Name: Student code:

Laboratory Task II

RESULTS SHEET: **Student Copy**

PART I

Q.1) Show the distillate (≥5 mL) to your demonstrator and ask for his/her signature.

Demonstrator Signature:……..

Q.2) Functional Groups Analysis of the distilled essential oil (S):

Tick (√) where appropriate.

Reagents	Positive test	Negative test
0.2% $KMnO_4$		
1% $FeCl_3$		
2,4-DNP		
Ceric ammonium nitrate		
Tollen's Reagent		

Functional groups in **S**	Present	Not present
-C=C-		
-OH (alcoholic)		
-OH (phenolic)		
-CHO		
-CO-		
-COOH		

Q.3) Functional Groups Analysis of unknown Y:

Tick (√) where appropriate.

Reagents	Positive test	Negative test
5% HCl		
5% NaOH		
5% $NaHCO_3$		
0.2% $KMnO_4$		
1% $FeCl_3$		
2,4-DNP		
Ceric ammonium nitrate		
Tollen's Reagent		

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Functional groups in **Unknown Y**	Present	Not present
-C=C-		
-OH (alcoholic)		
-OH (phenolic)		
-CHO		
-CO-		
-COOH		

Student signature:……..

Name: Student code:

Laboratory Task II

RESULTS SHEET: **Demonstrator Copy**

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Name: Student code:

Laboratory Task II

Tollen's Reagent		

RESULTS SHEET: **Demonstrator Copy**

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-CHO		
-CO-		
-COOH		

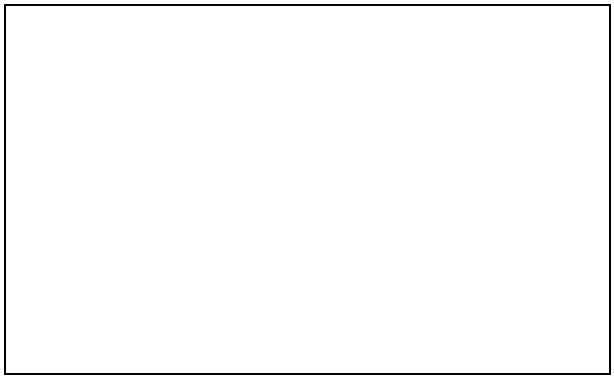
Student signature:……..

Name: Student code:

PART II

Q. 4) Structure Elucidation:

The structure which represents the main essential oil (**S**):



NMR Assignment of the main essential oil (S):
(See peak number in the given ^{1}H NMR spectrum)

Peak No.	Chemical shift (δ, ppm)	No. of proton(s)	Multiplicity *	^{1}H NMR Assignment
1	3.31	2H		
2	3.84	3H		
3	5.0-5.1	2H		
4	5.6	1H		
5	5.9-6.0	1H		
6	6.7	2H		Draw a structure of the essential oil (**S**) with peak no. assignment at each proton.
7	6.87	1H		

*** Multiplicity:**

s = singlet
d = doublet
t = triplet

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q = quartet
m = multiplet

Q.5) The structure of compound X and unknown Y:

Compound X	Unknown Y

NMR Assignment of Unknown Y:

(See peak number in the given ^{1}H NMR spectrum, labile proton does not appear in the spectrum)

Peak No.	Chemical shift (δ, ppm)	No. of proton(s)	Multiplicity	^{1}H NMR Assignment
1	3.59	2H		
2	3.86	3H		
3	3.88	3H		
4	6.81	3H		
				Draw a structure of the unknown **Y** with peak no. assignment at each proton.

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Laboratory Task II