G.A.U. Faculty Of Engineering
MT308 Numerical Analysis
Exercise Questions

1. Please use the Gaussian Elimination method to solve the following system:

$$2x - y - z = 2$$
$$4x + 3y + 2z = 14$$
$$6x + 5y - 2 = -8$$

2. (a) Write a MATLAB function that solves N unknowns from an upper triangular system A. The program should check whether the input A is an upper triangular matrix before solving. If it is not an upper triangular system, it should return -1000 and issue a warning to the user.

(b) Suppose that the following program is available in the work directory of MATLAB:

```
function az=ayz2(A)
[n,N]=size(A);
B(1:2)=0;
for i=1:N
   if B(1)<A(i)
      B(1)=A(i);
   end
end
for i=1:N
   if B(1)>A(i)
      if B(2)<A(i)
         B(2)=A(i);
      end
   end
end
az=sum(B)/2;
```

If we define A=[2, 5, 12, 4, 9, 3, 17, 1, 7, 13] and write ht=ayz2(A) in the command prompt what will be observed on the screen?

3. Please use the Gaussian Elimination method to solve the following linear system:

3x-2y+z=3
2x+2y-5z=-1
-x-y+5z=1

4. Write a MATLAB function (Use your first name as the name of the function) that takes a square matrix as its argument and returns another matrix of the same size. If the argument is not a square matrix, the function returns a zero matrix with dimensions matching those of the argument. If the argument is a square matrix, the function returns a new matrix created by swapping the rows of the original matrix, so that the diagonal elements are absolutely the largest in their respective columns when compared to the other elements in those columns. (i.e. $|a_{ii}| \geq |a_{ni}|$ if n>i)