	TANTA UNIVERSITY FACULTY OF PHARMACY DEPARTMENT OF PHARMACOGNOSY			
	FINAL EXAM FOR SECOND YEAR STUDENTS			
	COURSE TITLE:	Chemistry Of Crude Drugs		COURSE CODE: 3055
DATE:	31/12/2016	TERM: FIRST	TOTAL ASSESMENT MARKS: 250	TIME ALLOWED: 2 HOURS

PART I: Alkaloids..... (130 points, 65 min)

Question A : Draw the chemical structure and name the following: 30 points, 15 min

1a-A purine alkaloid used in bronchiospasms

2a-A morphinan alkaloid used in semisynthesis of codeine

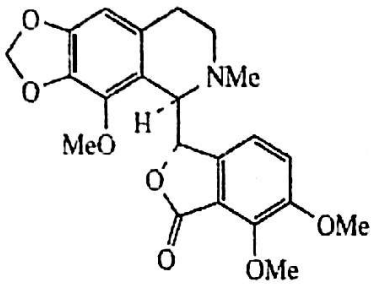
3a-A β-carboline alkaloid used to treat male impotence

4a-A sesquiterpenoid alkaloid with piperidine ring system

5a-An indoline alkaloid used in glaucoma

6a-A glyoxaline alkaloid biosynthesized from histidine

B: Identify the names of the following structures; give also the chemical and bio-synthetic classes also precursors & intermediates whenever applicable. Answers should be listed in Table I: 32points, 15 min



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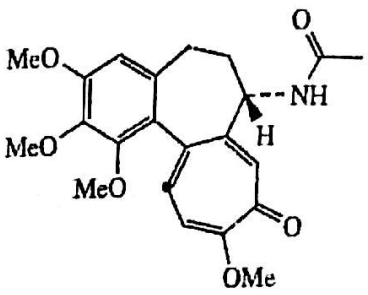

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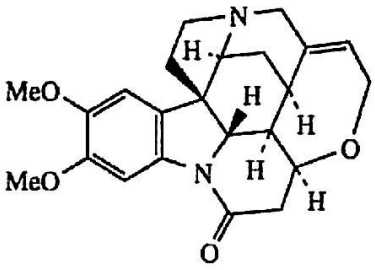

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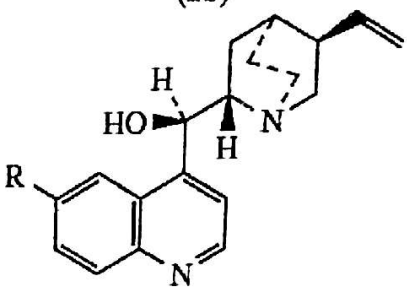
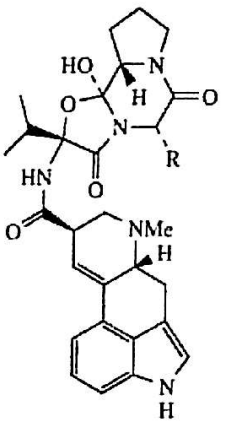


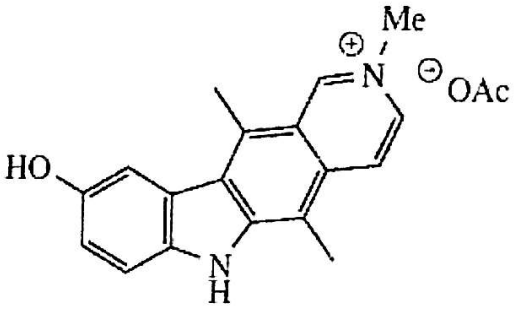
R = OMe

(4b)



R = CH_2Ph

(5b)



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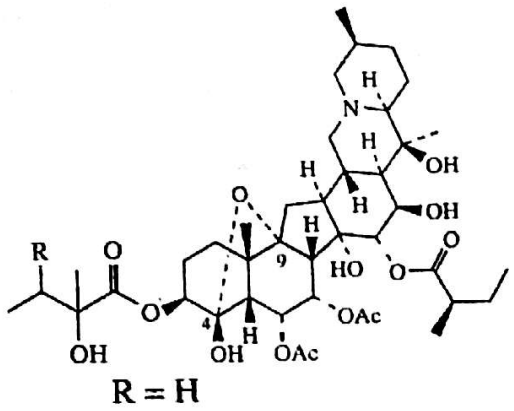

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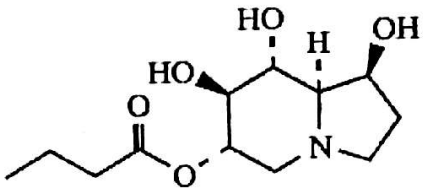


(8b)

Table (I)

No.	Name	Chemical class	Biosynthetic class precursors & intermediates
1b			
2b			
3b			
4b			
5b			
6b			
7b			
8b			

C- Match the number of the following statements with a correct answer in table II by writing the number of the statement in front of the correct answer: **18 points, 10 min**

1-Precursors in biosynthesis of alkaloid **1a.**

2-A Plant from which alkaloid **2a** is abundant.

3-An eburnane terpenoid indole alkaloid.

4-A diterpenoid alkaloid.

5-A synthetic analogue used in treatment of postoperative intestinal and bladder atony.

6-A specific chemical test for alkaloid **6a.**

7- Therapeutic uses of alkaloid **1b.**

8-Product (s) of treating alkaloid **2b** with hydrogen peroxide.

9-An organic acid present in salt form with alkaloid **3b.**

10-Separation of alkaloid **4b** from the other alkaloids in the same plant.

11-A reagent used in colorimetric assay of ergot alkaloids.

12-A structure needed for the activity of alkaloid **5a.**

13-Separation of a mixture caffeine and theobromine

14-The mechanism of antitumor action of camptothecin.

15-A disease in which drug **8b** is still in clinical trials for its treatment.

16-A reagent used in separation of a mixture of cephaline and psychotrine.

17-A chemical modification used to increase the activity of morphine.

18-A reaction used to prepare vinblastine from monomeric alkaloids present in *Vinca rosea.*

Table II

Statement	Answer number
Cholchicic acid methyl ester	
Ether	
Ekker's test	
Hydroxylation of C-14	
Glutamine, aspartic acid, glycine, methionine	
Celgosivir	
Van urk reagent	
Papaver bracteatum	
Anti-tussive/ antitumor	
As monosulfate	
AIDS	
Glutamic acid, asparagine, valine	
Sodium hydroxide	
As tartarate	
Topoisomerase 1 inhibition	
Methylation of phenolic hydroxyl group	
Hepatitis C	
Chlorogenic acid	
Vincamine	
Polonovski reaction	
Methylurethane (carbamate)	
Aconitine	
Intercalation between DNA double helix	
N-acetyl cholchinol	
Ammonium hydroxide	
Pyridostigmine	

Table III

Sentence	Answer number
a- An alkaloid in Brampton cocktail its racemic mixture is resolved by fractional distillation of its bitartarate salt.	
b- The hydrolysis product of the alkaloid described in sentence (*a*) by heating with aqueous $Ba(OH)_2$	
c- Curare like activity of tropane alkaloids is obtained by making the nitrogen ..... with higher alkyl groups.	
d- Hyoscine, in a mixture with hyoscyamine and atropine, can be assayed alone by titration after extraction with	
e- An alkali causes ..... of hyoscine.	
f- Atropine and hyoscyamine can be separated by fractional crystallization of their ..... salts.	
g- A color test specific for tropic acid esters.	
h- (-) Tropic acid is biosynthesized by rearrangement of	
i- Mannich reaction and Claisen condensation are included in the formation of tropine base from acetyl CoA and	
j- Nicotine and nicotelline can be separated by	
k- The answer of sentence (*d*) is also used for separation of nicotelline from	
l- Pyrrolidine ring in nicotine originates from	
m- A color reagent used for testing nicotine and atropine.	
n- Nicotine can be assayed gravimetrically by using a solution of	
o- Niacin is the acid hydrolysis product of	
p- A precipitating reagent used in the isolation of areca alkaloids from acidulated water extract.	
q- The alkaloid complex formed as mentioned in sentence (*p*) is destroyed by	
r- ..... is used to separate conhydrine from coniine and γ- coniceine	
s- Alkalies of different strengths are used to separate ..... alkaoids.	
t- The source of nitrogen in the alkaloids described in sentence (*s*) is	
u- The change of acetyl group to methyl on the ..... of colchicine results in proved activity against leukemia.	
v- A psychoactive protoalkaloid in which the nitrogen originates from the answer for question (*h*)	
w- Chen's test is a special test for	
x- A solvent not suitable for extraction of the alkaloid described in sentence (*w*).	
y- The optical rotation of pseudoephedrine is	

PART II (Volatile Oils.....55 min., 120 Points)

You are provided with 50 statements, please select only one correct answer by marking in the blank space corresponding to each of the statements in the enclosed answer sheet

1- Purification by re-distillation in order to remove nonvolatile matter and to adjust the proportion of the constituents to the official standard is called:

a- Rectification b- Cohobation c- Fractional distillation
d- Both a & c e- None of them

2- Most of volatile oils are liquid at low temperature Except

a- Cinnamon oil b- Clove oil c- Anise oil d- Rose oil e- Both c & d

3-The best method for preparation of oil of rose is

a- Steam distillation b- Expression method c- Solvent extraction
d- Water distillation e- Both a & d

4- Essential oils of family.....are synthesized and accumulated in secretory cavities

a- Rutaceae b- Myrtaceae c- Both a & b
d- Lauraceae e- Apiaceae (Umbelliferae)

5- Which method (s) which is (are) suitable for preparation of oils of lemon & bergamot?

a- Scarification and expression b- Sponge c- Ecuelle a piquer
d- Expression of rasping e- All of them

6- This apparatus could be used for preparation of:

a- Oils decompose by the action of steam b- Oils lighter than water
c- Oils present in small quantities d- Both a & c e- All of them

7- Supercritical fluid extraction is useful for preparation of volatile oils in case of:

a- Good quality of oil is needed b- Aromatherapy
c- Thermo labiale constituents are present d- Both a & b e- All of them

8- In pneumatic method:

a- The petals are spread across and pressed in
b- Air laden with essential oils is passed through a spray of melted fat
c- Wooden frames each enclosing a sheet of glass are used
d- Both a & c e- All of them

9- The following essential oil could be occurred in glycosidal combination:

a- Allyl isothiocyanate b- Gein c- Sinigrin d- Gaultherin e- All of them except a

10- This apparatus is used for:

a- Quality control of volatile oils b- Determination of volatile oils
c- Both a & b d- Preparation of volatile oils e- Oils lighter than water

11- ..... is a potent antimicrobial oil used in aromatherapy

a- Sandalwood b- Tea tree c- Eucalyptus
d- Rose e- Neroli

12- Camphor, chamomile, , peppermint, rosemary and wintergreen blend could be used in aromatherapy for treatment of:

a- Alzheimer's b- Back Pain c- Arthritis d- Hypertension e- Cough

13- Compound No. 1:

a- Could be synthesized starting with m-cresol b- Has anti-inflammatory activity

c- Has Gastroprotective effect d- Both a & c e- All of them

14- Compound No. 2:

a- Provide a possible novel approach for treating and preventing UV- induced melanogenesis

b- Could be synthesized starting from anisole and propionaldehyde

c- Induce apoptosis in human breast cancer cells

d- All of them e- Both b & c

15- Compound No..... should be handled as a carcinogen with extreme caution

a- (1) b- (2) c- (3) d- (4) e- (5)

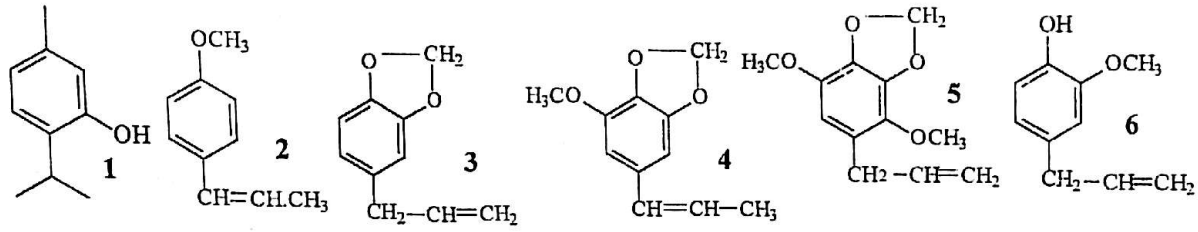
16- Compound No. 4:

a- Could be isolated by cooling at low temperature b- Has psychotropic activity

c- Occurs mainly in nutmeg butter d- Both a & b e- Both b & c

17- Compound No. ..... is a better substitute for Asprin.

a- (1) b- (2) c- (5) d- (6) e- None of them



18- In aromatherapy, all of the following are true Except:

a- Olfactory bulb and neurons are stimulated

b- Oils interact with body's hormones and enzymes

c- Oils stimulate the body to produce pain-fighting substances

d- The oils may be massaged on the skin e- The oils are taken orally in case of children

19- In the following aromatherapy blend:

2 tablespoons (30g) virgin coconut oil/ 1/3 cup (75ml) jojoba or olive oil/15 drops Eucalyptus essential oil/7 drops Peppermint essential oil/2 drops Cedarwood essential oil/1 drop Thyme essential oil

a- Coconut and Jojoba oils are better to replace with Grapeseed oil

b- Thyme oil may be avoided in special cases c- Both a & b

d- Could be used for cough e- All of them

20- The following oils are not recommended in aromatherapy Except:

a- Onion b- Horseradish c- Grapefruit d- Wintergreen e- Cinnamon

21- Rosemary oil is used in aromatherapy for:

a- Hypertension b- Hypotension c- Alopecia d- Both b & c e- Both a & c

22- Compound No. (7):

a- Can be obtained from citral by reduction

b- Can be isolated from compound **(8)** using Gildemeister and Hoffmann`s Procedure

c- Acts as a synergistic agent along with some conventional drugs

d- All of them e- Both b & c

23- Compound No. (8):

a- Obtained by oxidation of linalool and geraniol

b- Occurs in nature as a mixture of 2 isomers.

c- Optically active compound with lemon like odour d- Both a & b e- Both a & c

24- Compound No. (9):

a- Is the main constituent in Cassia and Cinnamon oils

b- Partially oxidized to a natural antimicrobial agent c- Both a & b

d- A cardioprotective against ischemic myocardial injury e- All of them

25- Compound No. (10):

a- Occurs in Citrus family

b- Extensively used in pharmaceutical and agrochemical industries

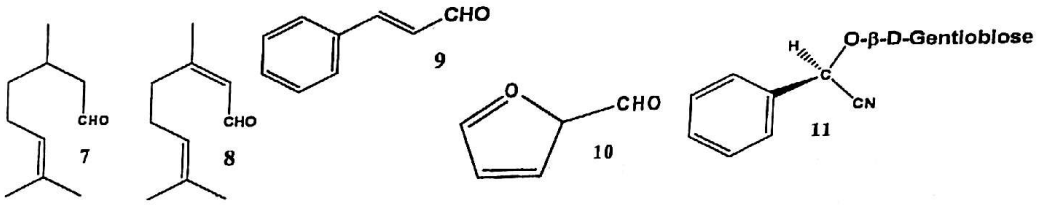
c- Gives –ve result with aniline acetate test d- Both a & c e- None of them

26- Compound No. (11):

a- Gives positive Prussian blue test b- Occurs in Black mustard seed

c- Could be determined using $AgNO_3$ using 10% $KCrO_4$ as indicator

d- Both a & b e- None of them



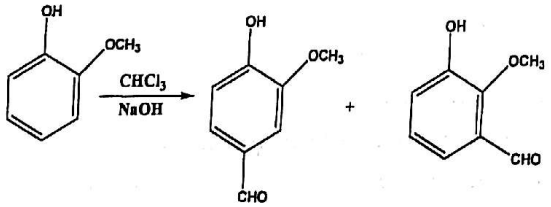
27- How to separate a mixture of citral a and b?

a- Using the reaction with alkaline cyanoacetic acid

b- Using Gildemeister and Hoffmann`s Procedure c- Both a & b

d- Using Reimer Tiemann`s reaction e- None of them

28- The following equation represents:



a- The most economic method for the synthesis of vanillin b- Pyrolysis of lignin

c- Reimer Tiemann`s reaction d- Both a & c e- Both b & c

29- A mixture of ……..can be separated using phthalic anhydride at 200°C.

a- Compounds **(14)** & **(15)**
b- Compounds **(13)** & **(17)**
c- Compounds **(14)** & **(16)**
d- Compounds **(13)** & **(14)**
e- Compounds **(12)** & **(17)**

30- Compound No……occurs in essential oil that is extracted from the green twigs of the bitter orange plant.

a- **(12)**
b- **(13)**
c- **(15)**
d- **(17)**
e- Both **(12)** & **(13)**

31- Compound No. (17) is

a- Insecticidal and repellent properties with low toxicity.
b- Penetration enhancer for transdermal drug delivery.
c- Chemopreventive agent for cancer.
d- Both b & c
e- All of them.

32- A mixture of …… can be separate by heating with $ZnCl_2$ in benzene:

a- Compounds **(14)** & **(15)**
b- Compounds **(13)** & **(17)**
c- Compounds **(14)** & **(16)**
d- Compounds **(13)** & **(14)**
e- Compounds **(12)** & **(17)**

33- …… forms a crystalline derivative with anhydrous $CaCl_2$

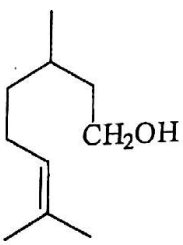
a- **(12)**
b- **(13)**
c- **(15)**
d- **(17)**
e- **(14)**

34-…… Inhibit the nAChR (Nicotinic acetylcholine receptors).

a- **(13)**
b- **(14)**
c- **(15)**
d- **(16)**
e- **(17)**

35- ……..showed dual viricidal activity against herpes simplex virus1(HSV-1).

a- **(14)**
b- **(15)**
c- **(16)**
d- **(17)**
e- **(18)**



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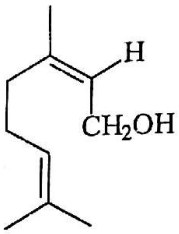

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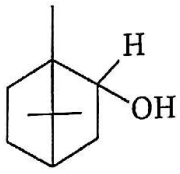

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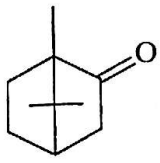

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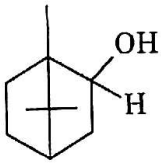

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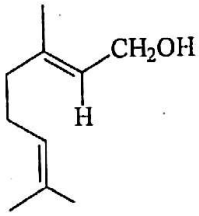
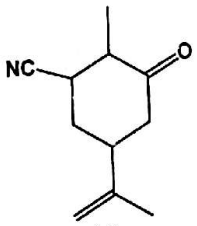


17

36- …… has / have anticonvulsant activity.

a- **(12)**
b- **(17)**
c- **(18)**
d- Both **(12)** & **(18)**
e- Both **(13)** & **(18)**



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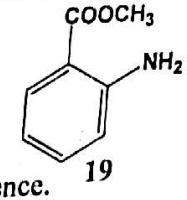


19

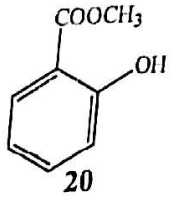
37- Compound No. (19) is all of the following Except

a- It occurs in ylang ylang oil.

b- It is isolated by shaking the oil with dil HCl.

c- It forms picrate needles derivatives. d- It has a blue-violet fluorescence.

e- It has antifungal activity.



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38- Compound No. (20)

a- Is prepared from *Gaultheria procumbens* by enzyme hydrolysis

b- Gives red violet color with $FeCl_3$.

c- Is a natural substitute of asprin

d- Both a & b e- All of them.

39- Mixture of borneol and camphor can be separated by....

a- Camphor form an ester with phthalic or succinic acids.

b- Borneol form non-volatile esters with benzoic or stearic anhydride.

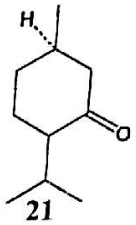
c- Camphor + $NH_2OH \rightarrow$ oxime which is soluble in 25% H_2SO_4.

d- Both b & c e- All of them.

40- .....is / are used in urinary disorders (diuretic and antiseptic).

a- α-santalol b- β-santalol c- Diosphenol

d- Both a & c e- All of them.



21

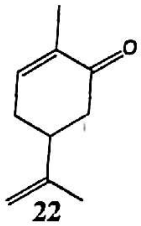
41- Compound No. (21)

a- Penetration enhancer in percutaneous absorption of tamoxifen.

b- Is used in the synthesis of menthol.

c- Thiosemicarbazone and semicarbazone derivatives have anti-HIV activity.

d- Both a & c e- All of them.



22

42- Compound No. (22)

a- l-form occurs in spearmint oil (*Mentha spicata*).

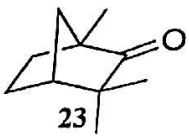
b- Is used in the synthesis of the terpenoid quassin.

c- Has anticonvulsant effect.

d- Is used in treatment of mucupurulent infections.

e- All except c

43- N-acyl compounds derived from (−) isomer of compound No. (23)



23

a- Has acaricidal activity.

b- Has anti-HIV activity.

c- Is used in treatment of mucupurulent infections.

d- Has antituberculosis activity.

e- All of them.

44- Compound No. (23)

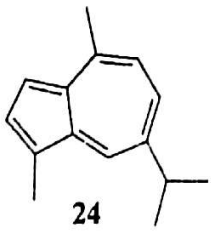
a- Is 1,3,3-trimethylbicyclo[2.2.1]heptan-2-one

b- Is 1,7,7-trimethylbicyclo[2.2.1]heptan-2-one

c- d-form occurs in fennel oil.

d- Both a & c e- Both b & c

45- Compound No. (24)



24

a- Forms additive compound with phosphoric acid regenerated by water.

b- Is phototoxic when exposed to sunlight.

c- Is a popular ingredient in cosmetic, skin, and body care products.

d- Both b & c

e- All of them.

46- .....inhibit (s) the growth of infectious endocarditis causing Gram-positive bacteria.

a- α-Pinene

b- β-Pinene

c- α-Pinene + β-Pinene

d- p-cymene

e- Limonene

47- Cocking & Hymas method is used for determination of:

a- **(24)**

b- **(27)**

c- **(26)**

d- **(29)**

e- **(28)**

48- Compound No. (25) is

a- Prepared by enzymatic hydrolysis of the defatted white mustard seeds.

b- Gives allyl cyanamide when treated in alcoholic solution with excess ammonia.

c- Is a war gas.

d- Determined using ammonia and know excess standard $AgNO_3$ solution.

e- Both c & d

49- 1 drop of .....+ 1 drop of 50% resorcinol solution ⟶ leaf-like crystals.

a- **(24)**

b- **(25)**

c- **(26)**

d- **(27)**

e- **(28)**

50- Regardig to the bisulfite method for determination of aldehydes and ketones:

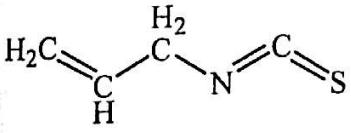
a- The non-aldehydic portion of the oil separates as an oily layer measured by cassia flask.

b- Can be used for menthone and camphor.

c- Is known as an absorption process.

d- Both a & b

e- Both a & c



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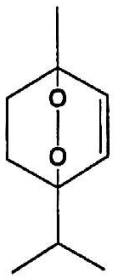

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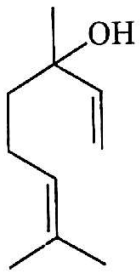

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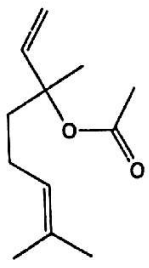
28



29

Answer sheet

No.	a	b	c	d	e	No.	a	b	c	d	e
1						26					
2						27					
3						28					
4						29					
5						30					
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23						48					
24						49					
25						50					

Good Luck