

ENGR 104 Exam 3 Examples

Part I Calculations (show the derivation/process for credit)

1. Convert the following binary numbers to decimal: 10101.11 **(10 points)**
2. Convert the decimal number to binary: 11.625 **(10 points)**
3. Convert the hex number to binary and then to octal: FFEEDAC.BA **(10 points)**
4. Calculate 110101×1011 and $110101 / 1011$ (Keep two digits after the binary point). **(20 points)**

Name _____

Part II Use Matlab to solve the problems

1. A vector is given by: $V = [-5, 2, -4, 1; 0, -9, -9, 20; 50, 89, 99, 100]$. Design a **user-defined function** and using a 'for loop' to kick out the elements that are larger than 10 and save the new vector in V2. **(15 points)**

2. Use a 'for loop' to compute and plot the following function over the interval $-2\pi \leq x \leq 2\pi$:

$$\text{for } x < -\pi, \quad g(x) = \cos(x)+2$$

$$\text{for } x \geq -\pi \text{ and } x \leq \pi, \quad g(x) = 2$$

$$\text{for } x > \pi, \quad g(x) = \cos(x)-2$$

Plot g versus x for x from -2π to $+2\pi$ (x on the horizontal axis, g on the vertical). All the three functions should be plotted in one diagram (one waveform).

Use at least 100 points in your x vector so you get a smooth curve. Label your graph. **(15 points)**.

3. Write an **user-defined function** to calculate the mean value and the maximum value of the following vector. Write another function to count how many '0's the vector has. **(send the functions to the email separately)**.

$x = [0, 103, 0, 105, 104, 0, 99, 100, 0, 102, 0, 107, 105]$

Your script should call that function to do this job. **(20 points)**