

**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)**

**Qualification Code :** 061005T4ICT

**Qualification :** ICT Technician Level 5

**Unit Code :** IT/OS/ICT/CR/3/5

## **Unit of Competency :** Perform Computer Repair and Maintenance

**WRITTEN ASSESSMENT ASSESSOR’S GUIDE**

**SECTION A: [20 MARKS]**

***Each question carries one (1) mark.***

1. Which one of the following is not a feature of the USB port?
2. Speed
3. Plug and play
4. Hot plug
5. **Connect one device only**
6. Power protection device that includes a battery and provides a few minutes of power, is called
7. surge suppressor
8. line conditioner
9. generator
10. **UPS**
11. What is the first action when MS windows reports that the hard drive is developing bad sectors?
    1. replace the hard drive
    2. run secclean from dos
    3. run defrag on the hard drive
    4. **run scandisk with the "thorough" option**
12. Which one of the following is not a correct way of protecting oneself against electrical shock while working on a computer?
    * 1. Disconnect power from the mains
      2. Remove jewelleries
      3. Use an anti-static device
      4. **Pull on cord itself**
13. A PC cannot display video. Which of the following is LEAST likely to be causing the problem?
14. loose video card
15. **crashed hard drive**
16. defective microprocessor
17. defective RAM (bank zero)
18. Which one of the following is done first when troubleshooting a faulty monitor?
19. **Check its connections to the computer and power source**
20. Use a meter to check the CRT and internal circuitry for continuity
21. Power down the monitor, then turn it on again to see if that corrects the problem.
22. Power down the computer, then turn it on again to see if that corrects the problem
23. The major component of a Personal Computer is the Central Processing Unit (CPU) which can be best described as:
24. The device that sends the monitor signals telling it what to display
25. The area that regulates all of the system power usage
26. The area where ail the of the Basic input/output routines are stored
27. **The area where all of the processing takes place**
28. Most Personal Computers give a single beep on boot up to indicate they are OK hardware wise. If a booting Personal Computer and doesn’t beep, what hardware component might be having a problem?
29. System board
30. RAM
31. Microprocessor
32. **Speaker**
33. Which device uses a DMA channel?
34. Modem
35. Network Card
36. **Sound Card**
37. RAM
38. An important first step in troubleshooting which component in a laser printer is causing a jam is to:
39. **Note where in the paper path the paper stops**
40. Check all voltages
41. Look up error codes
42. Turn the printer off, then on again
43. A computer has been infected by a virus. Which of the following parts will not be infected by that virus?
44. **CMOS**
45. Boot sector
46. Floppy disks
47. Program files
48. Which of the following is not a type of computer port?
49. VGA
50. Ethernet
51. PS/2
52. **Scanner**
53. ­­­­­­\_\_\_\_\_\_\_\_ is the software that runs devices in the computer.
54. **Driver**
55. Port
56. Window defender
57. None
58. BIOS stands for?
59. Basic Input Output Division
60. **Basic Input Output storage**
61. Basic Input Outcome Device
62. None
63. Which of the following would be a logical first step in troubleshooting a Personal Computer?
64. Check the computer CMOS
65. **Define the circumstances of the problem**
66. Call the vendor
67. Define what applications are being used
68. The output voltage of a Personal Computer’s power supply is in the form of \_\_\_\_\_.
69. Alternate Current
70. **Direct Current**
71. Amperage
72. resistive
73. When is the risk for electrostatic discharge the greatest?
74. Day time
75. High humidity
76. **Low humidity**
77. Night time
78. When connecting a ribbon cable to a connector, how does one know which direction to plug it in?
79. The red line in the cable goes to the highest pin number
80. It does not matter
81. **The coloured line in the cable goes to pin #1**
82. The blue or red line in the cable goes away from the power connector
83. How can one totally protect a PC from damage during an electrical storm?
84. **Disconnect the AC power cable**
85. Disconnect all external cables and power cords
86. Use a surge protector
87. Turn off the AC power
88. Which statement best describes a fragmented hard drive:
89. The platters are bad
90. Clusters of data are damaged
91. Data files are corrupted
92. **Files are not stored in consecutive clusters**

**SECTION B: [40 MARKS]**

1. Define the term computer maintenance. (2 marks)

* **Computer Maintenance is a type of maintenance that includes a set of operations that makes the computer functions properly, runs faster, more efficiently and crashes less than one that has not been maintained**

1. a) Identify the type of computer connector shown in figure 1. (1 mark)



Figure 1

**DB-15 (15 pins or sockets)**

b) Give **three** limitations of this type of a port. (3 marks)

* **they have limited speed**
* **they only transmit data out**
* **the pins can be bend if forced in**
* **Diagnosing problems with parallel devices could be a difficult task**

1. Explain **two** advantages of having an updated anti-virus in the computer. (4 marks)

* **Real-time protection − AVG antivirus system is one of the best antivirus software in the globe, and it supports real-time protection to your computer, laptop, or smartphone.**
* **Protects from spyware − The antivirus software can also protect the computer from spyware and integrity theft. Spyware is a type of software designed to affect your computer, spy on you, and keep all your data saved inside your computers such as financial information, important personal documents, and pictures.**
* **Malware Deletion − Most anti-virus programs, including McAfee or AVG, run scans on your computer and all of its available hard drives to identify possible malware files, and then attempt to remove them.**

1. Explain **three** classification of computer connectors. (6 marks)

* **Size: They have a determined size, running for example from the size of a penny (for the round ports) to the size of an electric plug (for a trapezoid shaped one like COM ports)**
* **Pin configuration: they have different pin configuration like 5 pin, or 6-pin**
* **Speed: connectors have different speeds of transmitting data**
* **Design and shape: ports have specific shapes that are the first and best way of recognizing them. Some are round (DIN/PS2, BNC), some are trapezoid (D-shell, Centronics) and some are rectangular (USB, Firewire)**

1. Outline **five** possible electrical problem symptoms in a computer system. (5 marks)

* **PC appears “dead”**
* **PC sometimes halts during booting**
* **Error codes or beeps occur during booting**
* **Smell burnt parts or odours exists**
* **PC powers down at unexpected times**
* **Hear a whine coming from the power supply**

1. Differentiate between a soft boot and hard boot as used in computer systems. (4 marks)

* **Soft boot refers to the boot process in which a system regains its initial state without hampering the power source while hard boot is a boot process in which a computer system starts up from a complete powerless state.**

1. List three basic components of a computer processor. (3 marks)

* **Input/output (I/O) unit**
* **Control unit**
* **Arithmetic logic units (ALUs)**

1. State **four** characteristics of DRAM. (4 marks)

* **It is the main or system memory of a PC.**
* **It stores the operating system, application programs and data while they are running.**
* **It is created from transistors and capacitors.**
* **It needs to be refreshed periodically to enable it preserve the information.**
* **It stores data bits as electrical charges within the structure of a single transistor.**

1. List **four** Causes of Electrostatic discharge. (4 marks)

* **Low humidity.**
* **Unshielded cables.**
* **Improper grounding.**
* **People movement.**

1. Explain **two** advantages of disassembling a faulty component in a computer.

(4 marks)

**A device may be disassembled to help**

* **determine a problem,**
* **to replace a part,**
* **to test the component in another device.**

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**SECTION C: [40 MARKS]**

1. John has a computer system with a faulty motherboard that needs to be replaced. As an ICT technician you are approached by John to assist in the installation of a new motherboard. Explain the process of motherboard installation.  (20 marks)

**When order the motherboard with a processor or memory, it will normally be installed on the board but may also be included separately. Preparing the new motherboard Before install the new motherboard, it should install the processor and memory. This normally be much easier to do before the board is installed in the chassis. Most processors today run hot enough to require to some form of heat sink to dissipate heat from the processor. To install the heat sink, use the following procedures:**

* + 1. **Take the new motherboard out of the anti-static bag it was supplied in and set it on the bag or the anti-static mat.**
    2. **Install the processor. There are two procedures, one for socketed processors, and the other for slot-based processor.**

**Socketed processors**

**The procedure is as follows: Find the pin 1 on the processor. Next, find the corresponding pin 1 of the ZIFsocket for the CUP on the motherboard or there may be a bevel on one corner of the socket. Insert the CUP into the ZIF socket by lifting the release lever until it is vertical. Then align the pins on the processor with the holes in the socket and drop it down into place. If the processor does not go all the way into socket, check for possible interface or pin alignment problem but make sure it is fully seated and there is no gap between the bottom of the processor with the holes in the socket and drop it down into place. Check for proper alignment and any possibly bent pins. If necessary, use a small needle nose pliers to carefully straighten to any pins. Don’t bend them too much or they will break off. When the processor is fully seated in the socket, push the locking lever on the socket down until it latches to secure the processor.**

**Slot based processor**

**Start by positioning the two universal retention mechanism brackets on either side of the processor slot so that the holes in the brackets line up with the holes in the motherboard. Push the included fasteners through the mounting holes in the retention bracket and motherboard until it snaps into place.**

**3. If the CPU does not already have a heat sink attached to it, attach it now. Most heat sinks will either clip directly to the CPU or to the socket with one or more retainer clips. Be careful when attaching the clip to the socket. In most cases, it is a good idea to put a dab of heat sink thermal transfer compound on the CPU before installing the heat sink. This prevents any air gaps and allows the heat sink to work more efficiently.**

**4. Refer to the motherboard manufacturers to set the jumpers, if any, to match the CPU going to install. Look for the diagram of the motherboard to find the jumper location and look for the tables for the right settings for CPU. If the CPU was supplied already installed on the motherboard, the jumpers should already be correctly set, but it is still a good idea to check them.**

1. a) A computer system has POST errors displayed every time it is on.
2. Define POST error. (2 marks)

**A power-on self-test (POST) is a process performed by firmware or software routines immediately after a computer or other digital electronic device is powered on.**

1. Explain **three** ways the POST errors are displayed. (9 marks)

(3 marks per point)

**The POST- tests normally provided three types of output messages: audio codes, onscreen text messages, and hexadecimal numeric codes that are sent to an I/O port address.**

**POST errors can be displayed in the following three ways:**

* **Beep codes – Heard through the speaker attached to the motherboard**
* **POST checkpoint codes – A special card plugged into either an ISA or a PCI card slot is required to view these codes.**
* **Onscreen messages – Error messages displayed onscreen after the video adapter is initialized.**

**BIOS POST Beep Codes**

**Beep codes are used for fatal errors only, which are errors that occur so early in the process that the video card and other devices are not yet functional. Because no display is available, these codes take the form of a series of beeps that identify the faulty component. When the computer is functioning normally one should hear one short beep when the system starts up at the completion of the POST.**

**BIOS POST Checkpoint Codes**

**POST checkpoint codes can be used to track the system progress through the boot process from power-on right up to the point at which the bootstrap loader runs. When placing a POST code reader card into a slot, during the POST, will see two-digit hexadecimal numbers flash on the card’s display. If the system stops unexpectedly or hangs, can identify the test that was in progress during the hang from the two-digit code. This step usually helps to identify the malfunctioning component.**

**BIOS POST Onscreen Messages**

**Onscreen messages are brief messages that attempt to indicate a specific failure. These messages can be displayed only after the point at which the video adapter card and display have been initialized. Most POST-code cards come with documentation listing the POST checkpoint code for various BIOS versions.**

b) List **nine** situations that are likely to cause POST problems. (9 marks)

**Problems that occur during the POST are usually caused by in correct hardware configuration or installation. They include:**

* **cables wrongly connected and secured**
* **wrong configuration settings in setup for the devices have installed? In particular ensure the processor, memory and hard drive settings are correct.**
* **Wrongly installed drives.**
* **wrong switches and jumpers on the baseboard, if changed from the default settings.**
* **Wrongly set input voltage in the power supply.**
* **Wrongly installed adapter boards and disk drives.**
* **Keyboard not attached.**
* B**ootable hard disk not installed.**
* **Do the BIOS support the drive installed, and if so, are the parameters entered correctly?**
* **Bootable floppy disk not installed in drive A.**
* **Memory SIMMs or DIMMs not installed correctly.**
* **Do the operating system properly install?**

1. Alice is repairing a faulty computer system. Discuss **five** major types of bus connectors found in typical IBM-class computer that she could use. (20 marks)
   * + - * **ISA (Industry Standard Architecture) Bus Connectors This type of bus connection is the most common. ISA bus connectors will be found in all XT- and AT-class computers, including Pentium motherboards. ISA bus connectors are black in colour, and transmit either 8 or 16 bits of data at a time. The shorter black connectors are 8-bit connectors, and the 2-part black connectors are 16-bit connectors. 8-bit cards can go into 16-bit slots (connectors), but 16-bit cards should not be plugged into an 8-bit slot. ISA bus connectors pass data to and from the CPU via the DMA (Direct Memory Access) and interrupt controllers located on the motherboard; these chips act as "traffic cops", policing what data gets to the CPU, and in what order.**
         * **EISA (Extended Industry Standard Architecture) Bus Connectors Developed by AST and Compaq, these special connectors accommodate 8- and 16-bit ISA cards, and also, they allow the user to plug in special EISA 32-bit adapter cards. A 2-level card-edge connector allows ISA cards to be pressed down into the first level of the connector, while EISA cards are designed to be inserted even further down into the connector, allowing the card to access the 32-bit data lines at the bottom of the connector. Special 32-bit EISA cards were manufactured by a limited number of companies, and the cost of EISA devices (such as drive controllers, video cards, etc.) were rather high. EISA-based motherboards and adapter cards saw limited use in the PC world, and EISA systems were used as network file servers and other kinds of high-performance systems (CAD, graphics development). VESA-Local Bus Connectors A number of major computer manufacturers turned to the Video Electronics Standards Association to develop an inexpensive, fast 32-bit bus connector that could be easily implemented within standard PC architecture.**
         * **The VESA-Local Bus provides 2 to 3 specialized 32-bit bus connectors on what would normally be an ISA motherboard. A third connector is added to the standard 16-bit ISA bus connector, and this connector passes 32-bits of data at a time directly to the CPU, bypassing the DMA and Interrupt controller chips. The data is passed to the CPU at the speed of the CPU, rather than at the 7.16 MHz speed at which the DMA and Interrupt controller chips are running. VESA-Local Bus devices would include video cards, drive interface cards, and SCSI host adapters; these devices would benefit from the added speed and bandwidth the VESA Local Bus connector provides. Other devices (sound cards, modems) do not require fast bus connections, and would be inserted into standard ISA bus connectors.**
         * **PCI Local Bus Connectors Intel developed the PCI (Peripheral Component Interconnect) bus connector, and implemented it on all Pentium motherboards it manufactured and licensed, thus imposing the standard. The bus connector transmits either 32 or 64 bits of data at a time (depending upon the type of CPU), bypassing the DMA controllers, at the input clock speed of the CPU (just as with the VESA-Local Bus connectors). The bus connector is white in colour, and smaller than all of the other types of bus connectors. PCI devices include video cards, SCSI host adapters, network cards, and drive interface cards.**
         * **Microchannel Architecture (MCA) bus connectors only appear in IBM PS/2 computers (with few exceptions). The bus connector transmitted either 16 or 32 bits of data, using bus mastering to allocate IRQ and DMA channel resources. PS/2 systems had only MCA connectors in them; no ISA or EISA connectors were allowed in such systems. Because few manufacturers adopted the MCA standard, and because IBM was the sole source for MCA adapter cards, the MCA bus became obsolete. No current technology PCs use an MCA bus structure.**