



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION
(Autonomous)
(ISO/IEC - 27001 - 2005 Certified)

WINTER – 2016 EXAMINATION

Model Answer

Subject Code: 17533

Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q. No.	Sub Q.N.	Answer	Marking Scheme
1.	(A) (a) Ans.	Attempt any THREE: Define the terms with reference to LCD Monitor. (i) Resolution (ii) Refresh Rate (iii) Response time (iv) Dot pitch (i) Resolution: The horizontal and vertical size expressed in pixels (e.g. 1024 X 768). (ii) Refresh Rate: Rate at which electronics in the monitor address the brightness of each pixel on the screen. (iii) Response time: The minimum time required to change a pixel's color or brightness. (iv) Dot pitch: The distance between dots (sub-pixels) on a display screen.	12 4M 1M for each definition
	(b) Ans.	State four preventive maintenance measures to be taken for maintenance of scanner. Preventive maintenance of Scanner: 1. Clean the exterior of Scanner using soft cloth with mild organic solvent. 2. Do not place the Scanner near heat generating machines such as heaters and furnaces.	4M Any four points 1M each



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		<ol style="list-style-type: none"> 3. Slower Scanner can be made faster by increasing the RAM so that swap file size is increased. 4. If the image is blurry or distorted, make sure the original document is placed firmly and cover is closed properly. 5. If the quality of the image scanned is poor, make sure the scanner and scanner software is set to the appropriate setting for the type of image being scanned. 6. Lamp effectiveness will gradually weaken over time. Replacement of the lamp unit (lamp, reflector, power connectors) 7. The air filters protect your scanner's air-cooling vents and keep out dust and unwanted particles. Replace the air filters if not working properly. 	
(c) Ans.	<p>State four features of DDR2 and DDR3 RAM.</p> <p>Features of DDR2:</p> <ul style="list-style-type: none"> • DDR2RAM chip have 240 pins • DDR2 operates at data rates of 400MHz, 533MHz, and 667MHz and above. • Operates at 1.8Volts. • Operation max temperature is 95⁰C • It prefetch 4 bits at a time. <p>Features of DDR 3:</p> <ul style="list-style-type: none"> • DDR SDRAM or Double Data Rate three Synchronous Dynamic Random Access Memory is a random access memory technology used for high speed storage of the working data of a computer or other digital electronic devices. • Its primary benefit is the ability to run its I/O bus at four times the speed of the memory cells it contains, thus enabling faster bus speed and higher peak throughputs than earlier technologies. • Also the DDR3 standard allows for chip capacities of 512 MB to 8 GB, effectively enabling memory modules of maximum 16 GB in size. • Higher bandwidth performance increase (up to effective 1600 MHz). • Enhanced low power feature. • Improve thermal design (cooler). 	<p style="text-align: center;">4M</p> <p style="text-align: center;"><i>½ M for each feature any four</i></p> <p style="text-align: center;"><i>½M for each feature any four</i></p>	
(d)	<p>State the functions of the following layers of OSI Reference Model.</p> <p>(i) Data link layer</p> <p>(ii) Transport layer</p>	4M	



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	Ans.	<p>(iii) Network layer</p> <p>(iv) Application layer</p> <p>(i) Data link layer: 1) Framing 2) Physical addressing 3) Flow control 4) Error control 5) Media access control 6) Node to node delivery</p> <p>(ii) Transport layer: 1) Service point addressing 2) Segmentation and reassembly 3) Connection control 4) Flow control: Flow control is performed end to end 5) Error control</p> <p>(iii) Network layer: 1) Logical addressing 2) Routing. 3) Congestion control 4) Accounting and billing 5) Address transformation 6) Source host to destination host error free delivery of packet</p> <p>(iv) Application layer: 1) Network virtual terminal 2) file transfer access and management 3) Mail services and directory services</p>	<p><i>Function of each layer</i> 1M</p>
1.	<p>(B) (a)</p> <p>Ans.</p>	<p>Attempt any ONE:</p> <p>State the step-by-step procedure for installation of TCP/IP Protocol and configuring the same.</p> <p>The various basic and advanced properties configured for TCP/IP. You can use this procedure to configure the TCP/IP settings for each of your network connections. Each connection can be configured to use IPv4 or IPv6, or both. To configure TCP/IPv4</p> <ol style="list-style-type: none"> 1. Open the Network Connections folder and view available connections. 2. Right-click the connection that you want to configure, and then click Properties. 3. Do one of the following: If the connection is a local area connection, on the General tab, in This connection uses the following items, click Internet Protocol Version 4 (TCP/IPv4), and then click Properties. If the connection is a dial-up, VPN, or broadband connection, on the Networking tab. In this connection uses the following items, click Internet Protocol Version 4 (TCP/IPv4), and then click Properties. 	<p>6 6M</p> <p><i>1M for each step</i></p>



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		<p>If the connection is an incoming connection, see Configure an Incoming Connection to use TCP/IP.</p> <p>4. Do one of the following: If you want IP settings to be assigned automatically by a DHCP server, VPN server, or other device that provides DHCP services that is installed on the network to which you're connecting, click Obtain an IP address automatically, and then click OK.</p> <p>If you want to specify an IPv4 address or a Domain Name Service (DNS) server address, do the following: Click Use the following IP address, and then in IP address, type the IP address, and an appropriate subnet mask and default gateway address.</p> <p>Click Use the following DNS server addresses, and then in Preferred DNS server and Alternate DNS server, type the addresses of the primary and secondary DNS servers.</p> <p>5. To configure DNS, Windows Internet Name Service (WINS), and IP settings, click Advanced.</p> <p>6. On a local area connection, selecting the Obtain an IP address automatically option enables the Alternate Configuration tab. Use this to enter alternate IP settings if your computer is used on more than one network. To configure DNS, WINS, and IP settings, click User configured on the Alternate Configuration tab.</p>	
	<p>(b)</p> <p>Ans.</p>	<p>State the function of:</p> <p>(i) Hubs (ii) Switches (iii) Routers (iv) Bridges (v) Gateways (vi) Firewalls</p> <p>(i) Hubs It is essentially a multi port repeater (repeater receives digital data, regenerates the signal and then re-transmits the data)</p> <p>(ii) Switches: It is used to transport the data to the specific computer.</p>	<p style="text-align: right;">6M</p> <p style="text-align: right;">1M for each function</p>



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		<p>(iii) Routers: It connects dissimilar networks such as LAN and Internet together.</p> <p>(iv) Bridges: It is used to send the data to the concerned segment, thus reducing excess traffic</p> <p>(v) Gateways: A gateway repackages information to match the requirements of the destination system.</p> <p>(vi) Firewalls: A firewall blocks unauthorized connections being made to your computer or LAN,, normal data is allowed through the firewall but all other data is blocked.</p>	
<p>2.</p>	<p>(a) Ans.</p>	<p>Attempt any FOUR of the following: Draw the block diagram of a flatbed scanner and state the function of each block. Explanation:</p> <p>A flatbed scanner uses a light source, a lens, a charge coupled device (CCD) array and one or more ADCs to collect the optical information about the object to be scanned and transforms it to a computer image file.</p> <ul style="list-style-type: none"> • A CCD is a miniature photometer that measures incident light and converts that measured value to an analog voltage. • A CCD element is all in one row with one element for each pixel in a line. <p>The following steps are involved in scanning a document:</p> <ul style="list-style-type: none"> ○ A light source illuminates a piece of paper placed face down against a glass window above the scanning mechanism. ○ A stepper motor moves the scan head beneath the page. As it moves, the scan head captures light reflected from individual areas of 	<p align="center">16 4M</p> <p align="right">2M for block diagram</p> <p align="right">2M for explanation</p>



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		<p>the page.</p> <ul style="list-style-type: none"> ○ The light from the page is reflected through a system of mirrors. A lens focuses the beams of light onto light-sensitive diodes that translate the amount of light into electrical current. ○ The more light that's reflected, the greater the voltage. White spaces reflect more light than black or colored letters or images. ○ An ADC converts each analog reading of voltage as digital pixel representing, black or white. ○ ADC on monochrome scanner stores only 1 bit per pixel, either on or off. ○ If the scanner is color scanner then the scan head makes three passes under the images and light on each pass is directed through a red, green or blue filter before it strikes the original image. ○ The digital information is sent to software in the PC, where the data is stored in a format with which graphics program. 																			
	<p>(b) Ans.</p>	<p>State two problems related to laser printer with their symptoms. State preventive maintenance measures for Laser printer.</p> <p>Problems of Laser printer:</p> <ol style="list-style-type: none"> 1. Easy accumulation of dirt and dust 2. The printers use paper, ink, carbon, etc. which also give pollutants. <p>Symptoms of Laser printer:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 10%;">No.</th> <th style="width: 40%;">Fault symptoms</th> <th style="width: 50%;">Trouble sources</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Light image</td> <td>1. Defective toner cartridge 2. Adjustment of print intensity control 3. Dirty corona wire</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Dark image</td> <td>Same as for 'light image problem'</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Smudges</td> <td>Dirty parts: drum, belt, rollers</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Distortions in image</td> <td>Defective drive motor or scanner</td> </tr> <tr> <td style="text-align: center;">5</td> <td>White or black stripes</td> <td>Fuser</td> </tr> </tbody> </table> <p>Preventive maintenance of Laser printer</p> <ol style="list-style-type: none"> 1. Check and clean the printer's fans and vents on periodic basis. 2. It consists of corona wires that require periodic cleaning using a foam scrub 3. Moistened with alcohol. 	No.	Fault symptoms	Trouble sources	1	Light image	1. Defective toner cartridge 2. Adjustment of print intensity control 3. Dirty corona wire	2	Dark image	Same as for 'light image problem'	3	Smudges	Dirty parts: drum, belt, rollers	4	Distortions in image	Defective drive motor or scanner	5	White or black stripes	Fuser	<p>4M</p> <p><i>Two problem with symptoms 1M each</i></p> <p><i>Any two 1M each</i></p>
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(c) Ans.	<p>What is POST? Explain. What is the meaning of the following BIOS beeps in IBM PCs.</p> <p>(i) 1 long beep and 1 short beep. (ii) 1 short beep.</p> <p>POST (Power On Self Test): The PC has built – in test programs which do their jobs as soon as the PC is powered on. This Power On Self Test (POST) firmware is stored in ROM on the motherboard. This ROM occupies the place (address) from where the microprocessor starts instruction processing, after a power on reset or hardware manual reset. The POST is a series of simple programs designed to test and catch faults in different hardware components and circuits. It tests the microprocessor, programmable LSIs like timer, interrupt controller, PPI, DMA controller, ROM, RAM, peripheral controllers etc. If the tests are successful, the POST arranges for loading the operating system from a diskette. If any hardware error is noticed, the POST indicates the fault to the user in five different ways: Hang or Halt at specific stages. Checkpoint: The POST outputs a number on the PPI port A. Beep method: The POST causes different tones (Long & Short) at the speaker. Error Code: An error code is displayed on the CRT. Error Message: The POST displays a detailed error message which identifies the problem area</p> <p>i) 1 long beep and 1 short beep : Meaning: Motherboard problem.</p> <p>ii) 1 short beep: Meaning : Normal POST, system OK</p>	<p>4M</p> <p><i>Definitio n & descripti on: 2M</i></p> <p><i>Each meaning – 1M</i></p>
(d) Ans.	<p>Describe IP Address classes with suitable examples.</p> <p>IP address classes: There are five classes of available IP ranges: Class A, Class B, Class C, Class D and Class E, while only A, B, and C are commonly used.</p> <p>Class A: Class A type of IP addresses have First byte consisting of Network address with first bit as 0 and the next 3 bytes with host id. Hence, number of hosts are more when compared to number of networks. Example : 10.1.12.56</p> <p>Class B: This type has first two bytes specifying network ID with starting two bits as 10 and last two bytes referring to host ID. Example : 131.25.1.6</p>	<p>4M</p> <p><i>Any four classes - Descripti on with example 1M each</i></p>



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		<p>Class C: This class has first three bytes referring to network with starting bits as 110 and last byte signifies Host ID. Here, number of networks are more when compared to number of hosts in each network. Example : 198.152.1.2</p> <p>Class D: Class D is used for multicasting and its starting bits are 1110. Example : 226.5.1.2</p> <p>Class E: Class E is reserved for future use and its starting bits are 1111. Example : 248.1.2.1</p> <div style="margin-top: 10px;"> <p>Class A</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">0</td> <td style="width: 35%; text-align: center;">net id (7 bit)</td> <td style="width: 55%; text-align: center;">host id (24 bit)</td> </tr> </table> <p>Class B</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">10</td> <td style="width: 45%; text-align: center;">net id (14 bit)</td> <td style="width: 45%; text-align: center;">host id (16 bit)</td> </tr> </table> <p>Class C</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">110</td> <td style="width: 55%; text-align: center;">net id (21 bit)</td> <td style="width: 35%; text-align: center;">host id (8 bit)</td> </tr> </table> <p>Class D</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">1110</td> <td style="width: 90%; text-align: center;">multicast (28 bit)</td> </tr> </table> <p>Class E</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">1111</td> <td style="width: 90%; text-align: center;">future use (28 bit)</td> </tr> </table> </div>	0	net id (7 bit)	host id (24 bit)	10	net id (14 bit)	host id (16 bit)	110	net id (21 bit)	host id (8 bit)	1110	multicast (28 bit)	1111	future use (28 bit)			
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(e) Ans.	<p>Compare TCP and UDP. (4 points)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 40%; text-align: center;">TCP (Transmission Control Protocol)</th> <th style="width: 40%; text-align: center;">UDP (User Datagram Protocol)</th> </tr> </thead> <tbody> <tr> <td>Complexity</td> <td>TCP is more complex</td> <td>UDP is less complex</td> </tr> <tr> <td>Connection</td> <td>TCP is connection oriented protocol</td> <td>UDP is connection less protocol</td> </tr> <tr> <td>Reliability</td> <td>It provides reliable delivery of messages</td> <td>It provides unreliable delivery of messages</td> </tr> <tr> <td>Function</td> <td>As a message makes its way across the internet from one computer to another. This is connection based.</td> <td>By using this protocol one program can send a load of packets to another and that would be the end of the relationship.</td> </tr> </tbody> </table>			TCP (Transmission Control Protocol)	UDP (User Datagram Protocol)	Complexity	TCP is more complex	UDP is less complex	Connection	TCP is connection oriented protocol	UDP is connection less protocol	Reliability	It provides reliable delivery of messages	It provides unreliable delivery of messages	Function	As a message makes its way across the internet from one computer to another. This is connection based.	By using this protocol one program can send a load of packets to another and that would be the end of the relationship.	<p>4M</p> <p><i>Any four points 1M each</i></p>
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		Which layer they exist	Transport layer	Transport layer	
		Flow controlling	TCP has flow control	UDP has no flow control	
		Overhead	Overhead is less	Overhead is very low	
		Which is powerful	TCP is more powerful.	UDP is less powerful	
3.	(a) Ans.	<p>Attempt any TWO of the following: Draw a neat sketch and describe the construction of CDROM. Describe the recording mechanism in CD-ROM.</p> <p>Construction of CD ROM:</p> <div style="text-align: center;"> </div> <ul style="list-style-type: none"> Polycarbonate disc 120mm in diameter, 1.2mm thickness & 1.5mm spindle hole Polycarbonate disc contains lands & pits Each pit 100nm depth & 500nm in width The space between the two adjacent pits is called land Pits represent binary zero & transition from land to pit & pit to land is represented by binary one. Polycarbonate substance covered by reflective aluminum Reflective aluminum is protected by coat of lacquer to prevent oxidation <p>Recording mechanism:</p> <ul style="list-style-type: none"> The CD recording method makes use of optical recording, using a beam of light from a minute semiconductor laser. Such a beam is of low power (milli watts) but the focus of the 			<p>16 8M</p> <p style="text-align: center;"><i>Construction with Diagram 4M</i></p> <p style="text-align: center;"><i>Recording Mechanism 2M</i></p>



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	<p>beam can be a very small point so that low melting point materials like plastics can be vaporized by a focused beam.</p> <ul style="list-style-type: none"> • A laser heats the surface of the CD which loosens up a solution in which the reflective metal particles are resided in. • When heated the metal particles are mobile. When not heated the metal particles are stationary. • To change the value of a specific bit on the disc, the laser heats the area and a magnet changes the orientation of the microscopic metal particles. • This orientation is either positive or negative. • When in positive position, the metal pieces reflect more light. • When in negative position less light is reflected. • The photo detector on the drive can sense these variations of the reflected/ deflected laser beam. <p>CDs have pits and lands. These are microscopic and represent the binary information of the data stored on the disc. A land is reflective and reflects the laser into a sensor to register it as a 1, but when the light hits a pit, it shatters and no reflection is received, thus a 0 is registered.</p> <p>To write 1' & 0's on CD, a laser beam is used. To write 1, the laser beam is turned on, which turns a pit up to the reflecting layer. To write 0, the laser beam is not turned on & hence, no pit is burned. The surface when there is no pit is called land.</p> <div data-bbox="430 1302 1258 1669" data-label="Diagram"> </div>	<p align="center"><i>Example</i> <i>2M</i></p>
<p>(b) Ans.</p>	<p>State the pin description of various pins in RS 232 serial interface.</p> <p>RS 232 Serial Interface Pin description:</p> <ol style="list-style-type: none"> 1. Transmit Data (TXD): The serial data leaving the port travels on Transmit data line. 2. Receive Data (RXD): The bits coming in from a distant serial port 	<p align="center"><i>8M</i></p>

