

Question 1

A)

Question 1 (10 marks)

a)

Program memory

```
#include <stdio.h>

void main()
{
    double x, y, z;
    printf("let's do a simple calculation.\n");
    x = 1.2;
    y = 3.34;
    z = (2.0 * x + y / 3.0) * 2;
    printf("For x = %f and y = %f\n", x, y);
    printf("z = (2.0 * x + y / 3.0) * 2 = %f\n", z);
}
```

working memory

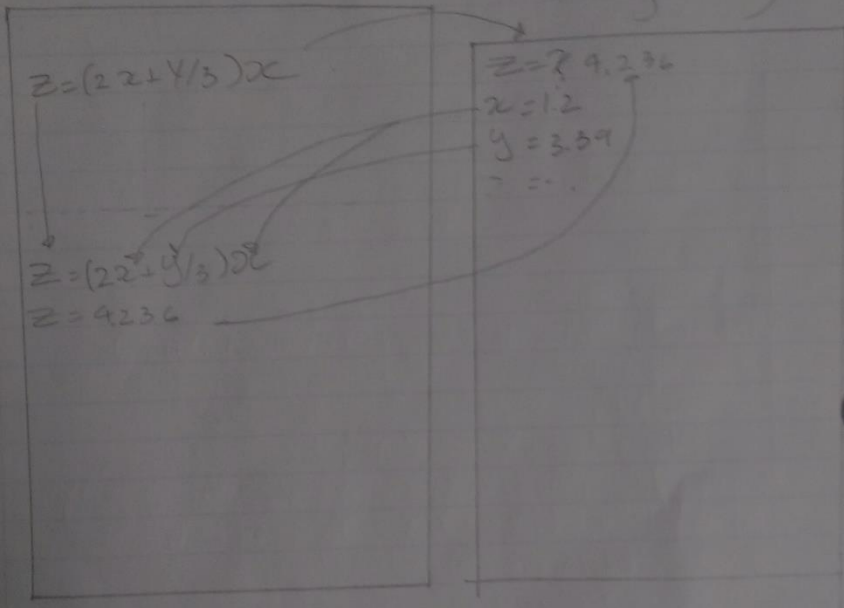
CPU

$x = 1.2$ $y = 3.34$ $z = 7.9236$	$[2(1.2) + 3.34/3] * 2 = 7.9236$
---	----------------------------------

b)

CPU

Working memory



b)

2.

```
// main.c
```

```
// Question2
```

```
#include <stdio.h>
```

```
int main(int argc, const char * argv[]) {
```

```
    //declaring variables
```

```
    double v0, a, t, v, x;
```

```
    printf("Enter the initial velocity at time 0: ");
```

```
    scanf("%lf", &v0); //getting the initial velocity from user and storing it in the variable v0
```

```
    printf("Enter the acceleration: ");
```

```
    scanf("%lf", &a); //getting the acceleration from user and storing it in the the variable a
```

```
    printf("Enter the time: ");
```

```
    scanf("%lf", &t); //getting the time from user and storing it in the variable t
```

```
    //Formula to find the final velocity:  $v(\text{final}) = v(\text{initial}) + a*t$ 
```

```
    v = v0 + (a*t);
```

```
    //Formula to find the distance:  $s = (\text{time} * (v1 + v2) / 2)$ 
```

```
    x = ((v0+v)*t)/2;
```

```
    printf("After time t = %.2f seconds, the velocity v = %.2f m/s and the displacement x = %.2f m", t, v, x); // by using %.2f it will convert to 2 decimal places
```

}

Test cases 1-5

```
"C:\Users\Vinul Gallapththi\Documents\Programming\assignment1\q2.exe"
Enter the initial velocity at time 0: 1
Enter the acceleration: 0
Enter the time: 10
After time t = 10.00 seconds, the velocity v = 1.00 m/s and the displacement x = 10.00 m
Process returned 88 (0x58) execution time : 11.769 s
Press any key to continue.
```

```
"C:\Users\Vinul Gallapththi\Documents\Programming\assignment1\q2.exe"
Enter the initial velocity at time 0: 0
Enter the acceleration: 250
Enter the time: 0.5
After time t = 0.50 seconds, the velocity v = 125.00 m/s and the displacement x = 31.25 m
Process returned 89 (0x59) execution time : 17.725 s
Press any key to continue.
```

"C:\Users\Vinul Gallapthi\Documents\Programming\assignment1\q2.exe"

```
Enter the initial velocity at time 0: 10.2
Enter the acceleration: 0.5
Enter the time: 5.2
After time t = 5.20 seconds, the velocity v = 12.80 m/s and the displacement x = 59.80 m
Process returned 88 (0x58)   execution time : 15.117 s
Press any key to continue.
```

"C:\Users\Vinul Gallapthi\Documents\Programming\assignment1\q2.exe" — □

```
Enter the initial velocity at time 0: 60
Enter the acceleration: 1.2
Enter the time: 120
After time t = 120.00 seconds, the velocity v = 204.00 m/s and the displacement x = 15840.00 m
Process returned 94 (0x5E)   execution time : 23.445 s
Press any key to continue.
```

```
"C:\Users\Vinul Gallapthi\Documents\Programming\assignment1\q2.exe"
Enter the initial velocity at time 0: 60
Enter the acceleration: 1.2
Enter the time: 0
After time t = 0.00 seconds, the velocity v = 60.00 m/s and the displacement x = 0.00 m
Process returned 87 (0x57)   execution time : 22.175 s
Press any key to continue.
-
```

3.

```
// main.c
```

```
// Question3
```

```
#include <stdio.h>
```

```
int main(int argc, const char * argv[]) {
```

```
    //declaring variables
```

```
    double mass, molecularWeight, temperature, volume;
```

```
    double gasConstant = 8.314;
```

```
    double pressure = 101.325;
```

```
    printf("Enter the mass: ");
```

```
    scanf("%lf", &mass); //getting the time from user and storing it in the variable mass
```

```

printf("Enter the Molecular Weight(in moles): ");

scanf("%lf", &molecularWeight);//getting the time from user and storing it in the variable
molecularWeight

printf("Enter the Temperature(in Celcius): ");

scanf("%lf", &temperature);//getting the time from user and storing it in the variable temperature

//converting celcius to Kelvin

temperature = temperature + 273.15;

//formula: = v =nrt/p

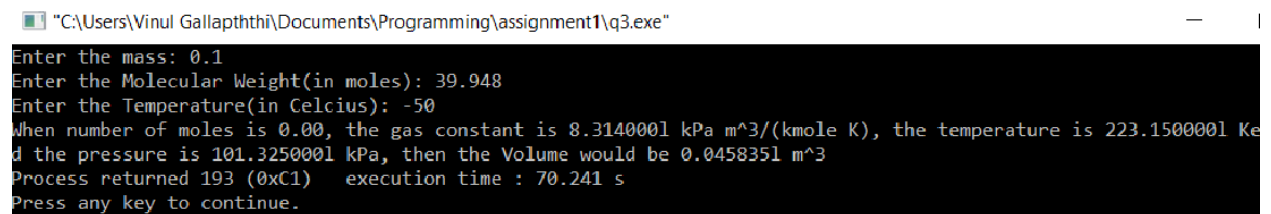
volume = ((mass/molecularWeight)*gasConstant*temperature)/pressure;

printf("When number of moles is %.2f, the gas constant is %fl kPa m^3/(kmole K), the temperature is
%fl Kelvin, and the pressure is %fl kPa, then the Volume would be %fl m^3",(mass/molecularWeight),
gasConstant, temperature, pressure, volume);

}

```

Trial



```

"C:\Users\Vinul Gallapththi\Documents\Programming\assignment1\q3.exe"
Enter the mass: 0.1
Enter the Molecular Weight(in moles): 39.948
Enter the Temperature(in Celcius): -50
When number of moles is 0.00, the gas constant is 8.3140001 kPa m^3/(kmole K), the temperature is 223.1500001 Ke
d the pressure is 101.3250001 kPa, then the Volume would be 0.0458351 m^3
Process returned 193 (0xC1)   execution time : 70.241 s
Press any key to continue.

```

