

UNIVERSITY OF GUYANA  
Faculty of Technology  
EMT121 Practice Test #1

Lecturer: Laurel Benn

March 1, 2012

DIRECTIONS: ANSWER ALL QUESTIONS. NO CALCULATORS.

1. Evaluate.

(a)  $\int \frac{\ln(x+5)}{x+5} dx$

(b)  $\int_0^1 x^2(x^3+1)^{11} dx$

2. Evaluate.

(a)  $\int \frac{2dx}{(x-1)(x+2)}$

(b)  $\int \frac{2x^3 dx}{(x-1)(x+2)}$

3. Evaluate.

(a)  $\int_0^\pi x \cos x dx$

(b)  $\int \sin^{-1} x dx$

4. Evaluate.

(a)  $\int \tan^3 x \sec^2 x dx$

(b)  $\int_0^{\pi/2} \sin 4x \cos 3x dx$

5. Evaluate.

(a)  $\int \frac{dx}{\sqrt{16-x^2}}$

(b)  $\int \frac{dx}{1+\sqrt{x}}$

6. Evaluate  $\int x^5 e^{(x+5)} dx$

7. Evaluate  $\int \frac{dx}{x^2 + 4x + 8}$ .

8. If  $f(x)$  is continuous on  $[a,b]$  the average of  $f(x)$  on  $[a,b]$  is given by

$$f_{ave} = \frac{1}{b-a} \int_a^b f(x) dx$$

Given  $f(x) = 1$ , find the average of  $f(x)$  on  $[1,4]$ .

9. Do the following binary additions:

(a)  $1001100 + 1100101$

(b)  $11111 + 10111 + 11100$

10. Convert to Binary.

(a)  $0xAF32$

(b)  $125_{10}$

(c)  $756_8$

11. Determine the one's complement for the following binary numbers:

(a)  $10001010$

(b)  $11010111$

(c)  $11111111$

(d)  $00000000$

12. Determine the two's complement of the binary number  $01100101$ .

13. Convert the following eight-bit two's complement binary numbers into decimal form:

(a)  $01000101$

(b)  $01110000$

(c)  $10101010$

(d)  $01100101$

14. Convert the 16-bit two's complement hexadecimal number  $0x8000$  into decimal form.

15. Add the following 8-bit two's complement binary numbers. State whether overflow has occurred.

(a)  $10110111 + 01110110$

(b)  $10000001 + 10010001$

16. In a 16-bit digital system, where all numbers are represented in two's complement form, what is the largest number that may be represented by those sixteen bits? Express your answer in decimal form.