Part A [10 points]

1) Choose the term from the list that matches each description.

Terms
a) Access Time
b) Addressability
c) Arithmetic/Logic Unit
d) Bus Width
e) Control Unit
f) CPU
g) Instruction Register
h) Latency
i) Program Counter
j) Registers
k) Seek Time
l) Transfer Rate

Descriptions

|		
1) Computer component that controls the rest	e - Control Unit
2) Number of bits stored in each memory location	b - Addressability
3) Memory locations within the CPU	j - Registers
4) Time required to locate the required track on a disk	k - Seek Time

2) Place a label at the back of each arrow to identify the component to which it points. [6]

A1 Solution
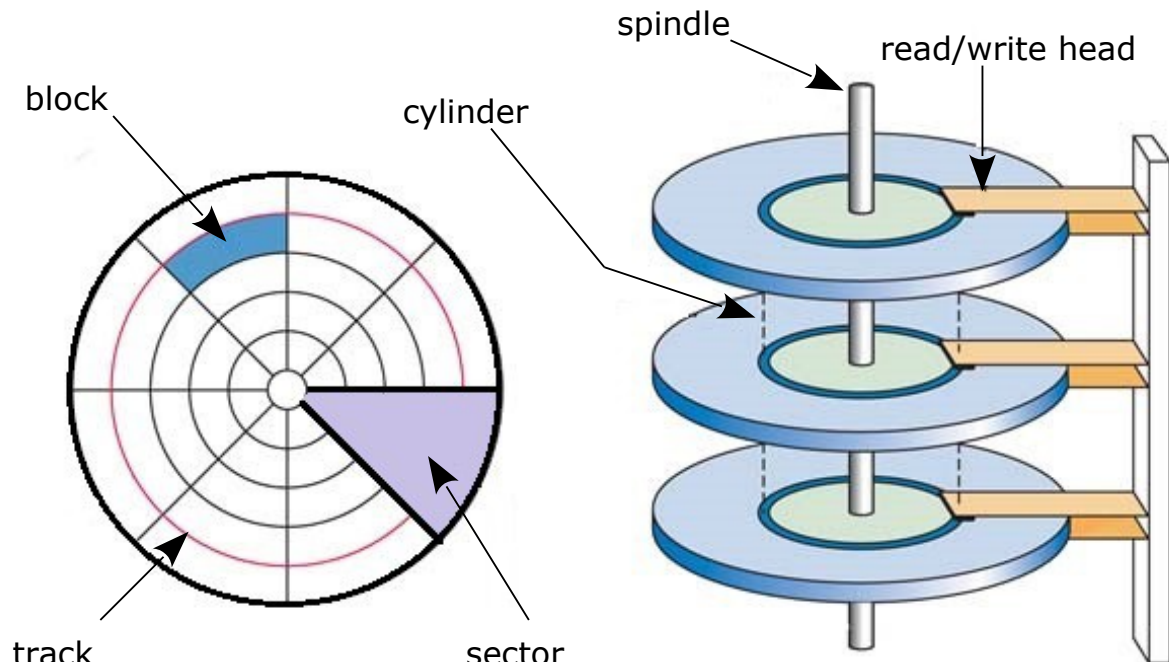
Part B [11 points]

Refer to the following circuit diagram for all questions on this page.
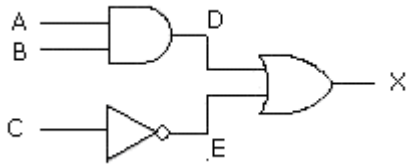
1. Write a Boolean expression that represents this circuit.[3]

X = AB + C'

2. Show how this circuit can be described in an Excel formula).[3]

= OR(AND(A,B), NOT(C))

3. Complete the Truth Table for this circuit. [4]

A	B	C	D	E	X
0	0	0	0	1	1
0	0	1	0	0	0
0	1	0	0	1	1
0	1	1	0	0	0
1	0	0	0	1	1
1	0	1	0	0	0
1	1	0	1	1	1
1	1	1	1	0	1

1 point for columns A,B,C
1 point for each correct column

4. How many transistors are required to construct the circuit? [1]

7

B1

Part C [6 points]

The table at the bottom of the page lists 3 processes in the *Ready state*, along with their **Service Times**.
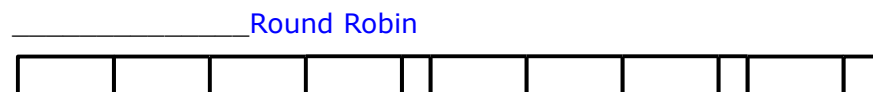
The charts represent the scheduling of the processes under 3 techniques:
- **FCFS** - First Come First Served
- **RR** - Round Robin
- **SJN** - Shortest Job Next

1) What name is given to this type of chart? [1]

   Gannt

2) Identify each of the charts by the scheduling technique it represents. [2]

_____Round Robin

_____SJN

_____FCFS

3) Now use the charts to calculate the Turnaround Times under each technique. [3]

Process	Service Times	Turnaround Times		
		FCFS	SJN	Round Robin
p1	165	165	230	380
p2	65	230	65	215
p3	220	450	450	450

N.B.   Where required, use a quantum of 50 units.

C1

Part D [11 points]

All ranges have been named using the labels that appear in the worksheets.

The table below has data in the left two columns and formulas in the right two.
All entries in the **SURNAME** column are in UPPER case.
All entries in the **given_name** column are in lower case.

SURNAME	given name	Last Name	First Name
AKINKUOWO	alan	Akinkuowo	Alan
AMIRTHALINGAM	alexandre	Amirthalingam	Alexandre
APPIAH-DJOMOAH	andrea	Appiah-djomoah	Andrea
AWWAD	artem	Awwad	Artem
BALKARAN	awo	Balkaran	Awo
BECCARIO	cheuk	Beccario	Cheuk
BELFIORE	chi-kin	Belfiore	Chi-kin
BOKORE	chris	Bokore	Chris
BONILLA	david	Bonilla	David
CASTILLO	dilber	Castillo	Dilber
CHAN	esha	Chan	Esha
CHANG	farhan	Chang	Farhan
CHEWCHUK	frank	Chewchuk	Frank
CHUNG	gerlie	Chung	Gerlie
DASTOOR	hiroyuki	Dastoor	Hiroyuki

1. Write An Excel formula that will produce the values in the **Last Name** column.[5]

=LEFT(SURNAME, 1) & LOWER(RIGHT(SURNAME, LEN(SURNAME) -1))

or

=CONCATENATE(LEFT(SURNAME, 1) , LOWER(RIGHT(SURNAME, LEN(SURNAME) -1)))

or

=LEFT(SURNAME, 1) & LOWER(MID(SURNAME, 2, LEN(SURNAME)-1))

An instructor decides to track the number of students who visit during office hours. The number of visitors is added to this worksheet, which then calculates the **Total** to date, and the **Daily % of Total**.

	A	B	C	D	E	F	G	H	I	J	K
1	Visitors	Day_1	Day_2	Day_3	Day_4	Day_5	Day_6	Day_7	Day_8	Day_9	Day_10
2	Daily:	2	3	4	1	0	3	2	3	5	1
3	Total:	2	5	9	10	10	13	15	18	23	24
4	Daily % of Total:	8%	13%	17%	4%	0%	13%	8%	13%	21%	4%

2. Write the formula(s) necessary to calculate the **Total:** row.[3]

B3 = Daily
C3 = Daily + B3   copy formula across

3. Write one formula that calculates **Daily % of Total** when copied to all cells.[3]

=Daily / Day_10 Total

D1

Part E [5 points]

1) A column in an Excel worksheet named **Letter Grade** contains the formula
    =IF(Score<80,"B",IF(Score<70,"C",IF(Score<60,"D",IF(Score<50,"F","A"))))
    What will appear in **Letter Grade** when **Score** is 88?

    A) A   B) B   C) C
    D) D   E) F

2) Using to the formula in the previous question, what will appear in **Letter Grade** when **Score** is 65?

    A) A   B) B   C) C
    D) D   E) F

3) Which of the following expressions could NOT be the first argument in an Excel IF function?

    A) "A1 < C1"   B) "A1" < "C1"   C) A1 < C1
    D) ISBLANK(A1)   E) NOT(A1<C1)

A company decides to give some of its employees a holiday bonus. Those who have been employed at the company for at least 10 years get a bonus if their performance is considered either *good* or *excellent*. Those who have not been employed at the company that long get a bonus only if their performance is considered *excellent*. Assume the columns are named as shown.

Years	Rating	Bonus
3	excellent	YES
15	poor	NO
12	acceptable	NO
2	good	NO
10	good	YES

4) Which formula could have been used to calculate the values in the **Bonus** column.
    A) =IF(Rating="good" AND IF (Years>=10," YES "," NO"))
    B) =IF(Years>=10 AND (Rating="excellent" OR Rating="good"),"YES","NO")
    C) =IF(Years>=10 AND (Rating>="good"),"Yes","No")
    D) =IF(Rating>="good",IF(Years>=10,"YES", "NO"),"NO"))
    E) =IF(OR(AND(Years>=10, Rating="good"),Rating="excellent"),"YES","NO")

5) Excel's LOOKUP function is often used to replace the use of
    A) the FREQUENCY function
    B) the SUMIF function
    C) the COUNTIF function
    D) the IF function
    E) none of the above

E1

Part F *[7 points]*

The rows have been named with the labels in the left column.

Colour Component	RED	GREEN	BLUE
Intensity	12	25	6
Brightness	Medium	High	Low

Intensity is a randomly chosen integer in the range 0 - 31 (inclusive).
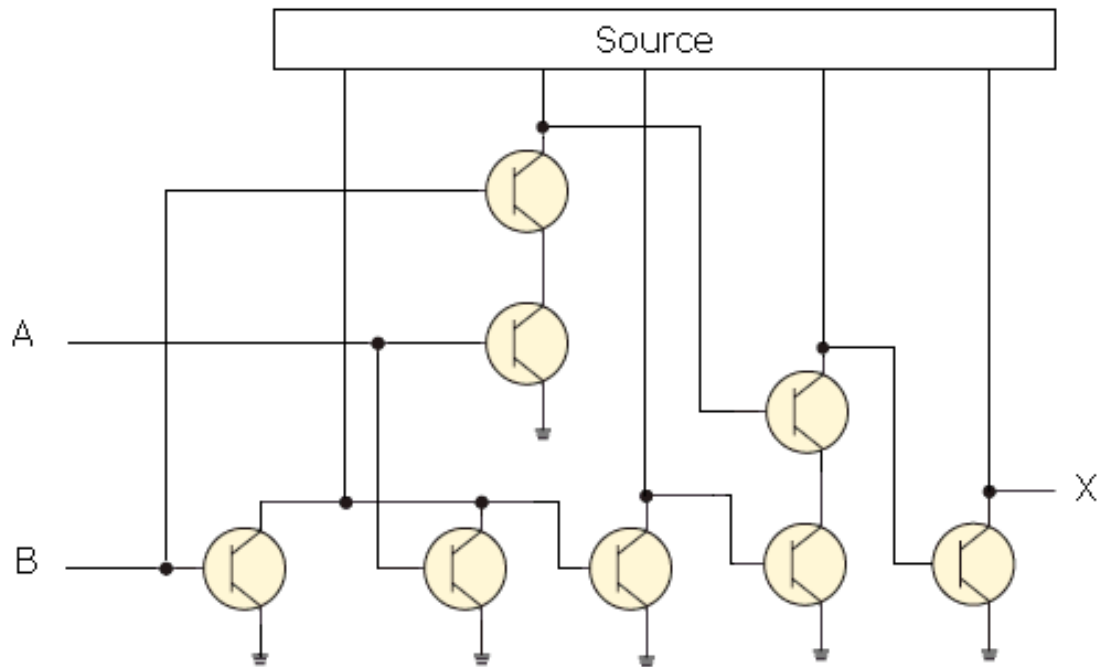
Brightness is
- "Low" when **Intensity** is less than 12,
- "Medium" when **Intensity** is greater than 11 but less than 23,
- and "High" otherwise.

Write a formula to produce the entries in the **Brightness** row. [7]

= IF(Intensity<12, "Low", IF(Intensity<23, "Medium", "High"))

Bonus [3 points]

As briefly as possible, describe the behaviour of this circuit of transistors.

XOR, A⊕B, A<>B are all worth 3 points

A Boolean expression like (A+B) • (A•B)' or (A+B)(AB)' is worth 2
A functional expression like AND(OR(A,B),NOT(AND(A,B))) is worth 2

Award 1 for a circuit diagram that looks correct