**INSTRUCTIONS:**

- Keep your eyes on your own paper, and do your best to prevent anyone else from seeing your work.
- Do NOT communicate with anyone other than the professor/proctor for ANY reason in ANY language in ANY manner.
- This is exam is closed book, closed notes, no calculator, and no computer.
- Turn all mobile devices off and put them away now. You cannot have them on your desk.
- Write neatly and clearly. What I cannot read, I will assume to be incorrect.
- Stop writing immediately when told to do so at the end of the exam. I will take 5 points off your exam if I have to tell you multiple times to do so.
- Academic misconduct will not be tolerated and will be referred immediately to the Emory Honor Council. Penalties for misconduct will be a zero on this exam, an F grade in the course, and/or other disciplinary action that may be applied by the Emory Honor Council.

**TIME:** This exam has 7 questions on 9 pages including the title page. Please check to make sure all pages are included. You will have 75 minutes to complete this exam.

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*I commit to uphold the ideals of honor and integrity by refusing to betray the trust bestowed upon me as a member of the Emory community. I have also read and understand the requirements and policies outlined above.*

Signature: __________________________________________

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
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<tbody>
<tr>
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<td>10</td>
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Score: ____________________________
1. **Excel Vocabulary**

Define 5 of the 6 terms below. You do not need a formal definition, just a good description. Limit your answers to about 20 words per term. You may use an example if it would be helpful. Clearly mark the term you do not wish to include; otherwise, I will discard the last term.

(a) (2 points) value

**Solution:** numerical data in Excel (Ch 2)

Ex: 34.4

(b) (2 points) function

**Solution:** built in “tool” which you can use in formulas to perform calculations. (Ch 4)

Ex: `RAND()` or similar

(c) (2 points) string

**Solution:** sequence or series of characters which make up text data in Excel (Ch 2)

Ex: “Hello”

(d) (2 points) relative addressing

**Solution:** Reference to a cell which changes/updates based on location of cell it is pasted into (Ch 2, Cell and Range References)

Ex: A4

(e) (2 points) argument

**Solution:** input to a function (Ch 4)

Ex: in the function \( \text{SUM}(4, 5) \), 4 and 5 are arguments

(f) (2 points) formula

**Solution:** Method of entering user-defined calculations in Excel

Ex: \( =A1+2 \)
2. **True or False**

Clearly indicate whether each of the following statements is true or false. If the statement is false write a 1 sentence explanation why it is incorrect.

(a) (2 points) Charles Babbage is widely considered to be the first programmer. He designed the Difference Engine and wrote a program for it to calculate Bernoulli numbers.

**Solution:** False. Babbage did design the Difference Engine, but Ada Lovelace wrote the Bernoulli Number program for it.

(b) (2 points) Mobile devices such as smartphones do not have operating systems (OS) software installed on them. Instead, they are engineered so with special communication channels for their application software.

**Solution:** False. Smartphones and other mobile devices have an OS as do desktops and laptops. Usually the OS is tailored to the specific platform of a mobile device (limited peripherals and memory). (OS reading, p 335).

(c) (2 points) Vacuum tubes (and later, transistors) were important technological developments in the history of computers as they allow us to amplify and modulate electronic signals.

**Solution:** True

(d) (2 points) The development of the UNIVAC is notable because it was the first commercial personal computer (PC) marketed and sold to the general public.

**Solution:** False. Unicac was the first commercial computer (1951). It was never intended to be a personal computer and was only used by/sold to corporations and academic institutions.

(e) (2 points) ARPAnet, the precursor to today’s internet was originally developed by IBM working in conjunction with AT&T.

**Solution:** False. ARPRnet was developed by the US government, specifically the Dept. of Defense’s research branch (ARPA).
3. **Basic Excel Evaluation**
Given the spreadsheet below, evaluate each of the following formulas. If the formula will generate an error, you can simply write “error”. You do not need to specify the type of error. You can assume that all data in column A is text, all data in column B is numbers, and all data in column C is Date/Times. **For full credit: use quotation marks to clearly differentiate text from numbers.**

![Spreadsheet Image]

(a) (1 point) \=B3-B5 \hspace{1cm} (a) \text{21}

(b) (1 point) \=B1&B6 \hspace{1cm} (b) “102”

(c) (1 point) \=A1&A6 \hspace{1cm} (c) “ABCDefgh”

(d) (1 point) \=VALUE(RIGHT(A2,B6)) \hspace{1cm} (d) 23

(e) (1 point) \=RIGHT(A5, 3)) \hspace{1cm} (e) “456”

(f) (1 point) \=COUNTIF(B1:B6, "<20") \hspace{1cm} (f) 4

(g) (1 point) \=UPPER(A3)=A1 \hspace{1cm} (g) TRUE

(h) (1 point) \=SUMIFS(B1:B6, B1:B6, ">=20", C1:C6, ">"&NOW()) \hspace{1cm} (h) 65

(i) (1 point) \=IF(B1+B4/B5>=B1, "Hello", "Goodbye") \hspace{1cm} (i) “Hello”
(j) (1 point) =DATE( YEAR(C5)-4, DAY(C3), MONTH(C1))

(j) 04/10/10

(k) (1 point) LEN(A5)

(k) 7

(l) (1 point) =REPLACE(A3, 2, 3, "abba")

(l) "aabba"

(m) (1 point) =SUBSTITUTE(A2, "B", "")

(m) "ACD123"

(n) (1 point) =HOUR(C3)

(n) 6
4. Consider the serial number for a Date/Time value 19752.5.

(a) (2 points) What time is represented by this serial number?

(a) noon, 12PM

(b) (2 points) Explain what the value of 19752 represents with respect to a Date or Time.

Solution: This is the number of days since Jan. 1, 1900.

(c) (2 points) Briefly explain how Excel’s use of serial numbers to store Date/Time values enables simpler computations with Date/Time values.

Solution: Since it’s just numbers, we can do math. If we need to know the number of days difference between two dates, for example, we can simply subtract them.

5. (8 points) The formula =OR(AND(B1, C1), AND(NOT(B1), NOT(A1))) is entered into cell D1. This formula is then copied and pasted into cells D2:D8. Fill in the table below with the appropriate values for cells D1:D8.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
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<tr>
<td>8</td>
<td>TRUE</td>
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</tbody>
</table>

Solution:
6. Consider the following spreadsheet which shows sales data for the months of January, February, and March. It is divided into sales regions marked East, West, South, and North.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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</thead>
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<td></td>
<td>TRUE</td>
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</table>

(a) (4 points) Write a formula which can be entered into cell B10 that calculates the total sales for the month of January. This formula should be written such that it can be copied and pasted into cells C10 and D10 to calculate the totals for February and March, respectively.

**Solution:** \( \sum(B5:B8) \) or \( B5+B6+B7+B8 \)

(b) (4 points) The projected (anticipated) increase in sales for April can be calculated by multiplying the sales from the month of March by the anticipated increase stored in cell B1. Write a formula in cell E5 which calculates the anticipated sales for the month of April for the East region. This formula should be able to be copied into cells E6:E8 to calculate the sales for the other regions.

**Solution:** \( D5+D5*B1 \)

Common error: calculating only the increase in sales (ie \( D5*B1 \)).
7. **Flowcharts and Problem Solving**

The mobile telecom company Acme155 has implemented tiered pricing for the data usage of their mobile phone customers. Their pricing scheme is as follows:

- All customers are charged a base charge of $29.95 per line per month.
- Each line has an allowance of 1 gigabyte per month of data.
- For usage above 1 gigabyte, but below 2 gigabytes, the line is charged an extra $0.10 per megabyte.
- For usage above 2 gigabytes, the user is charged $0.15 per megabyte.
- If a user uses less than 1 gigabyte of data in each of the previous two months, they receive a $10 discount on their bill.

(a) (1 point) How many megabytes are in a gigabyte?

(a) 1.024

(b) (6 points) Draw a flowchart which would calculate a customer’s monthly bill and implement the above conditions.
Below is a segment of a spreadsheet showing the data usage for three different accounts. This sheet will be used to calculate the current month’s (September’s) data charges.

<table>
<thead>
<tr>
<th>A</th>
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<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>171404-555-1212</td>
<td>1200</td>
<td>1000</td>
<td>1500</td>
</tr>
<tr>
<td>3</td>
<td>194678-555-1212</td>
<td>300</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>4</td>
<td>182704-555-1212</td>
<td>1400</td>
<td>500</td>
<td>900</td>
</tr>
</tbody>
</table>

(c) (5 points) Write a formula which would calculate whether or not a line qualifies for the $10 discount for their reduced data usage. Your formula should result in the value 10.00 if the line qualifies for the discount and 0.00 if it does not.

**Solution:**

\[
\text{IF(AND(D3\leq 1024, C4\leq 1024), 10.00, 0.00)} \text{ or } \\
\text{IF(D3<1024, IF(C4\leq 1024, 10.00, 0.00), 0.00)}
\]

Scoring:

+ .5 IF function
+ 2.5 criteria
+ 2 discount correct

(d) (5 points) Now write a formula which calculates the monthly charge for a line. You may assume your result/answer for part (c) above can be accessed with the named range 'Discount' when writing your formula.

**Solution:**

\[
29.95 - \text{Discount} + \\
\text{IF(Usage < 1024, 0, IF(usage<2048, .1*(usage-1024), .15*(usage-2048)+.1*1024))}
\]