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WINTER – 2018 EXAMINATION
MODEL ANSWER

Subject: Computer Hardware & Networking

Subject Code: 17533

Q. No.	Sub Q.N.	Answer	Marking Scheme
1.	(a) i) Ans.	**Attempt any <u>THREE</u> of the following:** **List out any four specification of LASER Printer.** Print Speed – Upto 19PPM Print Technology – Laser Print Quality – Upto 1200 x 1200 DPI Memory – 8MB Standard Interface – USB Postscript support – Standard Power Consumption – 329 Watt when operational Graphics Resolution – 300 to 2400 DPI	*12* *4M* *Any four points- 1M each*
	ii) Ans.	**Give the preventive maintenance for keyboard.** 1. Handle the keyboard gently and carefully 2. Press the keys gently without applying force and do not rest hand on the keyboard 3. Do not spill liquids on the keyboard. 4. Do not keep anything on the keyboard 5. Do not play with the keyboard after powering off the system. 6. Make sure that the cable is not subjected to high stress at the	*4M* *Any four points- 1M each*

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		keyboard end. This will cut signal wires inside the cable. 7. Periodically clean interior of keyboard with a miniature vacuum cleaner or turn it upside down to blow out the accumulated dirt. 8. Use dust cover for keyboard when not used. 9. Clean conducting parts of keyboard, use denatured alcohol along with lint free material.	
	iii) **Ans.**	**List and explain features of SDRAM and DDR.** **Features of SDRAM** 1. All SDRAM chips for desktop PC's have 168 pins. 2. Speed of SDRAM is 100MHz and 133MHz. 3. Generally available in sizes 32MB, 64MB, 128MB, 256MB, 512MB, 1GB etc. 4. Operating voltage 3.3V 5. Architecture used synchronous. 6. Operation Max Temperature 85°C. 7. It prefetches 1 bit at a time	*4M* *Any four features of SDRAM 2M*
		Features of DDR 1. All DDR RAM chips have 184 pins 2. DDR RAM comes in different speeds i.e. 100MHz, 133MHz, 166MHz, 200MHz. 3. DDR RAM is twice as fast as SDRAM. 4. Operating voltage 2.5V 5. Architecture used source synchronous (2n/prefetch). 6. Operation Max Temperature 85°C. 7. It prefetches 2 bits at a time	*Any four features of DDR 2M*
	iv)	**Define the terms:-** **(1) UDP** **(2) TCP** **(3) ICMP** **(4) SMTP**	*4M*
	Ans.	**(1)UDP:** UDP is User Datagram Protocol. It is connectionless protocol because data is sent without establishing a connection between sender and receiver before sending the data. UDP is unreliable because data is delivered without acknowledgement.	*Definition of Each term- 1M*

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		(2)TCP TCP is Transmission Control Protocol. It is connection oriented protocol because connection must be established prior to transmission of data. TCP is reliable protocol because data is delivered with acknowledgement. **(3) ICMP** It is Internet Control Message Protocol. It reports error and sends control messages. Error reporting messages such as destination unreachable, time exceed, parameter problem, redirection etc. are included. Query message such as echo request and reply, time stamp request and reply are included. **(4) SMTP** SMTP is Simple Mail Transfer Protocol. It is connection oriented text based protocol in which sender communicates with receiver using a command and supplying data over reliable TCP connection. SMTP is standard application layer protocol for delivery of email over TCP/IP network.	
1.	(b) i) Ans.	**Attempt any ONE of the following:** **Draw ARP message fields and state any four functions of ARP message field**. ARP stands for Address Resolution Protocol. ARP converts an Internet Protocol address to its physical network address (MAC). ARP was defined by RFC 826 in 1982. It operates at layer 2 of the OSI model.	6

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Functions:
- Local host maintains the ARP Table. ARP maps the Internet Protocol address (IP) to a physical machine address.
- It provides the interface between the IP addressing system used by IP and the Hardware addresses used by the data link layer protocol.
- ARP broadcasts an IP address in an effort to discover its equivalent hardware address.
- ARP has been implemented with many combinations of network and data link layer technologies.
- Responsible for ARP query and ARP response datagram.
- Maintains ARP cache so that if the same query has been processed earlier, new broadcast message is not created but, it checks in the ARP cache.

Correct Diagram 2M

Any four Functions 1M each

	ii) Ans.	**Explain Mesh topology with neat diagram and also state it's advantages and disadvantages.** In a mesh network topology, each of the network node, computer and other devices, are interconnected with one another. • Every node not only sends its own signals but also relays data from other nodes. • In fact a true mesh topology is the one where every node is connected to every other node in the network. • This type of topology is very expensive as there are many redundant connections, thus it is not mostly used in computer networks. • It is commonly used in wireless networks.	*6* *Explanation 2M*

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	• Flooding or routing technique is used in mesh topology. 	*Diagram 2M*
	Advantages of Mesh topology: 1. Dedicated Links: Dedicated links guarantees that each connection can carry its own data load, thus eliminating the traffic problems that can occur when links must be shared by multiple devices 2. It is robust. If one link becomes unusable, it does not incapacitate the entire system. 3. It is Secure. When every message travels along a dedicated line, only the intended recipient sees it. Physical boundaries prevent other users from gaining access to messages 4. Point to Point Connection: Point-to-point links make fault identification and fault isolation easy.	*Any two Advantages 1M*
	Disadvantages of Mesh topology: **1.** There are high chances of redundancy in many of the network connections. **2.** Overall cost of this network is way too high as compared to other network topologies. **3.** Set-up and maintenance of this topology is very difficult. Even administration of the network is tough.	*Any two Disadvantages 1M*
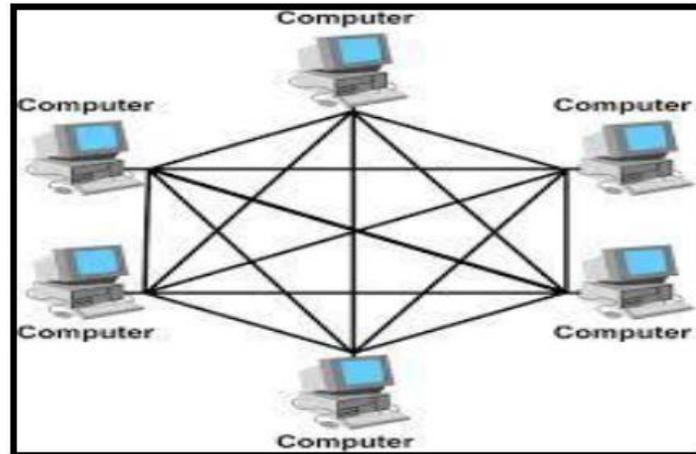
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2.		Attempt any <u>FOUR</u> of the following:	16
	a)	**What is cache? What is level 1 and level 2 cache?**	**4M**
	Ans.	Cache memory is extremely fast memory that is built into a CPU, or located next to it on a separate chip. It supplies the processor with the most frequently requested data and instructions. A cache controller always tries to make sure that the data required by the processor in the next memory access is available in the cache memory. There are three types of cache memory: **L1, L2 & L3 cache memory.**	*Definition 2M*
		L1 cache memory: The L1 cache also called internal or integral cache is always a part of the processor chip. L1 cache always runs at full processor speed. It was the fastest cache in the system. L1 cache was originally 8 KB.	*Description of L1 1M*
		L2 cache memory: The L2 cache originally called external cache because it was external to the processor chip when it was introduced. It was present on the motherboard and used to run at CPU bus speed. To improve the performance of the system, L2 cache was directly incorporated as part of the processor die. L2 cache was originally 128 KB.	*Description of L2 1M*
	b)	**Diagnose the following problem.** **"Junk character displayed on the screen"**	**4M**
	Ans.	1. This happens when there is mismatch between the monitor and the video board. 2. Check the video board support to the monitor being used. 3. Change the video board to standard generic VGA driver and reboot the system. 4. If the standard VGA driver does not work, contact the original driver and update. 5. Conflicts in the device drivers are also the cause for junk characters or garbage characters on the screen. 6. Troubleshoot the problem by checking the .bat and .sys files and reboot the system at every change.	*Any four points 1M each*

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	c)	**List out possible problem associated with Dot matrix printer. State trouble shooting process if "PRINTER NOT READY-ERROR" message is displayed**.	**4M**
	Ans.	Most problems associated with the printer can be traced to improper setup, installation, or cabling.	
		1. Ink smears 2. Printout is faint 3. Carriage moves but there is no printing 4. Paper out detector inoperative 5. Printer does not power up 6. Power is on but printer does not print 7. Carriage stops moving, all indicators start blinking 8. Paper wrinkles when using tractor feed 9. Buzzer sounds when installing single sheet 10. Printer cannot load single sheet through the top 11. Cut Sheet Feeder option (KX-P38) is installed but does not work 12. Unexpected characters appear in printing 13. Printout is double-spaced 14. Keeps printing on the same line 15. Wrong character set is printed 16. Cannot print ASCII characters with code above 127 17. Fanfold paper is jamming 18. KX-PS14 (serial interface board) is installed but cannot print 19. Cannot use parallel interface when installing serial interface board	*Any two Possible problem associated 2M*
		Causes of "printer not ready" error message The "printer not ready" message appears when the printer is not properly connected. The presence of some viruses and malware also prevent the printer from printing and displays a "printer not ready" error message. The device driver is essential for the working of a peripheral device. The corrupted or outdated device driver files could also make the printer not ready for the printing job.	
		Symptoms: When a printer is unable to perform a printing task, it displays an error message. This error message of the printer appears due to the system error code 21. The error message tells that an error was found while printing a particular document and the device is not ready.	

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		When this error occurs, your printer does not respond to the given printing task. In certain cases, a blue screen error appears. The slow performance of the computer, lock ups, system freezing, hard disk error and high CPU usage are other symptoms. **Troubleshooting:** First check the printer whether it is properly connected or not. Run a complete system scan. This issue could be resolved by reinstalling the corrupt printer driver, or changing the default printer by using the Printers application in Windows Control Panel. Either install a new printer driver and set it as the default or select a different driver from the list of currently installed printer drivers. Make sure that the updated device drivers are installed.	*Trouble shoot 2M*
d) **Ans.**		**Write the steps for installing TCP/IP protocol.** Complete the following steps to install and configure the TCP/IP protocol. 1. Open the Network utility. 2. Right-click the connection to which you want to add a network component, and then click Properties. 3. If Internet Protocol (TCP/IP) is listed, skip to Step 6. If Internet Protocol (TCP/IP) is not listed, click Install. 4. In the Select Network Component Type dialog box, click Protocol, and then click Add. 5. From the Network Protocol list, select TCP/IP Protocol and click OK. 6. From the General tab (for local area connections) or the Networking tab (for all other connections), select Internet Protocol (TCP/IP), and then click Properties. 7. Configure TCP/IP either automatically or manually. ▪ Automatically – To automatically configure TCP/IP services if there is a DHCP server on your network. This automatic process ensures easy and accurate installation of TCP/IP. ▪ Manually –To configure manually, select Use the following IP address, specify the necessary parameters like IP address, subnet mask, default gateway etc, and then click OK. To avoid duplicate addresses, be sure to use the values for IP addresses and subnet masks that are supplied by network administrator.	**4M** *Correct procedure 4M*

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		Compare IPV4 and IPV6			4M
e)		**Sr. no**	**Feature**	**IPv4**	**IPv6**	
Ans.		1.	Address length [bits]	32	128	
		2.	Address representation	Decimal numbers separated by dots	Hexadecimal numbers separated by colon	*Any four relevant points- 1M each*
		3.	Address space	Moderate	Large	
		4.	IPSec support	Optional	Required	
		5.	Fragmentation	Hosts and routers	Hosts only	
		6.	Packet Size [bytes]	576	1280	
		7.	Checksum in header	Yes	No	
		8.	Options in header	Yes	No	
		9.	Link-layer address resolution	ARP [broadcast]	ARP [group]	
		10.	Multicast membership	IGMO	Multicast Listener discovery [MLD]	
		11.	Router Discovery	Optional	Required	
		12.	User broadcast	Yes	No	
		13.	Configuration	Manual, DHCP	Automatic, DHCP	

3.		**Attempt any <u>TWO</u> of the following:**	16
a)		**Draw the block diagram and explain the working of laser printer.**	8M
Ans.		**Laser Printer**: - It is a non-impact printer. They are widely used in applications where high quality output is required. Printing speed is much higher than any other printer. It can support text and graphics. Its cost is more than any other printer.	

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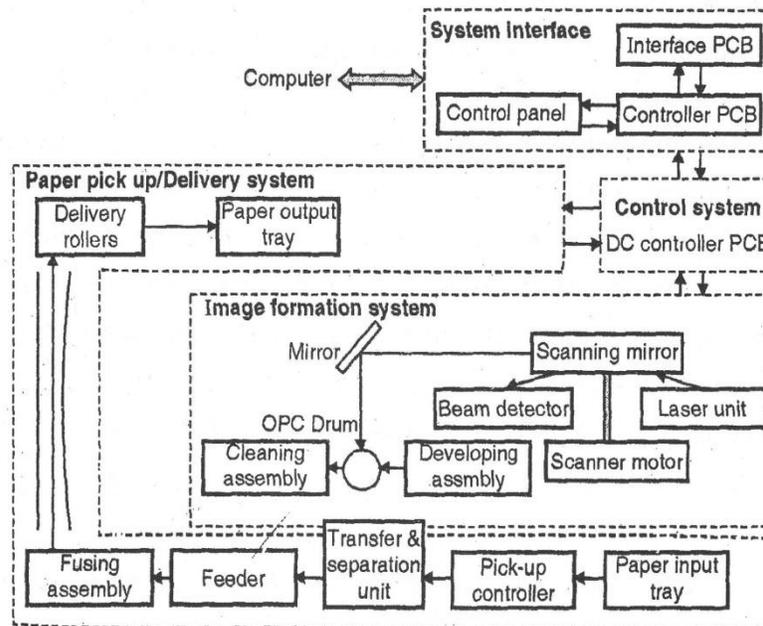
Correct Block diagram 4M

Principle (Image Formation System): Its operation is similar to that of Xerox machine. Laser is used for creating image on a photosensitive drum or OPC (Organic Photo Conductive) drum which is the main component of laser printer. It has special property of image formation on its surface and transferring this image on the paper. This drum is initially charged by charging electrodes before being exposed to the coherent monochromatic helium-neon laser. The drum is an aluminum cylinder, which is coated with an OPC material. The aluminum base of the drum is electrically connected to ground potential. The laser is made on and off. As the beam hits one face of the mirror, the movement of the mirror causes one scans across the drum. The drum and the mirror system are revolving in synchronism so that the beam scans the entire surface of the drum. Dot matrix characters are formed. When the OPC material is exposed to the light it becomes electrically conductive. Any charge that is deposited on the surface of the drum conducts to the base of the drum. The area of the drum, which is not exposed to light, remains non-conductive & retains the charges. This electrostatic image is converted to visible

Explanation of Working 4M

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		image using the toner material it is transferred to paper and is made permanent by passing the paper through hot pressure rollers. **Paper pick up/ Delivery system**: - This system is responsible for picking the paper from the input tray, delivering the paper to the image formation system & finally delivering it to the o/p tray.	
	b) **Ans.**	**Sketch block diagram of off-line UPS. State functions of each block. State any four rating of UPS.** UPS - Uninterruptible Power Supply are known as online backup supplies as they continuously function and supply power to the computer. The UPS operates on the battery with a voltage inverter, which keeps 12v DC from the battery to 230V AC. The block diagram of Off-line UPS is as shown, the different components used are: Functions of blocks: ➤ Step down transformer: - The mains voltage (230V) must be steeped down so that it can feed to the rectifier. Step-down transformer does this stepping down of 230V mains AC. ➤ Rectifier: - The input line voltage, which is stepped down, is given to rectifier. Rectifier usually bridge type converts this AC input to the DC & is filtered out by filter. ➤ Regulator: - The rectified DC voltage needs to be well regulated before it is applied to the inverter circuit. Due to this the output of the UPS will be constant and hence irrespective of any variations	**8M** *Correct Block diagram 2M* *Any four Functions 4M*

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		or fluctuations in the line voltage. ➢ Inverter: - The output of regulator is regulated DC which is applied to the inverter. The inverter is the circuit, which converts Dc voltage to AC voltage. This AC voltage is adjusted to 230V R.M.S and hence this will now work as a 230V AC supplies for computer. This flow will take place when line voltage is present. In ups chargeable batteries are used. Whenever line supply is present then the batteries will get charged up to their full value through a charger circuit. Whenever the line supply goes off then the battery will provide the DC supply to a regulator and then inverter will convert DC to AC. **Ratings of UPS:** 1. Output Power Capacity- 480 Watts / 800 VA 2. Max Configurable Power-480 Watts / 800 VA 3. Nominal Output Voltage-230V 4. Efficiency at Full Load-95.0% 5. Output Frequency (sync to mains)- 47 to 63 Hz 6. Topology- Line Interactive 7. Waveform Type- Stepped approximation to a sine wave 8. Output Connections	*Any 4 Ratings 2M*
	c) **Ans.**	**Explain working of Fibre optic cable. Give its advantages and disadvantages.** **Fiber optic cable construction: -** An optical fiber is a dielectric wave-guide that operates at optical frequencies. This fiber wave-guide is normally cylindrical in form. It confines electromagnetic energy in the form of light to within its surface and guides the light in a direction parallel to its axis. The surface basically establishes the information carrying capacity of the fiber and also influences the response of the wave-guide to environmental perturbances (disturbances). The basic construction of fiber cable is as shown: -	*8M*

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Working 4M
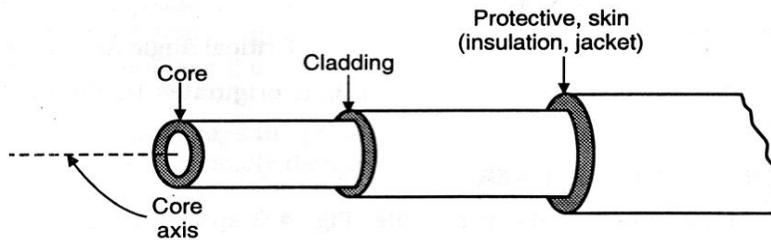
The structure is basically a single solid dielectric cylinder of radius a and index of refraction n1. The core is an innermost layer. Through the core layer the light rays are traveling. The cladding layer covers this layer. The core is surrounded by the solid dielectric cladding having refractive index n2, which is less than n1. The refractive index of the cladding layer is made less than that of core layer. This is achieved while manufacturing the fiber optic cable. The thickness of cladding layer is made one or more times than the wavelength of light to be guided. In addition to helping the propagation of light, the cladding reduces scattering loss resulting from dielectric discontinuities at the core surface, it adds mechanical strength to the fiber, and it protects the core from absorbing surface contaminants with which it could come in contact. Most fibers are encapsulated in an elastic, abrasion-resistant plastic material. This material adds further strength to the fiber and mechanically isolates or buffers the fibers from irregularities, distortions or rough nesses of adjacent surfaces.

<u>Advantages of Optical fiber cable: -</u>
1. Fiber optic cables are light in weight.
2. The size of fiber optic cable is small. The diameter is comparable to that of human hair.
3. Since the data is passing through the fiber Optic cable in the form of light rays and not in the form of electrical signals there are no chances of short circuits.
4. No cross Talk generation inside the fiber optic cable.
5. Electromagnetic Interference is absent.
6. It is not affected by an electrical noise.
7. Drastic environmental conditions don't affect the fiber optic cable.

Any 2 Advantages 2M

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	8. Signal can be send up to 100 times faster in fiber optic cables than along copper cables. 9. It possesses a wide band transmission property. 10. Intermediate amplifiers are not required. **Dis-Advantages of fiber optic cable:** 1. Expensive as compared to conventional cable. 2. Difficult to install. 3. Unidirectional light propagation. 4. Maintenance requires expertise.	*Any 2 Dis-advantages 2M*