



FACULTY OF ENGINEERING
END OF SEMESTER EXAMINATIONS - APRIL 2025

PROGRAMME: DIPLOMA IN ELECTRICAL AND CONTROL ENGINEERING

YEAR/SEM: YEAR 1/SEMESTER 1

COURSE CODE: DEE1107

NAME: FUNDAMENTALS OF COMPUTER SCIENCE

DATE: 2025-04-25

TIME: 9:00AM-12:00PM

INSTRUCTIONS TO CANDIDATES:

1. Read the instructions very carefully
2. The time allowed for this examination is STRICTLY three hours
3. Read each question carefully before you attempt and allocate your time equally between all the Sections
4. Write clearly and legibly. Illegible handwriting cannot be marked
5. Number the questions you have attempted
6. Use of appropriate workplace examples to illustrate your answers will earn you bonus marks
7. Any examination malpractice detected will lead to automatic disqualification.

DO NOT WRITE ANYTHING ON THE QUESTION PAPER

Section A Answer ANY THREE (3) questions in this section

Question 1:

- a) Differentiate between Analog and Digital systems. Hence, give reasons why Digital systems are preferred to Analog systems. **(5 Marks)**
- b) What is the difference between an integrated and non-integrated motherboard? **(4 Marks)**
- c) What is the purpose of each of the following items that are located on the motherboard? **(6 Marks)**
 - (i) AGP slot
 - (ii) PCI slots
 - (iii) DIMM slot
- d) John is a first year student who owns a desktop computer that has a problem. It will shut down at any random minute and then he has to cut off power to get it back on. He has formatted this computer many, many times and it still shuts down. When he tries to run a virus scan it will shut down before it ends. One time the computer didn't even fully boot up before it shut down. With the knowledge you have acquired, what should you do to resolve this problem? **(5 Marks)**

Question 2:

- a) What's the storage capacity of a normal DVD? **(2 Marks)**
- b) A USB flash storage device is to be used to store files from two computers which have different operating systems. The files on the USB need to be able to be accessed by either computer. What factors should be considered in this situation? **(4 Marks)**
- c) A computer virus is a type of malicious software program that when executed, replicates itself by modifying other computer programs and inserting its own code. Infected computer programs can include, as well, data files, or the "boot" sector of the hard drive
 - (i) State the different sources of viruses and how they get into the system. **(6 Marks)**
 - (ii) Other than using and installing anti-virus software, what two precautions could be taken to minimize virus infections? **(4 Marks)**
 - (iii) What is the difference between 'real- time' and 'scheduled' anti-virus scanning? **(4 Marks)**

Question 3:

- a) How many nibbles are contained in four (4) bytes? **(3 Marks)**
- b) Differentiate between the following terms as used in computers. **(4 Marks)**
 - i) RAM and ROM
 - ii) Most significant bit (MSB) and Least significant bit (LSB)
- c) Describe with the help of an example the following scheduling techniques **(7 Marks)**
 - i) Shortest Job First Scheduling
 - ii) Round Robin Scheduling
 - iii) Priority Scheduling
- d) Describe the three main ways given below in which the operating system allocates disk space to the file **(6 Marks)**
 - i) Contiguous Allocation
 - ii) Linked Allocation
 - iii) Indexed Allocation

Question 4:

- a) Highlight the significance of number systems in the area of digital systems. Hence, how many nibbles are contained in six (6) bytes? **(2+2 Marks)**
- b) The 2's complement is a binary number system that represents signed integers on computers. It's the most common way to represent fixed point binary values and signed integers.
 - (i) Subtract 00000111 from 11111001 using the 2's complement. **(3 Marks)**
 - (ii) Suppose that $n=8$, solve the following number using 2's complement $(-53-29)$ **(5 Marks)**
- c) Perform the following conversions.
 - (i) $(22.625)_8$ to binary **(3 Marks)**
 - (ii) $80F_{Hex}$ to octal **(2 Marks)**
 - (iii) $(101001010.010101)_2$ to octal **(3 Marks)**

Section B Answer ANY TWO (2) questions in this section.**Question 1:**

- a) Differentiate between the following terms as used in computers:
 - i) Volatile memory and non-volatile memory **(3 Marks)**
 - ii) Internal memory and external memory **(3 Marks)**
- b) By using examples, differentiate between intermediate and end devices as used in computer networks. **(4 Marks)**
- c) Joseph was storing files on a USB flash storage device. When he removed the device, a message appeared indicating that there was a write error and that files may have been lost or corrupted. How should he have removed the device to prevent the message from appearing? **(4 Marks)**
- d) Suppose that $n=8$, solve the following number using 2's complement $(-32-12)$ **(6 Marks)**

Question 2:

- a) What's the storage capacity of a CD-ROM? **(2 Marks)**
- b) Write short notes about the following terms as applied to computers. **(4 Marks)**
 - (i) Partitioning.
 - (ii) Multitasking.
- c) Sarah is a first year student who owns a desktop computer which she keeps in the corner of her room. One morning she tried to start it and it had no display. What could have been the problem and how can she avoid this from happening again? **(5 Marks)**
- d) Perform the following conversions. **(9 Marks)**
 - i) 10101101_2 to hexadecimal
 - ii) $24CE_{16}$ to octal
 - iii) $(651.124)_8$ to binary

Question 3:

- a) Write 'TRUE' if the statement is true and 'FALSE' if the statement is false. **(5 Marks)**
 - (i) PROM is used as a primary memory.
 - (ii) The keyboard shortcut **Cntrl+C** is a common command used to Cut selected text to the clipboard

- (iii) A binary number can be converted to a decimal number by summing the decimal values of the weights of all the 1s in the binary number.
- (iv) The mouse is an example of an output device.
- (v) In number systems, 1 MB = 1024 Bytes.
- b) Draw the truth table and logic symbol for the following gates; **(6 Marks)**
 - (i) AND gate
 - (ii) OR gate
 - (iii) XNOR gate
- c) With the help of a diagram, describe the five states of the process state diagram, from when a process is initiated in the CPU till its completion. **(9 Marks)**

Question 4:

- a) Suppose that $n=8$ and the binary pattern is 10010101B, solve the value of this signed integer in 1's complement. **(3 Marks)**
- b) Compare **BIG ENDIAN** and **LITTLE ENDIAN** in relation to storage of bytes in computer memory. **(4 Marks)**
- c) What factors affect the speed of a microprocessor? **(3 Marks)**
- d) A business has recently experienced a number of computer maintenance problems which have affected the workplace efficiency. Management has decided to improve procedures and documentation to minimize the impact of these problems on workplace efficiency. **(10 Marks)**
 - (i) Describe the tasks that should be included in a regular hardware maintenance schedule.
 - (ii) **Figure 1** shows a maintenance card that is currently used by the business. Explain how this maintenance card could be improved to meet management's expectations of workplace efficiency.

<p>MARK ENGINEERING GROUP</p> <p>Computer S/N: ... (not filled).....</p> <p>Problem: ... Computer doesn't work....</p> <p>Comments: ... Computer fixed.....</p>
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Figure 1