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Batch- ENC 5

Assignment- 6

Q2) a)

The top screenshot shows the MATLAB R2020a interface with the editor displaying the following code:

```
1 clc;
2 clear;
3 a = [4 1 0; 1 20 1; 0 1 4];
4 x0 = [1; 1; 1];
5 n=3;
6 t=input("Tolerance:");
7 error=1;
8 iter=0;
9 k=0;
10 max_iter=20;
11 while( iter < max_iter)
12     y=a*x0;
13     k=(norm(y,inf));
14     x0=y/k;
15     if (norm(k-1,inf)<t)
16         break;
17     end;
18     iter=iter+1;
19 end;
20 fprintf("x0=");
21 disp(x0);
22 fprintf("k=");
23 disp(k);
24 fprintf("y=");
25 disp(y);
26
```

The bottom screenshot shows the same MATLAB R2020a interface after execution. The Command Window displays the following output:

```
Tolerance: 0.001
x0 =
    0.0620
    1.0000
    0.0620

k =
    20.1240

y =
    1.2481
    20.1240
    1.2481

fx >>
```

Q2) b)

The image displays the MATLAB R2020a - academic use interface. The top toolbar includes options for HOME, PLOTS, APPS, EDITOR, PUBLISH, and VIEW. The EDITOR tab is active, showing a script file named q2b.m. The script contains a while loop for solving a system of linear equations using the Gauss-Seidel method. The command window on the right shows the execution results, including a warning about the matrix being close to singular and the final values of x0 and 1/k.

```
1 clc;
2 clear;
3 B=[1 1 0 0; 1 2 0 1; 0 0 3 3; 0 1 2 3];
4 a=inv(B);
5 x0=[1; 1; 0; 1];
6 [n,~]=size(a);
7 t=input("Tolerance:");
8 error=1;
9 iter=0;
10 k=0;
11 max_iter=20;
12 while( iter < max_iter)
13     y=a*x0;
14     k=(norm(y,inf));
15     x0=y/k;
16     if (norm(k-1,inf)<t)
17         break;
18     end;
19     iter=iter+1;
20 end;
21 fprintf("x0=");
22 disp(x0);
23 fprintf("1/k =");
24 disp(1/k);
25
```

Warning: Matrix is close to singular or badly scaled. Results may be inaccurate. RCOND = 3.965082e-18.  
> In q2b (line 4)

Tolerance:0.001  
x0= 1  
-1  
-1  
1  
1/k = 3.0279e-17  
fx >> |