[Q1] Which of the following is NOT an arithmetic operator in MATLAB?

A) * B) / C) ^ D) @ E) +

[Q2] Which of the following functions are commonly used to assess execution time of MATLAB code?

A) tic B) toc C) profile D) bench E) all of the above

[Q3] How would you reference the `telno` field for the last person in a struct array named `myFriends`?

A) `myFriends(end).telno` B) `class(myFriends, 'telno', end)`
C) `myFriends.telno{end}` D) `struct(myFriends, 'telno', end)`
E) none of the above

[Q4] Cell arrays should be used in MATLAB

A) when elements in the array have different lengths
B) when elements in the array are of different class
C) when elements in the array have different lengths and/or class
D) when simulating biological systems
E) to make code run faster

[Q5] What MATLAB code structures does the break command terminate?

A) for loops B) while loops C) both for and while loops
D) recursion E) none of the above

[Q6] Given the following string defintions

```
test1 = 'easy'
test2 = 'HARD'
test3 = 'impossible'
```

Which of the following commands produces an error message?

A) `[test1, test2, test3]` B) `[test1; test2; test3]`
C) `strcmpi(test1, test2)` D) `strcmp(test2, test3)`
E) `test1 == test2`

[Q7] What is the result of the following command:

```
class(5>4 || 3*2 - 7 > 0)
```

A) logical B) true C) false
D) error message E) none of the above

[Q8] What is the difference in memory requirements between the MATLAB single and double data types?

A) single uses 1 bit and double uses 2 bits
B) single uses 1 byte and double uses 2 bytes
C) single uses 4 bytes and double uses 8 bytes
D) double requires an extra sign bit
E) there is no difference in memory requirements

[Q9] Given the following definitions

```
F = [-1 -2 -3  0  3  2  1]
G = [-4  2  2  1 -2 -2  2]
H = F+G < 0
```

What is the result of the command `J = F(H)`

```
A)   [-1 -2 -3]          B)   [-1 -3]
C)   [-2 -3 2]           D)   [-1 -2]
E)   [-2 -3]
```

[Q10] Which of the following binary digit strings provides the correct 8-bit representation (uint8) of the unsigned integer value 25?

A) 0001 1001 B) 0001 0101 C) 1001 0110
D) 0010 0011 E) 0010 1010

[Q11] Which of the following gives a result of true?

A) `isprime(49)`
B) `isfinite(0/0)`
C) `isnan(tand(90))`
D) `isinf(cos(Inf))`
E) none of the above

[Q12] Which of the following is NOT a valid assignment in MATLAB?

A) `X = X+1` B) `X = Y==5` C) `X = Y = Z`
D) `X = X .^ 2` E) all of the above are valid

[Q13] Which of the following MATLAB expressions gives a result of 12?
(don't worry about small differences that may occur due to round-off errors)

A) `sqrt(144)` B) `144^1/2` C) `6*4 / 1*2`
D) `length(0:12)` E) all of the above

[Q14] Function handles can be used to reference which of the following?

A) anonymous functions B) custom functions C) sub-functions
D) built-in functions E) all of the above

[Q15] What is the value of G after running the following code?

```
G = 0;
for k = 1:20
    G = G + k;
    if G > 3, break, end
end
```

A) 3 B) 4 C) 5 D) 6 E) none of the above

[Q16] Given the following code, what is the result of `size(z)`

```
x = linspace(1, 10, 20)
y = 11 : 20
z = [x, y]
```

A) 1 20 B) 1 30
C) 20 D) 30
E) none of the above

[Q17] How would you expect compute time (t) to scale with problem size (N) for the following calculation?

```
function [out] = myMatrixRMS(N)
A = rand(N);   % NxN matrix of random numbers
B = sum(A.^2)/N;
out = sqrt(sum(B)/N);
end
```

A) $t \sim O(N)$ B) $t \sim O(N^2)$ C) $t \sim O(N\log N)$
D) $t \sim O(N^3)$ E) none of the above

[Q18] Given the function definition below, what is the result of `myRecursive(5)`

```
function [out] = myRecursive(N)
if N <= 1
     out = 1;
else
     out = N + myRecursive(N-1);
end
```

A) 5 B) 10 C) 15 D) 120 E) none of the above

[Q19] What will be the value of `result` after executing the following code?

```
n = [0  1  2  3];
while length(n) < 7
    n = [n, sum(n)];
end
result = sum(n);
```

A) 6 B) 7 C) 24 D) 48 E) none of the above

[Q20] What will the value of n be after evaluating the following code?

```
n = 3;
myArray = [1, 4, 15, 17, 12, 9, 7, 15];
while ~any(myArray == n)
      n = 2*n;
end
```

A) 3 B) 6 C) 9 D) 12 E) none of the above

[Q21] What is the error in the following code?

```
F = @(x) sin(x)/x;
fplot(@F, [-8*pi 8*pi])
```

A) range of x values to be plotted is not specified correctly
B) corresponding y values for plotting have not been provided
C) call to `fplot` should reference F rather than @F
D) there is an error in the first line of code
E) there is no error

[Q22] Given `X=[1 2 3 4]`, what is the result of `X*X'`

A) `[1 4 9 16]` B) `[1 4 9 16]'` C) `[2 4 6 8]`
D) `30` E) error message

[Q23] Which of the following will extract all values from the second and third columns of matrix M?

A) `M(2:3, 1:end)`
C) `M([2 3], end)`
C) `M(1:size(M,2), [2 3])`
D) `M(:, [2 3])`
E) none of the above

[Q24] What is the error in the following code?

```
switch tunit
     case {'F', 'f'}
          T = (T-32)/1.8 + 273.15;
     case {'C', 'c'}
          T = T + 273.15;
     case {'K', 'k'}
          T = T;
     otherwise
          error('Unrecognized units %s', tunit);
end
```

A) switch command is used incorrectly
B) case commands are not allowed to reference cell arrays
C) otherwise clause is not needed
D) conversion from Celsius to Kelvin is incorrect
E) there is no error

[Q25] Which of the following is **NOT** a 1×4 character array?

A) `['s', 'p', 'o', 't']` B) `['O'; 's'; 'k'; 'i']'`
C) `num2str(3.14)` D) `class('3.1415927')`
E) all of the above are 1×4 character arrays

[Q26] Given the following code, what is the final value of the variable X?

```
X = 'LMNOPQ';
for k=1:length(X)
    if rem(k,3) == 1
        X(k) = char(X(k) + 1);
    elseif rem(k,3) == 2
        X(k) = char(X(k) - 1);
    end
end
```

A) MLNPOQ B) MLONQP C) LMNOPQ
D) LNMOPQ E) none of the above

[Q27] What is the value of X after executing the following code?

```
X = 'Able was I ere I saw Elba';
X = X(isstrprop(X, 'lower'));
X = upper(X(end:-1:1))
```

A) ABLEWASIEREISAWELBA B) ABLWASERESAWELB
C) AIIE D) EIIA
E) none of the above

[Q28] What is the value of Y after executing the following code?

```
Pi = '3.14';
U = 'I';
Y = sprintf('%s is close to %d say %c','Pi', round(pi), U);
```

A) `'Pi is close to 3 say U'`
B) `'Pi is close to 3 say I'`
C) `'3.14 is close to 3 say U'`
D) `'3.14 is close to 3 say I'`
E) none of the above

[Q29] What is the value of S after executing the following code?

```
S = 0;
for k = 1:10
     if isprime(k), continue, end
     S = S + 1;
     if rem(k,2)==1, S = S + k; end
end
```

A) 6 B) 10 C) 16 D) 34 E) none of the above

[Q30] The hexadecimal representation C1C0 0000 of a single precision real number encodes what value? Hint: $N = (-1)^s 2^{e-b} (1+f)$, where e is represented as an unsigned 8-bit integer, and b = 127 for the single precision case.

A) −24 B) −12 C) −6 D) −3 E) 12