Image and Text Representation Worksheet - Intermediate

Name: _____ **Date:** _____

Section A: Text Representation

1. Explain the difference between ASCII and Unicode character sets, including their capacity and applications.

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2. Convert the following ASCII binary values to text:

a) 01001000 01100101 01101100 01101100 01101111

Answer: _____

b) 01000011 01101111 01101101 01110000 01110101 01110100 01100101 01110010

Answer: _____

3. Convert the following text to ASCII binary:

a) Code

Answer: _____

b) IGCSE

Answer: _____

4. Why might some languages require Unicode instead of ASCII? Give two specific examples of languages and explain why.

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Section B: Image Representation

5. Explain how a black and white image is represented in binary. If an image is 10 pixels wide and 8 pixels high, how many bits would be needed to store this image?

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6. What is metadata in relation to images? List three examples of metadata that might be stored with an image file.

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7. Complete the table below about color depth:

Color Depth	Number of Possible Colors	Effect on Image Quality	Effect on File Size
8-bit	_____	_____	_____
16-bit	_____	_____	_____
24-bit	_____	_____	_____

8. Explain how the RGB color system works to create different colors. How many bits are typically used to represent each of the R, G, and B components in a 24-bit color system?

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Section C: Practical Application

9. The following binary represents a 6×6 black and white image (1 = black, 0 = white):

111111

100001

101101

101101

100001

111111

a) Draw what this image would look like.

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

b) If we wanted to add a simple grayscale with 4 possible shades (including black and white), how many bits would be needed to represent each pixel?

_____

c) How would this change the total file size for the same 6×6 image?

_____

_____

10. A website needs to display a colorful logo. The designer has two options:

- Option A: 300×300 pixels with 24-bit color depth
- Option B: 600×600 pixels with 8-bit color depth

a) Calculate the file size (in bits) for each option.

Option A: _____

Option B: _____

b) Which option would you recommend and why? Consider both quality and loading time.

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Challenge Question: How might image compression help with the file size issue? Briefly explain the difference between lossy and lossless compression.

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