ANSWER KEYS

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1.	**Attempt *any three* of the following:**	
a.	**Explain how green computing effect on cost saving.**	
ANS	**Cost Savings** If properly followed Green Computing practices can save millions of rupees of an organization. Ecologically responsible practices must be adopted. For green computing, initial investment will be more, but eventually not only we will save money but also help to sustain the environment. **1. Hardware** We can reduce cost for hardware is to simply buy less equipment. a) **Taking the Steps, Gaining the Rewards:** Using server virtualization to reduce its energy use to save money and less damage to the environment…….. **b) Use What You Have:** Before purchasing new equipment, once again go through our old inventory and old dump electronic elements…….. **2. Power** Saving the power is saving the money as well as saving the environment. **a) Desktops:** The power can cab be effectively used in desktop computer by enabling power management settings……. **b) Datacenters:** The increase in servers and network infrastructure has caused a sharp hike in the electrical usage in the datacenter. Where using smart switches cost can be saved…….. **c) Consumption:** From properly organizing physical space to reduce cooling loads to using energy-efficient power supplies……..	
b.	**How hardware deployments can affect the environment?**	
	There are a number of ways that specific hardware and hardware deployments can affect the environment. We can reduce cost for hardware is to simply buy less equipment. **Taking the Steps, Gaining the Rewards:** The Nashville's Vanderbilt University and the state of Oregon have begun datacenter virtualization projects and expect to save millions of dollars by the time the projects are finished. Vanderbilt's Information Technology Services organization is using server virtualization to reduce its energy use to save money and less damage to the environment. **Use What You Have:** Every time before purchasing new equipment, once again go through our old inventory and old dump electronic elements. If we found something that can be reused and renovated with energy efficiency, first do that. We can take an older computer and turn it into a thin client for the processing and storage duties are conducted at the server, as the client just needs enough power to be able to display what is going on at the server. A thin client uses 15 watts of energy instead of the 150 watts that workstations use on an average. If we are doing so our energy bill will be ten times less than what it is now.	

c.	**What are the steps involved for Measuring of carbon footprint?**	
	A carbon footprint is defined as: The total amount of greenhouse gases produced to directly and indirectly support human activities, usually expressed in equivalent tons of carbon dioxide (CO2). In few organizations, *carbon footprint* might mean that everything is tallied—sourcing materials, manufacturing, distribution, use, disposal, and so forth. **Measuring** Measuring of carbon footprint is time consuming job. Following steps can be used for it. **Step 1. Define the boundary for your carbon footprint** We need to monitor the carbon footprint process year by year, so it is very important to have some rules to follow about scope of work to be done. Our primary objective is to reduce the emission of carbon, if we fail to define the carbon footprint boundary can inhibit comparisons against benchmarks and could also undermine meaningful monitoring of performance. There are three types of boundaries: **Type 1: Operational control:** Using this approach every operation of our organization/company is captured in the carbon footprint. This also includes supply chain if an organization has sufficient operational control over suppliers. **Type 2: Financial control:** In this approach all financial elements are included. Often this excludes elements which our company may operate but not financially control and therefore using this approach can result in a smaller carbon footprint. **Type 3: Equity control:** This approach includes all elements that our company owns. If our company has part ownership then the proportion ownership is used to calculate the relevant carbon footprint attributable to that company. **Step 2. Decide which emissions will be included under scope:** Scope refers to the emission types captured in a carbon footprint. The scope of an organization's carbon footprint also breaks down into three components. **Scope 1 emissions:** These are direct emissions from assets that are either owned by our company (i.e. fleet vehicle emissions from the consumption of fuel) or emissions produced through an on-site activity (i.e. emissions from the burning of natural gas in a company's boiler). **Scope 2 emissions:** Scope 2 covers all indirect emissions or more specifically emissions derived from the production of purchased electricity. Here company hasn't actually produced the emissions associated with electricity generation but due to the consumption of electricity to power lights, equipment etc. we can say that our organization is indirectly responsible for these emissions. **Scope 3 emissions:** Scope 3 covers all other indirect emissions which are not as a result of the consumption of purchased electricity. This includes a wide array of emission sources including waste, consumables, staff commute, supply chain emissions, water use etc. **Step 3. Define your carbon footprint period** A carbon footprint is typically measured across an annual period. When choosing our period for measurement it is best to think of other reporting cycles which can be used as the set time-frame. **Step 4. Use a practical approach to collect annual data** Once we have defined our boundary and the type of emissions we are going to capture, we'll then need to collect data on all elements that we are going to measure carbon emissions for (i.e. electricity and gas usage, vehicle mileage, waste volume etc.)	
d.	**Describe the functions of Basel Action Network.**	
	The Basel Action Network (BAN) is a non-profit organization which operates globally. It is focused on working with the human rights and environmental impacts of e-waste. It also works to ban waste trade and promote green, toxin-free design of consumer products. BAN performs these broad functions:	

- It provides information on the waste trade for journalists, academics, and the general public by using e-mail, newsletter and electronic action alerts.
- It also provides international policy advocacy. BAN works with United Nations (UN), Organization of Economic Cooperation and Development (OECD) and the UN Environment Program (UNEP) Chemicals Program and Governing Council. It also has produced Model National Legislation on toxic waste trade for developing countries.
- BAN conducts field research and investigations in developing countries and provides photographic and video documentation of e-waste trade.
- BAN participates with NGOs around the world in campaigns to counter toxic trade.

e. Mention the steps taken by CHINA in managing their own e-waste problem?

China is major destination of much of the world's e-waste. The Chinese regulation is normally referred to as China RoHS. China RoHS, contains a list of included products which is called as catalog.

Products: There are many product types which are not part of of EU RoHS are within the scope of China RoHS. Which includes the following:

- Automotive electronics
- Radar equipment
- Medical devices
- Semiconductor and manufacturing equipment, components, and some raw materials
- Some packaging materials

Products shipped to China must be marked as to whether the items are compliant or noncompliant. The Electronic Information Products (EIP) logo or other label is used to mark parts that do not have unacceptable levels of substances listed by China RoHS.

Materials: Products that contain hazardous substances must be marked with the EIP logo and include an Environmental Protection Use Period (EPUP) value listed in years.

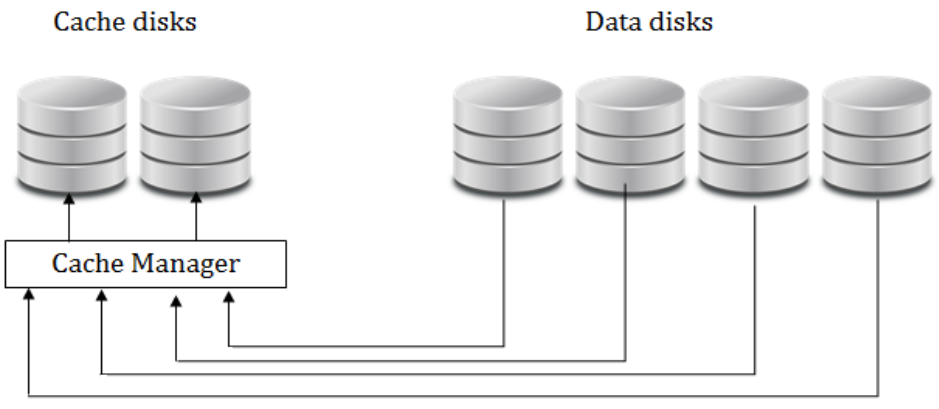
China RoHS bans the following substances:

- Lead
- Mercury
- Cadmium
- Hexavalent chromium
- Polybrominated biphenyls (PBBs)
- Polybrominated diphenyl ether (PBDE)

Marking: The initial requirement is for a mark and disclosure of any of the six aforementioned hazardous substances and their locations within the product. Labels must contain the following information:

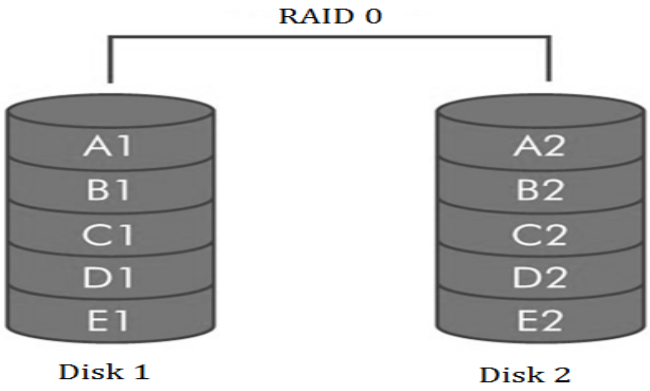
- Whether the product contains any of the six hazardous substances. If they are present, the "Environment-Friendly Use Period" (EFUP) must also be determined and indicated.
- Disclosure of which hazardous substances are contained in the product and the component(s) they are present in.
- Packaging material must be disclosed on the outside packaging.
- The date of manufacture.

The regulations have not been implemented yet, being postponed in their formal adoption twice. There is no formal schedule for completion of the Catalog.

f.	**What StEP stands for? Explain objectives of StEP.**	
	As e-waste is an international concern, United Nations has taken a lead and implemented its solving the E-waste Problem (StEP) program. StEP is not supposed to misunderstand as a strict organization which monitors office buildings where CRTs are being disposed of unsafely. Instead StEP is a program where companies, governmental organizations, academic institutions, nongovernmental organizations (NGOs), and nonprofit organizations around the world can participate. To be involved with StEP, an organization has to commit to active and productive involvement in the StEP program. **StEP's prime objectives are as follows(Year 2016):** 1. **Research and piloting:** Overcoming the e-waste problem requires knowledge, leadership and action. By conducting and sharing scientific research, Step is helping to shape effective policy-making. Research is also key to reducing or replacing resources used in manufacturing. By fostering the generation of problem-solving ideas, Step can support their implementation and analyze their effect. 2. **Strategy and goal-setting:** While the overall goal is the elimination of e-waste as a problem, there are realities to be embraced along the way. Targets, goals and strategies must take into account the varying circumstances of different jurisdictions and markets. A key strategic goal is to empower pro-activity in the marketplace through expanded membership and to secure a robust funding base to support activity. 3. **Training and development:** Step's global overview of e-waste issues makes it the obvious provider of training on e-waste issues. The Step E-Waste Academy brings together diverse groups of participants and trains them on key issues. A syllabus is being defined with the ultimate goal of expanding the Step E-Waste Academy. 4. **Communication and branding:** Brand communication and awareness is vital, both within the membership and throughout the industry as a whole. One of Step's priorities is to ensure that members, prospective members and legislators are all made aware of the nature and scale of the problem, its development opportunities and how Step is contributing to solving the e-waste problem.	
2.	**Attempt *any three* of the following:**	**15**
a.	**Explain MAID and RAID.**	
	MAID: A massive array of idle disks (MAID) is a system that uses hundreds or thousands of hard drives for near line data storage.  MAID system structure	

MAID is designed for write once, read occasionally (WORO) applications. The drives in this disk only spin whenever accessed. As small amount of the data is being accessed, these disks can be powered as needed, thus reducing the power used to run them as well as reducing the generation of heat, which in turn reduces cooling costs. MAID has increased storage density and is much less expensive, thus saving power and the need for cooling.
MAID solution are somewhat slow, its data access can take a few milliseconds up to 10 seconds. This system allows a dense packaging of drives, and typically only 25 percent of the disks are spinning at any given time. Use of SATA drives made architecture of MAID more popular because SATA disk are made to be spin as per need. So it is always a good solution to use MAID architecture for storage for achieving energy efficiency.

Power-managed RAID: The RAID (redundant array of inexpensive disks) is majorly known for its security features. A typical RAID consumes more power. To deal with this issue, a new form of RAID has been introduced.
A Power-managed RAID provides parity protection, but with only some of the RAID disks actually turned on. When data is written, only the parity and associated data drives are powered up. When data is read, only the disk being read needs to be powered up.



Here Non-disruptive and sequential read/writes are accomplished by staging the data to an always-spinning drive, while the next drive is being powered up. The result is that your organization can have hundreds of terabytes in storage in a single footprint which in turns results in power saving.

b. How computer monitor settings save energy?

The computer monitors consumes maximum power. Even new monitors can consume 100 W of power while they are on. In sleep mode, they typically use 5 W or less. Adjusting monitors to automatically enter sleep mode after a period of nonuse is a quick-and-easy way to reduce costs. Even all LCD models are not power savers. It is always better to know how much power our monitor power draws before buying it.

Settings: Normally we suppose to turn off monitors when not in use. We can also use some other settings for power saving, such as setting proper brightness of screen, choosing proper color scheme, not using screen savers animations etc. Following table shows the energy consumed for color to display on screen on an average.

Color	Watts Used
White	74 W
Yellow	69 W
Aqua	68 W
Silver	67 W
Blue	65 W

Red	65 W
Lime	63 W
Gray	62 W
Olive	61 W
Purple	61 W
Teal	61 W
Green	60 W
Maroon	60 W
Navy	60 W
Black	59 W

It is clearly visible that White and bright colors can use up to 20 percent more power than black or dark colors.

c. What is polling? Give example.

Polling: It is the process of automatically checking of, if a given action has been taken draws power from idling computers, because it automatically wakes the computer up to check for a given event. Every time an application polls for something, the CPU wakes from an idle state and consumes power.

Polling is the process where the computer or controlling device waits for an external device to check for its readiness or state, often with low-level hardware. For example, when a printer is connected via a parallel port, the computer waits until the printer has received the next character. These processes can be as minute as only reading one bit. This is sometimes used synonymously with busy-wait polling. In this situation, when an I/O operation is required, the computer does nothing other than check the status of the I/O device until it is ready, at which point the device is accessed. In other words, the computer waits until the device is ready. Polling also refers to the situation where a device is repeatedly checked for readiness, and if it is not, the computer returns to a different task. Although not as wasteful of CPU cycles as busy waiting, this is generally not as efficient as the alternative to polling, interrupt-driven I/O.

For example 10 polling actions that occur within 1 second. Schedule them so that they run immediately after another, rather than at various times during that period. By grouping them together, the computer only has to come out of an idle state once, rather than multiple times.

d. How to achieve proper humidity levels?

Higher level of humidity can destruct datacenters equipment. Even very less humidity level can also not suitable for the equipment's. So we need to maintain and manage proper humidity level in our work area. Following tips can help us to achieve proper humidity levels.

- **Establish a humidity sensor calibration (adjustment) schedule:** The humidity sensors can give poor readings over the time, so it required to make frequent adjustments on regular basis, more so than temperature sensors. Also, incorrect humidity sensors are less likely to be noticed than incorrect temperature sensors. So, establish a frequent test and calibration schedule for our humidity sensors.
- **Allow for sensor redundancy:** Purchase adequate number of sensors to measure datacenter's humidity level. To ensure a tight control, multiple sensors should be used. At the very least use two, but more are better.
- **Manage humidity with a dedicated unit:** If ventilated air is used (maybe from an air-side economizer), control humidity with a single ventilation air handler.
- **Lock out economizers when necessary:** When using an air-side economizer, minimize the amount of air that's brought in when the dew point is low. This saves money on having to humidify the dry air.
- **Centralize humidity control:** Each datacenter should have its own centralized humidity control system. Having multiple systems may affect each other's work and will result in loss of effectiveness.

e.	**How to prevent Recirculation of Equipment Exhaust?**	
	The new devices generally are energy efficient, but their cooling can be absorbed by other old devices. It results in all devices may heat unnecessarily. As an example networking gear can get hot enough on its own and doesn't need help from its neighbor nor does it need to heat up its neighbors. But using few tips we can eliminate exhaust from being reabsorbed by other devices: 1. **Hot-aisle/cool aisle:** Adjust the hot-aisle/cool-aisle design mentioned above in this chapter. 2. **Rigid enclosures:** Decide an unalterable place to keep exhaust heat from being sucked back into the device's cool air intakes. 3. **Flexible strip curtains:** Use flexible strip curtains to block the open air above racks that have been configured into a hot-aisle/cool-aisle layout. 4. **Block unused rack locations with blanks:** The equipment typically fetch cool air from the front and exhausts it out the back. Blanking (Make a place to pass the air) open areas under equipment prevents the exhaust from being drawn back into the device. 5. **Design with cooling in mind:** Some equipment does not fetch air in from the front and exhaust it out the back. Some have top discharge or side to side designs. In this situation we can configure (rearrange) racks in such way that the equipment doesn't blow into the intake of other equipment. 6. **Select racks with good airflow:** We need to purchase racks that don't have an internal structure that would block the smooth flow of air to equipment.	
f.	**State the advantages of custom centralized air-handling system.**	
	The custom centralized air-handling system is the best solution for cooling. This system has several advantages over the multiple distributed unit system, as listed below. • Better efficiency. • Can use surplus and redundant capacity. • Unit's works in combination with each other, instead fighting against each other. • Uses fluid-cooled chiller plants, which are much more efficient than water- and air cooled datacenters. • Less maintenance is required. **Design for Your Need** It is always better to have a system as per our need and solutions best fit for it. Unfortunately, our datacenters' power needs rarely get the exact fit they need. They are usually loaded too light. There are ways to correct size, it is important to get as close as we can with electrical and mechanical systems so that they still operate properly when under loaded, but are still scalable for larger loads. We can achieve this by considering following few issues: • Increase the duct, plenum, and piping infrastructure. This reduces operating costs and allows a measure of future proofing. • Use variable speed motor drives on chillers, chilled and condenser water pumps. Also, use cooling tower fans to help with part load performance. This can be especially helpful when controlled as part of a coordinated cooling system. • Examine efficient design techniques, such as medium temperature cooling loops and fluid-side economizers. • Cooling-tower energy use is typically a small portion of energy consumption. If we increase cooling towers, we can improve chiller performance and fluid-side economizers. Although this involves a larger cost up front and a larger physical footprint, but will gain savings in operational costs.	

3.	**Attempt *any three* of the following:**	**15**
a.	**What are the ways to control the use of water in organisation?**	
	The use of water is a big issue that can be considered for greening process in our organization. How much we can in this regards is depends upon how much water is used. For example urban area offices generally use less amount of water, while in rural area water consumption is more as offices are beautified with surrounding grass lawns. Following few tips will help us to control the use of water: • Document our maintenance and upgrades to fixtures. • Monitor our water usage. Keep a log of meter reads on a weekly basis so that points in usage can be assessed and repairs made in a timely fashion. • Install leak detection and water conservation tools, such as isolated meters and shut off valves to each appliance or fixture. Rain shut-off devices are especially helpful if we have grass to water. • Determine flow rates, flush volumes, and daily water use. Put a plan in place to reduce the amount of water that's used. • Install low flow fixtures. If we have already got low flow fixtures, keep up on their maintenance. • If we do have an irrigation system in place, consider these issues to prevent wasted water. • Inspect our property for leaks on a regular basis. Repair leaks as soon as they're detected. • Check our irrigation systems on monthly basis and look for problems. • Sprinkler heads routinely break and can go unnoticed for months. • Adjust watering schedules to fit the needs of the plants. • Consider getting rid of turf and installing plants. • Pick weeds early in the season. Grass and weeds are both huge water consumers. • If we have any tropical plants, be sure they are grouped with plants that have similar watering needs. • Annuals should be watered on a separate schedule. Their roots are shallower and need more frequent watering, but in lesser amounts.	
b.	**Which things are necessary for evaluating suppliers for their level of environmental responsibility?**	
	We need to also expect the changes from our suppliers. When we are evaluating suppliers for their level of environmental responsibility, we need to take care of following things. • What are the supplier's environmental values? How are they measured and enforced? • Does the supplier have an environmental management system? • Who is accountable for environmental performance? Is it just the supplier's environmental staff, or is it all employees? • Does the supplier comply with federal, state, and local environmental laws? • Is the supplier willing to understand and work with our environmental goals? • Has the supplier made efforts to design and manufacture products with the environment in mind? • How efficient is the supplier in using resources, materials, and energy, as well as recycling and pollution prevention? • Will the supplier reclaim its products or packaging at the end of their useful lives? All the things mentioned above may not be followed by every supplier. But we can emphasis on our requirements, this will spread awareness among the supplier. Also we will come to know about suppliers efforts that meet our own green sourcing needs or not and how well they align with our corporate culture.	

Communicate with Your Suppliers

During the sourcing process and monitor compliance and progress, we need to clearly set and convey our expectations to our suppliers. It is going to be a good start and help us smooth conduction of green sourcing.

We also need to make the supplier understand what they need to provide and how they will be measured at our place. This ensures that they are providing what we want and are putting in place the processes to achieve compliance.

For example, this can include detailing how suppliers are to recycle discarded materials, that they need to use less-toxic chemicals, and that they create products which are easily disassembled for less waste and easier recycling.

c. **Describe intranet? How to build it?**

An intranet is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and also use leased lines in the wide area network. Typically, an intranet includes connections through one or more gateway computers to the outside Internet. The main purpose of an intranet is to share company information and computing resources among employees. An intranet can also be used to facilitate working in groups and for teleconferences.

By using intranet of our organization, all employees can access their documents from anywhere in the office. We also not need to reprint the manual book; just send out an e-mail to our employees that the change has been posted to the manual.

Intranets reduces the amount of paper that is used in-house. The files stored on the public Internet are accessible to anyone, files on our private intranet are only accessible to us and our coworkers.

Building an Intranet:

If we have to go for an organizational intranet set up, it needs some specific hardware as well as software's.

Parts

We need following four components for intranet set up as shown in next figure:

- **Local area network (LAN):** We need use LAN architecture to set up intranet.
- **Web server:** Intranet is nothing but an internal website. For running the website, we need a web server. Also we need to host our website locally on web server. The two most popular web servers we can use as Apache and Microsoft Internet Information Server (IIS). Following table compares these two. Also we can outsource our web hosting which is less costly and a lot easier. Often, providers supply easy-to-use security and other tools and templates so we can set up a secure intranet quickly.
- **Web browsers on client PCs:** To access the intranet website we need web browser software, such as Internet Explorer or Firefox.
- **Web page development software:** We need to develop a website using HTML and supportive web technologies.

Installation of Apache webserver is simple but after installation it requires lot of configuration to be done. Foe better management of webservers we can refer the manuals for both the web servers.

The intranet in this form is great for local users, but it can also be accessed remotely for the people who are working from home for our organization. We can achieve this by using a virtual private network or a secure WAN connection.

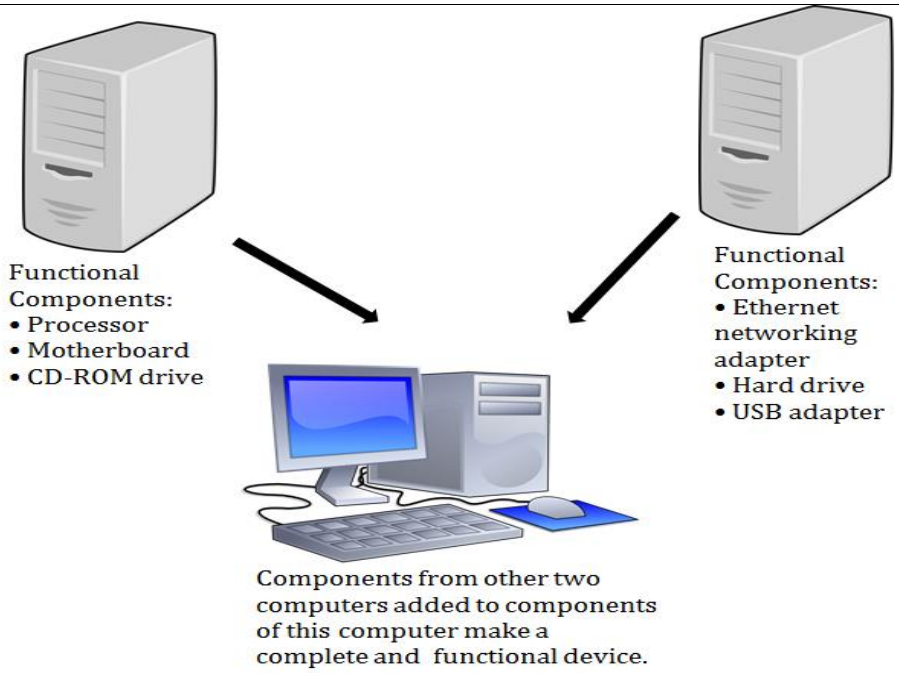
Content Management Systems

The websites or intranet are the dynamic entities. We should install a content management system (CMS) to easily add, delete, and update content. A CMS makes intranet maintenance much easier and can be done by someone with a very limited background with HTML, opening up the role of content management to a wider range of users. Among other things, a CMS facilitates the following:

	• Addition of new content • Removal of old content • Better organization of the data on the site • Managing text, articles, documents, files, and other communications • Managing images and other elements There are a many free CMS solutions are available for both Windows and Linux.The Windows CMSs include Community Server and DotNetNuke. DotNetNuke is shown in following figure: The Linux supports a variety of well-known CMS solutions such as Drupal, Joomla, Mambo, Moodle, Post Nuke, and Xoops. Following figure shows Joomla interface. Once our website is set up, we need to explore it to our users for its usefulness. We need to take regular surveys to find out what people find most useful and what helps them to be more informed and efficient.	
d.	**What is Telecommuting? Explain in brief.**	
	Telecommuting is a work arrangement in which the employee works outside the office. It helps to reduce our environmental impact. The major problem in make use telecommuting is to make the people to agree on its use. Here the worker might interested to use it but management may hesitate to implement it. Telecommuting is often wrongly perceived as a vacation and workers not having to do their share of the work. But that it is not the fact. The Research organization IDC stated that 8.9 million Americans worked at home at least 3 days a month in 2004. That's only a tiny increase from the 8.7 million people IDC reported as teleworkers in 1999. Hewitt Associates, a human resources consulting firm, conducted its own survey of 936 large companies. Its results showed that 32 percent of these companies offered telecommuting opportunities in 2004. It was a 1 percent increase over the prior year. Sun Microsystems operates its own telecommuting program called iWork. With it, workers can work from home, or if they need to they can drive to a flexible work center when they need an office. Around the world, Sun has 115 flexible office locations. Although this is a nice arrangement for employees, Sun isn't missing out on any cost savings. Sun says this setup has saved the company $255 million over 4 years. It has reduced its cost for real estate by eliminating 7,700 seats. The company also saves money by not having to pay so much for electricity and not having to upgrade computers. It is not as such simple to telecommute like sending a worker home with a company issued VPN client, a username, and password. For making it effective, companies need to determine which job categories should be eligible; then guidelines and performance goals need to be established. The company also needs to decide what equipment it should provide and develop training for employees and managers.	
e.	**Which things are needed to go paperless in organization?**	
	There are many ways we can adopt in organization for going paperless, it is not just the scanners that will do the work. Every stakeholder of an organization must be agree to adopt the approach. Once we decided to go for paperless, we need to take care of following things: • **It won't happen overnight**: The execution of going paperless cannot be implemented at one go in organization. We need to start gradually by scanning old papers. Then we can go for incoming paperwork as paperless. • **"Paperless" isn't an absolute**: Sometimes we may require a hard print of paper. Some of our clients or business partners will still want their interactions done via paper. Also, there will likely be some tax documentation that needs to be maintained as hard copies.	

	• **You have to sell it**: The idea of going paperless might not be easily accepted by all. We need to convince our people by explaining them effectively about benefits of the new system. For an employees it might be hard to change. The best thing we can do is educate them about the benefits of being paperless, and understand that it will take some time for everyone to come around. Give it time. Going paperless will save money in in the cost of printing, mailing, shipping, and storage. But as we proceed with the system, there are other advantages also: • It takes less time for finding lost paperwork. • It gives ability to access most documents in seconds. • It gives ability to access all our documents from home or satellite offices. • It saves the space in our office as filing cabinets are moved out.	
f.	**Write a note on PDA and TabletPC.**	
	PDAs PDA is a term used for a small, mobile, handheld device that provides computing and information storage and retrieval capabilities for personal or business use, often for keeping schedules, calendars and address book information handy. This devices also comes with memory card slots for data storage, and a wireless connection. PDAs can be used for delivering a package, the delivery driver might ask us to sign for the package on his PDA. The PDAs typically run a version of Microsoft Windows Mobile for Pocket PCs or with the Palm OS. **Tablet PCs** A tablet PC is a portable PC that is a hybrid between a personal digital assistant (PDA) and notebook PC. Equipped with a touch screen interface, a tablet PC usually has a software application used to run a virtual keyboard. However, many tablet PCs support external keyboards. Tablet PCs have built-in Web browsing capabilities, multiple connectivity options, capacitive touch screens and multimedia - including high definition (HD) support. Tablet PCs are also equipped with accelerometers, which allow users to view display screens in portrait or landscape mode. Generally they comes with Microsoft Windows XP or Vista OS.	
4.	**Attempt *any three* of the following:**	**15**
a	**List various ways to clean the hard drive. Explain any two.**	
	Only formatting is not sufficient to clean the hard drive. Information can be retrieved from the hard drive even after format. After formatting the hard drive only makes operating system unable to display the data. The quick formatting just writes to a portion of the disk, but most of the old data is still there and is readily accessible using fairly common recovery tools. Even disks that have been completely formatted can be partially or completely recovered. We can safely decommission our old hard drives using several methods such as Deleting, Overwriting, Degaussing, Mechanical Shredding, Secure Erase etc. **1. Deleting** Generally use delete the data case they need to removal of it from hard drive. In deleting process data is actually not deleted. When a file is deleted, the file system's pointer to that file is removed, but that doesn't remove the file itself. The only way the file will be completely removed, using this method, is if data overwrites the area where the file resided. The data remains on the hard drive, and it can be recovered with the right software. **2. Overwriting** The removal of data is also possible with overwriting random data by using three times. In U.S. Dept. of Defense (DoD), rule is there to overwrite the data over three times because there may be problems with the following: • Incompetence of the overwrite procedures	

	• Equipment failure, such as a misalignment of read or write heads of the disk • Inability to overwrite bad sectors of tracks of data in inter-record gaps Software overwriting is demonstrated in following figure. This solution is very useful because of availability of many applications to achieve this as well as we can also do it in our home. Also overwritten drives can be used again in our organization or we can sell them. Problem with software overwriting is, it is a time consuming process. It can take several hours to wipe one drive. This can cause a loss of productivity, especially in an organization that is overwriting hundreds or even thousands of hard drives. **3. Degaussing** The powerful magnetic force can erase a data on magnetic disk. This process of erasing data is known as degaussing. It uses a machine that produces a strong electromagnetic field and destroys the information stored on a hard drive. Because today's hard disks are strongly protected from the magnetic signals we need stronger electromagnetic field to erase the data from it. The process of deleting the data using high magnetic field is very fast, but it destroys other components of the hard drive, leaving them inoperable. So they cannot be reused and we are not sure about all data is erased or not. We need to take care while degaussing machine. While wiping one hard drive, we run the risk of destroying other machines that might be in the area. This process is generally conducted by highly professional third party. These companies buy the degaussing equipment and perform the work. **4. Mechanical Shredding** Here the old hard drives are put down into a shredder machine and they are torn into a many small pieces. We can give our all drives to shredder machine holder, pay for work and get it done, we need not to purchase a new machine. Benefit here is that we are sure that all information is erased and there is no way to get it back after shredding a hard drives. **5. Secure Erase** A Secure Erase technology was introduced in 2001. ATA and SATA drives contain the technology to erase the data contained on them. But this facility by default has been disabled by most motherboard BIOSs probably because of concerns that a user might accidentally destroy data. The National Security Agency and the National Institute for Standards and Testing have given Secure Erase a higher security rating than block overwriting software. Secure Erase is approved to erase that data. We just have to download a Secure Erase utility software. And make use of it to erase our data permanently.	
b	**Write short note on refurbishing.**	
	Refurbishing (renovate) The computer refurbishers recondition discarded computers to get them in working order. This is generally done by commercial refurbishers such as Dell Refurbished, IBM Refurbished, and Amandi Services. There are also noncommercial refurbishers, which are usually nonprofits or school programs. First they take discarded computers, tests them, extracts useable parts from computers that are not repairable, and then fixes the ones that can be fixed. The process can be explained as making one working computer from two or three discarded machines. This is shown in following figure.	



The totally nonworking computers are sent to a recycler.
The important part of refurbishing is completely cleaning the machine by formatting all old data and installing the appropriate operating system. The cost of refurbish a computer includes labor, parts, and e-waste disposal also.
The process is further categorized as noncommercial refurbishers and commercial refurbishers.

Noncommercial Refurbishing

Here generally nonprofit and school-based programs doing computer training are involved. Aim is to make refurbished computers and provides them to low-income families. Almost than 70 percent of noncommercial computer reuse is sent to schools. The CompuMentor is an organization that helps to provide PCs and other technology to low-income individuals, along with them there are many such programs available in US.

Commercial Refurbishing

The old computers can sold online using many commercial website, it may be in working or non-working conditions. This can be option for an individual to get rid of old system and earn the money also.
Generally major computer companies like HP Financial Services and IBM Global Asset Recovery Services.
The noncommercial and commercial programs are also working together for refurbishing process. Example RECONNECT (www.reconnectpartnership.com) is a partnership between Dell and Goodwill Industries. Computers can be brought into Goodwill locations, Dell will refurbish them, and then the repurposed computers are sold with the proceeds going to Goodwill Industries**.**

c **Give advantages and disadvantages of buying equipment's.**

Buying equipment also comes with its own set of advantages and disadvantages as follows:

Advantages:

- **Ease in comparison to leasing**: In leasing bringing in and sending out the equipment's at certain date become headache for the organizational staff. It is very buying only once you have to purchase and then equipment is all ours, no need to return it. Lease terms can also be tricky to negotiate, and we might end up getting unfavorable terms or spending too much.
- **Maintenance is up to you**: Generally leases are used to follow a maintenance schedule established by the leasing company. When we own the computers, we can decide when to defragment hard drives, install operating system

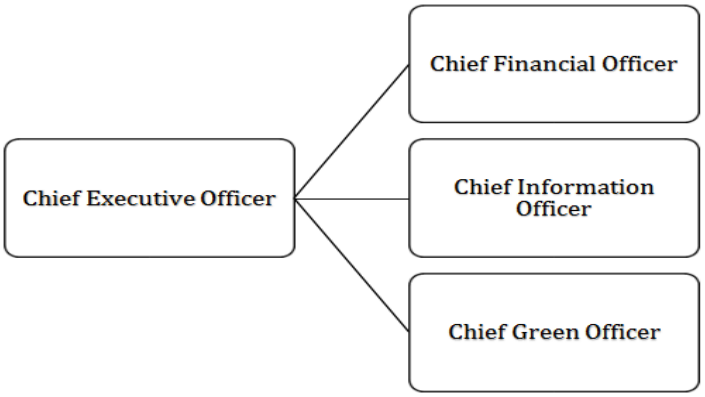
	updates, and so forth. • **Tax deductibility**: If you buy the computers, you can write off the price from your taxes. If you lease, you can only write off the monthly cost. **Disadvantages:** • **High initial outlay**: If we buy our computers, we will have to spend that money up front from the funds of company. That money could have been used to build the business through marketing, advertising, or something else. • **You're stuck with it**: With a lease, when the lease term is over and the machines go back to the lease company, disposal becomes the company's problem, not ours. However, when we own the computers, we have to figure out how to recycle or repurpose the machines.	
d	**Explain how remote desktop server is configured.**	
	Remote desktop is a program or an operating system feature that allows a user to connect to a computer in another location, see that computer's desktop and interact with it as if it were local. When we configure our server for Remote Desktop, we need to enter the user account name when Windows asks for the object name in the Select Users dialog box. To configure a Remote Desktop server, follow these steps: Remote Desktop comes pre-installed on any Windows Vista or later computer. The only requirement is that any accounts on the computer that will be accessed remotely must have a password. 1. To begin the configuration, we must set passwords for any user that will remotely connect. If we already use a password to access our account, we can skip to step 2. If our account does not have a password, click Start | Control Panel | User Accounts. Once there, select our user account, and click Create a password. When we have created a password, close the user accounts window. 2. Click Start | Control Panel and double-click the System icon (click Switch to Classic View on the left side of the Control Panel if we don't see a System icon). On the System Properties window, click the Remote tab or Remote Settings link. 3. On the Remote tab, place a check in the box next to Allow Remote Assistance connections to this computer (Windows 7). **Note**: If we are planning to remotely connect to a computer that is joined to a University of Iowa Active Directory Domain, take note of the Full computer name listed. This is the "hostname" we will need to enter when making the connection from the client (remote) computer. 4. Click the Select Remote users button to add users who can access the host computer remotely. If we need to add additional users, click the Add button, type in the account name, and click OK. Click OK one more time and Remote Desktop will be enabled. We can now connect to the host computer from a remote computer using the Remote Desktop Client. **Remote Desktop Client** 1. Start the Remote Desktop client software on the remote computer (Start | Programs | Accessories | Communications | Remote Desktop Connection on a Windows machine). 2. Select the Options drop-down arrow to review available options and select our preferences. For example, under the Display options tab, we can select the default display size and select multiple monitors for display. 3. Enter our hostname (work computer name) click the Connect button. 4. We should be presented with a log in screen for the host computer. Enter our username and password for the account and click OK. **Note**: We may need to enter the domain followed by a backslash (\ ) before the our username in order to log in. We should now be logged in and able to remotely use our computer.	

e	**Explain Restriction of Hazardous Substances certification.**	
	The Restriction of Hazardous Substances Directive 2002/95/EC, (RoHS 1), short for Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment, was adopted in February 2003 by the European Union. The RoHS 1 directive took effect on 1 July 2006, and is required to be enforced and became a law in each member state. This directive restricts (with exceptions) the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment. Any business that sells applicable electrical or electronic products, equipment, sub-assemblies, cables, components, or spare parts directly to RoHS countries, or sells to resellers, distributors or integrators that in turn sell products to these countries, is impacted if they utilize any of the restricted 10 substances. RoHS is often referred to as the "lead-free directive", but it restricts the use of the following ten substances: **1. Lead (Pb)** **2. Mercury (Hg)** **3. Cadmium (Cd)** **4. Hexavalent chromium (Cr6+)** **5. Polybrominated biphenyls (PBB)** **6. Polybrominated diphenyl ether (PBDE)** **7. Bis(2-ethylhexyl) phthalate (DEHP)** **8. Butyl benzyl phthalate (BBP)** **9. Dibutyl phthalate (DBP)** **10. Diisobutyl phthalate (DIBP)** Any RoHS compliant component must have 100 ppm or less of mercury and the mercury must not have been intentionally added to the component. In the EU, some military and medical equipment are exempt from RoHS compliance.	
f	**Define and explain the terms packaging and Toxins with respect to Hardware Considerations.**	
	Packaging The packaging and shipping are the important aspect in regards with its environmental impact. Generally the computer equipment comes in packaging that cannot be reused or recycled. Multi-material packaging makes recycling difficult, and non-recyclable materials also cause problems. Following tips can be useful at the time new computers transported to us: • We can ask for multiple computers to be packaged together for shipping, instead of boxed individually. • We can ask for recycled-content materials and recyclable packaging for our machines. • We must know the material types used for packaging because same we have to inform our recyclers. So it is needed a labeling to show what type of plastic is used. • We can ask for take back packaging for reuse or recycling to manufacturers or shippers. • We can ask for online manuals and preinstalled programs. **Toxins** There are negative impacts of toxic components of computers when they are at their end of life. We can manage how much toxic material is used by looking for hardware that has been created following these guidelines: • Going for manufacturers who use low levels of toxic chemicals. • Going for manufacturers who use lead-free solder. • Going for manufacturers who use low-mercury and long-life lamps in flat-panel displays. • Batteries should be removable, rechargeable, and recyclable.	

5.	**Attempt *any three* of the following:**	**15**
a.	**List and explain tools used for measuring and tracking our data.**	
	For measuring and tracking our data, we can use business intelligence (BI) tools, such as the following: • **Digital dashboards**: These are called as business intelligence dashboards, enterprise dashboards, or executive dashboards. This helps to get visual summary of the data we want to track as well as summery for understanding the business conditions. • **Online Analytical Processing (OLAP)**: This allows some information systems to analyze data from different perspectives and give us the results. • **Reporting software**: These applications generate aggregated views of data we are tracking. They can compare different times so we can get a good understanding of our overall conditions. • **Data mining**: This the process of digging the old/past data and search for a specific piece of information. For example, if we want to track a metric we hadn't previously thought to track, with data mining we can go back through existing data and make our new measurements. **Microsoft SQL Server** A Microsoft SQL Server, is a relational database management system which also can be used to track and store the data. It can be used in combination with a product such as PerformancePoint Server. With this we can have our own database for future reference. Microsoft SQL Server is very powerful and includes such services as the following: • Service broker • Replication • Analysis • Reporting • Notification • Integration • Full-test search For Example, SQL Server's Analysis service adds OLAP and data-mining capabilities. The service includes various algorithms such as decision trees, clustering algorithm, naïve Bayes, time series, sequence clustering, linear and logistic regression, and neural networks. **Microsoft PerformancePoint** PerformancePoint Server 2007 busies itself with three missions: • Planning • Monitoring • Analytics Monitoring and analytics are delivered through a Monitoring Server, which includes two interfaces: • Dashboard Designer • SharePoint Web Parts The Dashboard Designer allows us to perform the following tasks: • Define the data we wish to monitor. • Create views that allow we to monitor that data. • Assemble the views in a dashboard. • Deploy the dashboard to Microsoft Office SharePoint Server or Windows SharePoint Services.	

	The Monitoring Server is used to manage the content collected by Dashboard Designer collects which is saved at SQL Server database. Data connections, like OLAP or relational tables, are managed through Monitoring Server. After the publishing the dashboard to the Monitoring System database, it can be sent to Microsoft Office SharePoint Server or Windows SharePoint Services. The information can also be viewed in a web browser.	
b.	**What is the difference between Application Service Providers and Software as a Service?**	
	Ideally, SaaS extends the ASP model idea. While ASPs try to focus on managing and hosting 3rd-party ISV software, SaaS vendors manage the software they have developed on their own. In addition, ASPs provide more traditional client-server applications, requiring installation of software on users' PCs. On the other hand, SaaS rely solely on the Web and can be accessed via a web browser. Additionally, ASPs' software architecture required that, for each business, you must maintain a separate instance of the application. However, SaaS does not maintain such requirements, as SaaS solutions use a multi-tenant architecture in which the application serves multiple users and businesses. Users access SaaS over the internet and it works in maintenance and service operation. Also, users pay per use and not as per a license, while the provider is responsible for maintenance and storage of data and business logic in the cloud. A major advantage of SaaS is that businesses can potentially reduce IT support costs by outsourcing their hardware and software maintenance and support needs to the SaaS provider. Typically, SaaS is mostly utilized as a delivery model for several business applications, including Office & Messaging software, Management software, DBMS software, Development software, CAD software, Virtualization, collaboration, accounting, human resource management (HRM), customer relationship management (CRM), enterprise resource planning (ERP), management information system (MIS), invoicing, service desk management, and content management (CM). However, ASP is a failed model because of the following reasons: • It lacks scalability for the vendor • No inbuilt aggregation of data • Too much customization • Generally a single revenue model • No network effect data for collection and aggregation While there are some vendors who have found success with ASP model, this success has been limited due to issues of scalability and customization between systems.	
c.	**Which area needs to be updated in organization to reduce the amount of waste?**	
	The operational mechanism of our business also has a huge impact on the environment as how much power we consume and waste we generate. We need to update our organization to reduce the amount of waste we generate in the following areas: • Worker time • Power • Inefficiency • Paper • Materials **Customer Interaction** The customer interaction work can be achieved with time saving and money if planned proper. This is concern with relationship with the customers, tracking	

	their interaction with our company, and making the lives of the customers, as well as our own as easy as possible **Billing and Online Forms** To become environment friendly, we need to follow a paperless approach. But an organization must embrace it. This process is also convenient for us and our customers. It provides also an ultimate cost and time savings for our organization. The following figure shows the conventional billing and payment system. **Paper Reduction** Minimizing the use of paper can save money as well as help the planet from environmental damages. All the people may not be able to become complete paperless. Some people can turn to this by handling one change at a time such as turning their fax services into a paperless work. There are few tools available which can help us to reduce the paper we use. **Green Supply Chain** We need to also involve the companies we are in business with and the companies we buy parts and services from should towards greening process. We cannot enforce any company, but we can go for a selection of company that follows the green standards such as Dell. Dell has a whole rating system in place for its vendors. If a vendor doesn't meet Dell's minimum standards, the company finds someone else. We should evaluate to what degree greening is important and then decide whether our vendors are acting in a manner with which we are comfortable. **Just-in-Time Buying** The just-in-time buying reduces the total number of product in our warehouses. We need to purchase the equipment's only when needed. Otherwise these devices will lay down on shelf, waiting for installation, also consuming the place. Dell does this with its computers. Rather than have warehouses bursting at the seams with product, the company has a system in place where, when a certain component is running low in stock, new ones are shipped. Dell builds computers to order so that there aren't built-out machines waiting to be purchased, or facing uselessness.	
d.	**Explain characteristics of Software as a Service.**	
	Software as a Service (SaaS) Few applications don't even need a software installed on our servers. This is another way that equipment can be eliminated from our company. It is referred as SaaS. **<u>Characteristics</u>** The SaaS is a model where a software vendor offers its software for use over the Internet. So we don't need any equipment to run it, we can access all the services of that software over internet. For software also we don't need to pay for, but for use we have to pay. Benefit of SaaS is that we don't have to worry about buying upgrades to the application, performing upgrades, and troubleshooting any problems. Any upgrades are performed by the SaaS provider. The SaaS software includes the following characteristics: • Network-based access to, and management of, commercially available software. • Activities that are managed from central locations rather than at each customer's site, enabling customers to access applications remotely via the Web. • Application delivery that typically is closer to a one-to-many model, including architecture, pricing, partnering, and management characteristics.	

	• Centralized feature updating, which obviates the need for downloadable patches and upgrades. The SaaS applications are priced on a per-user basis. Additional fees can be added for extra bandwidth and storage.	
e.	**Describe the work of Chief Green Officer.**	
	There is no secret that going green is a dual benefit as, the environment benefits, and our organization benefits. But it is not an easy to achieve. There are few organizations, as part of their green initiatives, have appointed Chief Green Officer (CGO). This person has the overall responsibility to make sure the company is meeting its green goals and looking for ways to do an even better job.  The CGO, ultimately, is going to be responsible for three things: • **Reducing the organization's environmental footprint:** • **Engaging diverse stakeholders:** • **Discovering new revenue opportunities:**	
f.	**List and explain key strategies to review action plan.**	
	After review and analysis of our performance data, the next step is to understand what is influencing our results. Our review should be especially critical of our action plan, and it should detail which activities were successful and which were not. Based on that we can reevaluate our plan and decide how to proceed next. Reviewing our action plan involves these key strategies: • **Get feedback:** Talk to people in our organization and get feedback information from the energy team and others in our organization. • **Gauge awareness:** Find out whether employees are aware of energy issues. • **Identify critical details:** Figure out which details contributed to our plan failing or succeeding. • **Know your side benefits:** List and quantify any side benefits that arose from our action plan. This could be employee comfort, any impact on sales or operations, and so on. It could be a boost in community relations. The reviewing our action plan allows us to do the following: • Identify new sources of action. • Avoid repeated failures by identifying the actions that were not successful. • Evaluate the usefulness of the tracking system, and make appropriate changes. • Communicate our successes to your staff. • Communicate successes to stakeholders inside and outside the organization.	