world's environment, it is crucial to empty all the beneficial knowledge, technology, and tools that scientists, engineers and other professional can offer.

4. What are the three individual priorities of Green IT?

- i. Business priorities
- ii. Personal priorities
- iii. Environmental priorities

5. Define Green Ethics?

A green ethic offers a set of standards and principles that we should systematically apply to nature.

6. What are the potential advantages of Green IT?

- Ensure ongoing effort at all levels of IT.
- Ensure ongoing effort to reduce carbon in procurement, operation, and disposal.
- Make the carbon state available publically.
- Maintain security and confidentiality of carbon data and information.

7. Define Green Washing?

Green washing is where a firm spends time and money advertising and marketing that their goods or services are environmentally friendly when, in fact, they are not. In other words, green washing is the act of making false or misleading claims about the environmental benefits of a product, service, technology, etc.

8. What are the two major important areas of communication?

- Within the organization
- Outside of the organization

9. What are the six categories of communication channel?

- i. Personal
- ii. Collaborative
- iii. Mobile
- iv. Asynchronous
- v. Physical
- vi. Group

10. What is GET?

A GET is made up of processes and frameworks. The green enterprise framework provides the -as is// and -to bell states, whereas the transformation process provides the activities, roles and deliverables that are employed in reaching that new state.

11. What are the four dimensions of GET?

- a. Economic
- b. Technical
- c. Process
- d. Social

12. Define Green Transformation Process (GTP)?

Green Transformation is one of the urban transformation processes. It is a system which puts emphasis on the use of renewable energy sources and green areas for the sustainable future of cities.

13. What are the four phases of Green Transformation Process?

- i. Diagnose
- ii. Plan
- iii. Enact
- iv. Review

14. Define Green IT Audits?

Green IT Audits are formal, independent, verification and validation of the carbon performance and carbon reporting of the organization. With increasing legislative demands on carbon reporting, these Green IT audits play a vital role in establishing the green claims of the organization.

15. Write the five areas of green metrics?

- i. Measure
- ii. Monitor
- iii. Manage
- iv. Mitigate
- v. Monetize

16. What are the advantages of Green IT audits?

- Validation of entire organizations asset register from a carbon emissions prespective.

- Cross check on smart meters used for automatic reading and display of carbon data.
- Provision of relative benchmarks from audit to audit.
- Validating the measuring of degree of sophistication or maturity.

17. What are the various types of Green audit?

- ✓ Data collection
- ✓ Data analysis
- ✓ Carbon trends
- ✓ Carbon compliance

18. Define Carbon Compliance?

The carbon compliance unit is the maximum permitted amount of CO₂ arising from an organizations heating, cooling, fixed lighting and ventilation systems.

19. Who are the various key stakeholders in Green IT Audits?

- Individual users
- Departmental heads
- CEO/Chief Green Officer(CGO)
- Regulators

20. Define SaaS Computing?

Software as a service (SaaS) provides an ideal way to deploy software applications. SaaS provides access to the application that is executing on a remote server, by anyone, as and when needed. SaaS is the execution of application from a centralized server through the connectivity accorded by the Internet.

21. List out the areas of Cloud Computing?

- Infrastructure
- Applications development
- Application execution
- Reusable data service

22. Define nanotechnologies?

Nanotechnology deals with computing at a microscopic level. These technologies have the potential to impact Green IT in terms of both its hardware and its software. Nanotechnologies provide means to create, measure, and manipulate electronic data and communications at atomic size. The reduction in size requires considerable research effort—design, development, and production.

UNIT: 4

GREEN COMPLIANCE

16 MARKS

1. Write in detail about Socio-cultural aspects of Green IT?
2. Explain in detail about Green users practices?
3. Discuss about attitude and subjectivity in Green IT?
4. Explain about Green IT ethics and code of conduct?
5. Briefly explain about Green Enterprise Transformation Roadmap?
6. Explain about the four dimensions of GET?
7. Briefly explain about Green Compliance, protocols, and standards?
8. Explain Green IT audits in detail?
9. Write about emergent carbon issues?
10. List out the process involved in Skills Framework for Information Age (SFIA) and Green HR?
11. Explain in detail the ISO 14000:2004 Family of standards?
12. Discuss how the four phases of green transformation process and their measures change when applied to a coal mine?

UNIT: V

CASE STUDIES

PART-A (2 Marks)

1. List out the understanding of current business scenario in your organization?

- The way people use the processes.
- The current product or service portfolio.
- Underlying technologies that support business.
- Identify KPI of business.

2. List out the terms adopted by your organization to adopt green policies?

- Reduction of energy consumption.
- Reduction of carbon foot print
- Reduction of operational costs.
- Improvement of reputation of organization.
- Meet government regulations and legislation.

3. Give the ICT practices that have been adopted by your organization?

- Videoconferencing
- Telecommuting
- Fleet and force management
- Web and emails
- Mobile phones / PDA's

4. Illustrate the practices regarding energy saving data centers?

- Energy saving choice when purchasing new ICT hardware.
- Reducing energy used by data centers.
- Use open source system software.
- Machine server virtualization.

- Replace conventional with electronic friendly devices.

5. Define the term compliance audits?

- ✓ Well documented model for carbon emissions.
- ✓ Regular updates and modifications of environmental parameters.
- ✓ Standard approach to accessing government rules and regulations.
- ✓ Provides feedback to government.
- ✓ Periodically check environmental documents of the vendor.

6. List some strategic measures for reducing emissions?

- ✓ Use of ICT.
- ✓ Use of Government regulations.
- ✓ Implement Monitoring methods.
- ✓ Use solar / wind energy.

7. What are the 4 major phase of transformation in Green Mead hospital?

- i. Diagnose
- ii. Plan
- iii. Enact
- iv. Review

8. Write some objectives of Green Business?

- ✓ Reduction in carbon emissions across all departments and process of the organization.
- ✓ Aim for a comprehensive and holistic GET that is futuristic.
- ✓ Create positive green attitude across the entire staff through Green HR.

9. What are the steps to develop a hospital ERBS?

- i. Business Objectives in becoming Green.
- ii. Green IT Strategies.
- iii. Green IT policies and preconditions.
- iv. Green IT resource plans.

- v. Green Transformation plans.

10. Define AuPack scenario?

AuPack is a hypothetical organization in the business of manufacturing packages and containers that in turn are used by other manufactures of goods and products.

11. What are the two drivers for environmental business?

- i. Sociopolitical Pressure.
- ii. Enlightened self-interest.

12. List out the Weakness of Green IT?

- i. The technical infrastructure of the organization is aging.
- ii. Most workers of AuPack are not serious about the environmental issues.

13. What are the GET areas in AuPacks?

- i. Customers and partners.
- ii. IT systems and applications.
- iii. CEM's (Carbon Emission Management Software).
- iv. SLA's (Software level Agreements)
- v. External and internal business process.
- vi. Operational Organization.

14. Define the Scenario of Zeetel Telecom Service?

Zeetel is a hypothetical large telecom company operating in the African region. It is responsible for the core telecom infrastructure in the region, I addition to offering some land based and mobile services.

15. List the noteworthy findings from green IT audit undertaken by bank?

- ❖ The preliminary Green IT audit reveals that the bank had a significant carbon foot print.
- ❖ Reviews of systems, printers, consumers and workers were undertaken.
- ❖ Opinion of CGO officer will reduce the carbon foot print.

UNIT: V

CASE STUDIES

PART-B (16 Marks):

1. Write in detail about ERBS with a case study scenario?
2. List out some of the case study scenarios for trial runs to experiment with their Green IT Strategies?
3. Briefly explain about the application to a home in Green IT Strategies?
4. Briefly explain about the guidelines for preliminary green investigation, Green Business Objectives and SWOT of Good Mead Hospital?
5. List out the steps in developing a hospital ERBS?
6. Explain AuPack Scenario, strategic approach and SWOT in Green IT?
7. Briefly explain about Telecom Scenario and SWOT for ZeeTel Telecom services?
