G.C.E. O/L Grade 10 ICT · Lesson 3

Lesson 3 O/L Exam Practice: Questions and Answers

These questions are in the style of the O/L ICT exam. Paper I has multiple choice questions. Paper II has structured questions with parts, working and marking points. They cover all of Lesson 3 (3.1 to 3.5): number systems, conversions, storage units and coding systems, including the 2026 syllabus topics. Try them first, then check the answers.

Paper I – Multiple choice questions (25)

1. Why do computers use the binary number system?

A. Binary numbers are shorter than decimal
B. Electronic circuits have two states, ON and OFF
C. Humans find binary easier to read
D. Binary has ten digits

2. What is the decimal number 37 in binary?

A. 100011_2
B. 1000101_2
C. 100101_2
D. 101001_2

3. What is the place value of the leftmost bit in an 8-bit binary number?

A. 8
B. 64
C. 256
D. 128

4. Which set contains only valid octal digits?

A. 2, 6, 8, A
B. 0, 3, 5, 7
C. 0, 7, 9, B
D. 1, 4, 8, 9

5. What does the hexadecimal digit D represent in decimal?

A. 13
B. 14
C. 12
D. 4

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6. What is 200_{10} in octal?

A. 302_8

B. 320_8

C. 310_8

D. 250_8

7. What is 300_{10} in hexadecimal?

A. $12C_{16}$

B. $1C2_{16}$

C. $2C1_{16}$

D. $12E_{16}$

8. What is the place value of the third digit from the right in a hexadecimal number?

A. 32

B. 64

C. 48

D. 256

9. What is 110110_2 in decimal?

A. 27

B. 54

C. 108

D. 52

10. What is 101011100_2 in octal?

A. 435_8

B. 443_8

C. 534_8

D. 354_8

11. What is 11010111_2 in hexadecimal?

A. $D6_{16}$

B. 327_{16}

C. $7D_{16}$

D. $D7_{16}$

12. What is $2E_{16}$ in binary?

A. 101110_2

B. 1110010_2

C. 1001110_2

D. 111010_2

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13. What is 64_8 in hexadecimal?

A. 64_{16}

B. 43_{16}

C. 34_{16}

D. 40_{16}

14. Which number is the largest?

A. 376_8

B. FF_{16}

C. 11111110_2

D. 250

15. How many bits are in 3 bytes?

A. 3

B. 12

C. 24

D. 30

16. In O/L ICT, how many kilobytes are in 3 MB?

A. 3000 KB

B. 2048 KB

C. 300 KB

D. 3072 KB

17. Which list is in order from smallest to largest?

A. KB, Byte, GB, MB, TB

B. Bit, MB, KB, GB, TB

C. Byte, MB, KB, TB, GB

D. Byte, KB, MB, GB, TB

18. A student has a 32 GB memory card. Photos are 4 MB each. About how many photos can it hold?

A. 128

B. 8192

C. 8000

D. 4096

19. Which storage normally has the largest capacity in a 2026 school computer?

A. SSD / hard disk

B. Cache memory

C. ROM

D. RAM

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20. What is the number 47 in BCD?

A. 101111

B. 0100 0111

C. 0111 0100

D. 0010 1111

21. The ASCII code of 'A' is 65. What is the ASCII code of 'E'?

A. 69

B. 101

C. 70

D. 68

22. How many characters can standard 7-bit ASCII represent?

A. 128

B. 65,536

C. 256

D. 7

23. Which coding system was developed by IBM for mainframe computers?

A. Unicode

B. BCD

C. EBCDIC

D. ASCII

24. Why is Unicode needed to type Sinhala in a message?

A. Unicode uses fewer bits than ASCII

B. Unicode is only for numbers

C. Sinhala letters are in BCD

D. ASCII has no codes for Sinhala letters; Unicode has U+0D80–U+0DFF

25. What is the binary ASCII code for 'C' (67)?

A. 01000011

B. 00110111

C. 01100011

D. 01000110

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Paper II – Structured questions

1. Scenario – Number systems. A teacher writes the decimal number 83 on the board and asks students to convert it. *(8 marks)*

(i) Convert 83_{10} to binary. Show working. *(3 marks)*
(ii) Convert 83_{10} to octal. *(2 marks)*
(iii) Convert 83_{10} to hexadecimal. *(2 marks)*
(iv) Check your binary answer by converting it back to decimal. *(1 marks)*

2. Scenario – Binary to other bases. A sensor sends the binary value 1011011110_2. *(7 marks)*

(i) Convert it to decimal. *(2 marks)*
(ii) Convert it to octal by grouping. *(2 marks)*
(iii) Convert it to hexadecimal by grouping. *(2 marks)*
(iv) Why are leading zeros added before grouping? *(1 marks)*

3. Scenario – Octal and hexadecimal. A program shows the octal number 726_8 and the hex number $B5_{16}$. *(8 marks)*

(i) Convert 726_8 to hexadecimal through binary. *(3 marks)*
(ii) Convert $B5_{16}$ to octal through binary. *(3 marks)*
(iii) Convert $B5_{16}$ to decimal. *(2 marks)*

4. Scenario – Storage. Nimali buys a laptop with 16 GB RAM and a 512 GB SSD. She also has a 64 GB USB drive. *(7 marks)*

(i) How many MB of RAM does the laptop have? *(1 marks)*
(ii) Her song files are 4 MB each. How many songs fit on the USB drive? *(2 marks)*
(iii) How many 512 GB SSDs make 2 TB? *(2 marks)*
(iv) Arrange in ascending order of capacity: SSD, cache, RAM, USB drive. *(2 marks)*

5. Scenario – Bits and bytes. A file is 3 KB. *(4 marks)*

(i) Find its size in bytes. *(1 marks)*
(ii) Find its size in bits. *(1 marks)*
(iii) What is the largest decimal number one byte can store? *(1 marks)*
(iv) State one difference between KB and KiB. *(1 marks)*

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6. Scenario – ASCII. The word "CODE" is stored in ASCII. 'A' = 65. *(6 marks)*

(i) Write the decimal ASCII codes of C, O, D, E. *(2 marks)*
(ii) Write the 8-bit binary code for 'D'. *(2 marks)*
(iii) How many bits are needed to store "CODE" in 8-bit ASCII? *(1 marks)*
(iv) The ASCII code of 'a' is 97. Find the code of 'e'. *(1 marks)*

7. Scenario – Coding systems. A school system stores marks, English names, and Sinhala names, and prints the year 2026 on a digital display. *(6 marks)*

(i) Write 2026 in BCD. *(2 marks)*
(ii) Why can't ASCII store the Sinhala names? *(1 marks)*
(iii) Name the coding system that should be used, and give its Sinhala range. *(2 marks)*
(iv) Give one limitation of Unicode compared with ASCII. *(1 marks)*

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Exam tips

- Write the base as a subscript every time: 1011_2, 57_8, $2F_{16}$.
- Decimal → any base: divide repeatedly and read remainders from bottom to top.
- Any base → decimal: multiply each digit by its place value and add.
- Binary → octal: groups of 3 bits; binary → hex: groups of 4 bits, from the right.
- Octal ↔ hex: always go through binary.
- Learn A=10, B=11, C=12, D=13, E=14, F=15 by heart.
- Check a conversion by converting back – it takes one minute and saves marks.
- 8 bits = 1 byte; in O/L, 1 KB = 1024 bytes, 1 MB = 1024 KB, and so on.
- Going to a bigger unit: ÷ 1024. Going to a smaller unit: × 1024.
- Capacity order: cache < ROM < RAM (GB) < USB/SSD/HDD (hundreds of GB to TB).
- ASCII: 'A' = 65, 'a' = 97, '0' = 48; 7-bit ASCII has 128 characters.
- BCD codes each decimal digit in 4 bits; Unicode is needed for Sinhala and emoji.

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Answers and explanations

Paper I

1. **B** – Transistors are either ON (1) or OFF (0).
2. **C** – 37 = 32 + 4 + 1.
3. **D** – Places are 2^0 … 2^7 = 128.
4. **B** – Octal uses 0–7.
5. **A** – A10 B11 C12 D13.
6. **C** – 200÷8=25 r0, 25÷8=3 r1, 3÷8=0 r3
7. **A** – 300÷16=18 r12 (=C), 18÷16=1 r2, 1÷16=0 r1
8. **D** – 16^2 = 256.
9. **B** – 1×32 + 1×16 + 0×8 + 1×4 + 1×2 + 0×1 = 54
10. **C** – Groups of 3: 101 011 100
11. **D** – Groups of 4: 1101 0111
12. **A** – 2 → 0010, E → 1110.
13. **C** – 64_8 = 110 100 = 0011 0100.
14. **B** – FF = 255; others 254, 254, 250.
15. **C** – 3 × 8 = 24.
16. **D** – 3 × 1024 = 3072.
17. **D** – Each step × 1024.
18. **B** – 32 × 1024 ÷ 4 = 8192.
19. **A** – SSD/HDD are 256 GB–2 TB.
20. **B** – 4 → 0100, 7 → 0111.
21. **A** – A65 B66 C67 D68 E69.
22. **A** – 2^7 = 128.
23. **C** – EBCDIC is an 8-bit IBM code.
24. **D** – Unicode covers all scripts and emoji.
25. **A** – 67÷2=33 r1, 33÷2=16 r1, 16÷2=8 r0, 8÷2=4 r0, 4÷2=2 r0, 2÷2=1 r0, 1÷2=0 r1

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Paper II – model answers and marking points

1. *(8 marks)*

> **(i)** (3 marks)
> 83÷2=41 r1, 41÷2=20 r1, 20÷2=10 r0, 10÷2=5 r0, 5÷2=2 r1, 2÷2=1 r0, 1÷2=0 r1; read up → 1010011_2 (working 2, answer 1)

> **(ii)** (2 marks)
> 83÷8=10 r3, 10÷8=1 r2, 1÷8=0 r1 → 123_8 (2)

> **(iii)** (2 marks)
> 83÷16=5 r3, 5÷16=0 r5 → 53_{16} (2)

> **(iv)** (1 marks)
> 1×64 + 0×32 + 1×16 + 0×8 + 0×4 + 1×2 + 1×1 = 83 (1)

> 🎯 Examiner tip: always write the base as a subscript and show every division line – marks are given for working.

2. *(7 marks)*

> **(i)** (2 marks)
> 1×512 + 0×256 + 1×128 + 1×64 + 0×32 + 1×16 + 1×8 + 1×4 + 1×2 + 0×1 = 734 (2)

> **(ii)** (2 marks)
> 001 011 011 110 → 1336_8 (2)

> **(iii)** (2 marks)
> 0010 1101 1110 → $2DE_{16}$ (2)

> **(iv)** (1 marks)
> To complete the leftmost group; they do not change the value (1)

> 🎯 Examiner tip: group from the RIGHT. Grouping from the left is the most common mistake.

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3. *(8 marks)*

> **(i)** (3 marks)
> 111 010 110 → 0001 1101 0110 → $1D6_{16}$ (3)

> **(ii)** (3 marks)
> 1011 0101 → 010 110 101 → 265_8 (3)

> **(iii)** (2 marks)
> 11×16 + 5×1 = 181 (2)

> 🎯 Examiner tip: each octal digit → exactly 3 bits and each hex digit → exactly 4 bits (keep zeros like 010).

4. *(7 marks)*

> **(i)** (1 marks)
> 16 × 1024 = 16384 MB (1)

> **(ii)** (2 marks)
> 64 × 1024 = 65536 MB (1); 65536 ÷ 4 = 16384 songs (1)

> **(iii)** (2 marks)
> 2 × 1024 = 2048 GB (1); 2048 ÷ 512 = 4 (1)

> **(iv)** (2 marks)
> Cache < RAM < USB drive < SSD (2)

> 🎯 Examiner tip: in O/L answers use 1024, not 1000. Write the unit with every answer.

5. *(4 marks)*

> **(i)** (1 marks)
> 3 × 1024 = 3072 bytes (1)

> **(ii)** (1 marks)
> 3072 × 8 = 24576 bits (1)

> **(iii)** (1 marks)
> $11111111_2 = 2^8 - 1 = 255$ (1)

> **(iv)** (1 marks)
> KiB is always 1024 bytes; makers often use KB = 1000 bytes (1)

> 🎯 Examiner tip: bytes → bits is × 8; KB → bytes is × 1024.

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6. *(6 marks)*

> **(i)** (2 marks)
> C = 67, O = 79, D = 68, E = 69 (2)

> **(ii)** (2 marks)
> 68 = 01000100 (2)

> **(iii)** (1 marks)
> 4 × 8 = 32 bits (1)

> **(iv)** (1 marks)
> 97 + 4 = 101 (1)

> 🎯 Examiner tip: count on from A = 65 (or a = 97). Lower case = upper case + 32.

7. *(6 marks)*

> **(i)** (2 marks)
> 0010 0000 0010 0110 (2)

> **(ii)** (1 marks)
> ASCII has only 128 (or 256) codes, all for English letters and symbols (1)

> **(iii)** (2 marks)
> Unicode (1); U+0D80 – U+0DFF (1)

> **(iv)** (1 marks)
> Needs more bytes per character (e.g. 3 bytes for ඇ in UTF-8) (1)

> 🎯 Examiner tip: BCD codes each digit separately – it is NOT the binary of 2026.

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