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USE OF CAI LEARNING MODEL FOR COMMUNICATION OF CHEMISTRY [ORGANIC AND OTHER BRANCHES] AT HIGHER SECONDARY, U.G. & ENGINEERING LEVELS

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ABSTRACT:-

Computer Assisted Instruction (CAI) reference to those application of computers instruction where a student engages in a dialogues with a computer programme to achieve a well defined and measurable un derstanding or skill. Tutorial provides interactive h elp on assigned homework, problems, Built in drill and remedial review ensure that students achieve understanding of the reasoning leading to problem solution as well as o btaining the correct answer, objective directed tutorial and drill complements, Suppl ements or replaces lecture and text book study on a specific topic like 'SN' reactions, Conversion of Methane to Carboxylic acids to Amides t o Amines to Alcohols to Esters to Ethers to iodides etc. A student selects a learning objectives or concept tha t part of the course and "CAI' programme tutors, quizzes the students on the Chemistry. Appropriate drill, review and re mediation are included, Prelab CAI, Post lab CAI, lab extension CAI, Strategies in CAI, Tutorial CAI, Present -in form (Ex positron material in small segments). This technique is very much use full for higher secondary, UG and PG level students. Preparation of notes, practicing Organic Synthetic reactions etc. is useful by CAI.

KEYWORDS:

Computer, CAI, Prelab, Post lab CAI, Expository materi als Indole, Benzofuran, Vent -Hoff's formula Opticalisomers, Achiral and chiral carbons, PPL, Enantiomers, X , EPD, Programme logic Prologue, Di atiomic, Bachk-Tracking Transformatiiob, T, S, R, i, r, p t D, H, T, Synthetic, Enantiomers.

1.1 INTRODUCTION

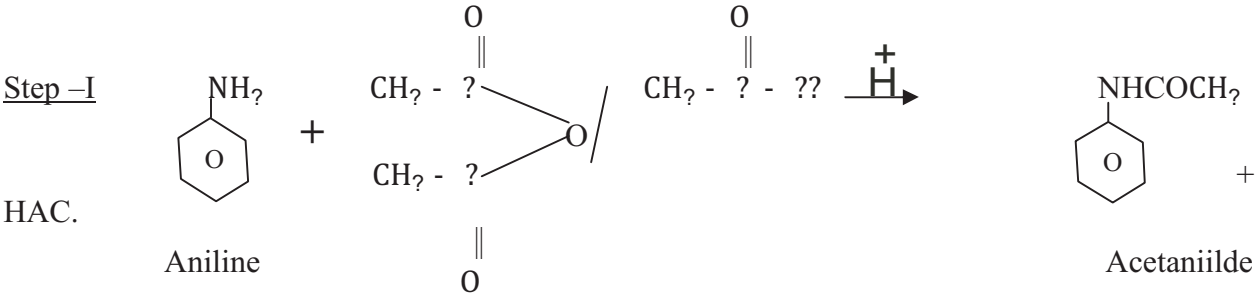
A computer programme to achieve a well defined and measurable understanding or skill. A computer system that can accommodate a large number of such interactive programme all of which are readily ac cessible to Organic Chemistry (including other branches like Inorganic Physical, Polymer, Industrial chemistry). The ability of

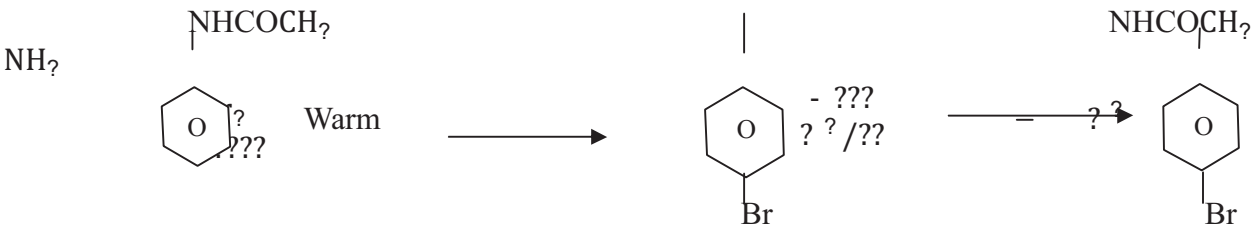
a Computer to engage in a dialogue about some specific topic like syntheses of Carboxylicacids, Ind ole, Benzofuran, other Heterocyclic compounds, Carbohydrates, mechanism li ke F.C.R., Fries rearrangements, Michal, Rosenmunds, keto-enol-tautomerism etc, Practical theoretical, Calculations, Graphs, Molecular structures can be used in different ways and CAI profoundly has been incorporated successfully into Chemistry.

1.2 CAI.

Especially in laboratory, students are required to assemble apparatus take reading and compute and interpret results before doing the same things in the Chemistry laboratory. This ensures benefit fr om the laboratory. Let us take the preparation of P-bromo-Acetanilide from Aniline. Students are set the apparatus in such manner that to the R.B.F., fix Air condensser and supplying heat to the R.B.F. Mean while Acetic anhyried / Acet yl chloride were added warm and power the reaction mixture to the ice -cold ba th and crystallized in hot water to give white crystalline product further it is used for bromination in gly HAC and boil and then allow to cool an d transfer to ice-cold water bath to form crude product of P.Bromo Acetanilide to P-bromo Aniline.

The reaction:





This is feeded in Computer a techniques as CA I, students were getting the experimental ideas setting of laboratory apparatus, skills etc.

1.3 POST LAB CAI:

This technique allows a students to enter experimental results into the computer for verification of the reasonableness of the data check on correctness of the data check on correctness of calculations, di scussions the measuring of the results. It is used into estimation of the results. It is used into estimation of Aniline/Phenol/D-

Glucose/ Nitrogen for finding the C.B.R. of Back/Blank titration and calculation of the amount of Aniline/ Phenol/ Glucose from the supplied solution. These functions can be rapidly and accurately performed by the CAI in most cases allowing the instructor time to discuss specific individual problem with students.

1.4 LAB EXTENSION CAI

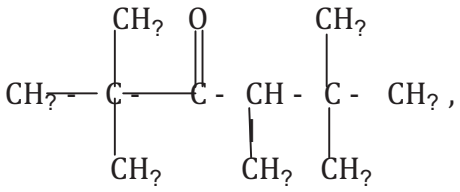
Experiments that students have already performed in the laboratory can obtain an feeling for the pro perties of materials of the effects of changing experimental conditions even though an expe riment may be time consuming or requires too much equipment to be reported. Lab substitute CAI has been used to simulate experim ents that cannot be run in the laboratory because they are too difficult (ex. Estimation of Nitrogen by Kjeldh al's Method, Ether separation of volatile substance [Organic Mixture]) because of accuracy, such as ignoring the net change of the ion and might choose examples that check whether the error is repeated. Even these simple examples represent a major advance over what would be possible without CAI ordinary classroom drills are time consuming. The teacher and students not readily practice drill.

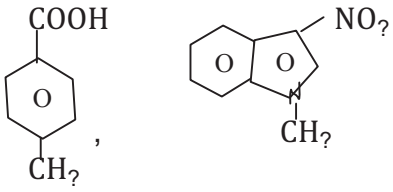
1.5 TUTORIAL CAI PRESENTS

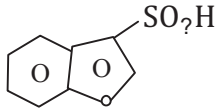
The students are active participation is required for example, students can develop the basic idea of the common nomenclature system by extension of their knowledge of the names of simple Organic Compounds in Organic Chemistry. Interaction outlined below starts by asking for the name of

?? ? - ?? ? Then add the names of new group ? ? ? ? and asks the students to develop the name of

?) ?? ? - ?? ? - ?? ? - ?? ?, ii) ?? ? - ?? ? - ? - ?? ?

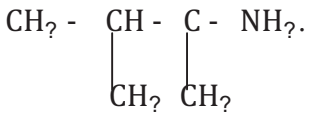
iii) 

iv) 

v) 

COMPUTER

The names of many Organic Compounds are simply derived from the groups or atoms which must be assembled to form the molecule. What is the name of



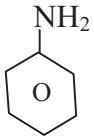
STUDENT

2, amino, 2, 3, dimethyl,n-butane. **Or** But [2' 3, dimethyl] an-2- amine.

COMPUTER

When $-NH_2$ group attached to the compound of Benzene what is its structure ?

STUDENT



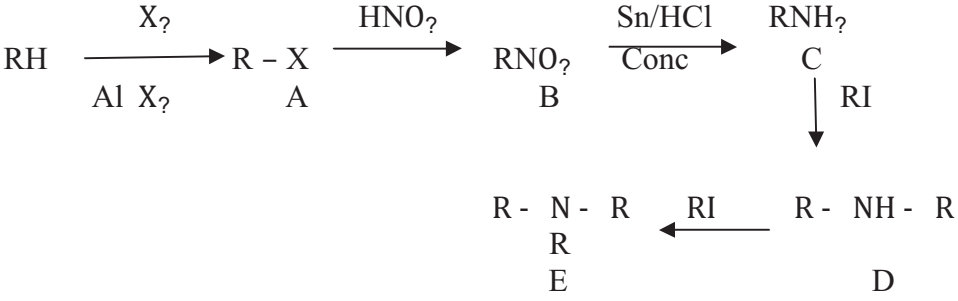
Name is Aniline.

---------- etc. This type dialogue does not help student to give the expected response.

1.6 IMPLEMENTATION OF CAI

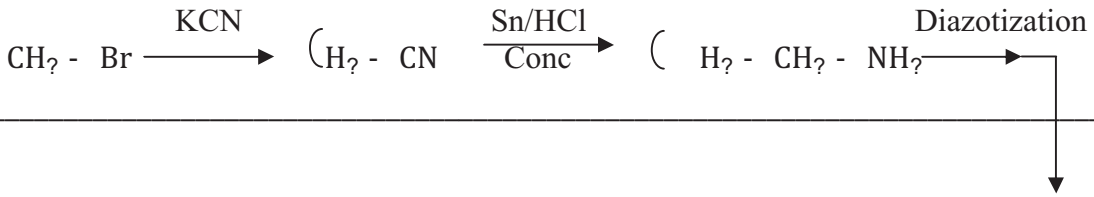
Avery inportant feature of any 'CAI' Programme is the anticipated correct answer. The experienced teacher can predict a number of errors that students may make and the computer should recognize the errors print an appropriate comment and permit the student to try again. In most cases there will be several anticipeted correct answers, with unique comment. It is quite easy to programme a computer buld on the correct portion of the students solution by recognizing and correcting common errors. The conversion of Alkane to Tertiary amine.

Reaction Set No. I:

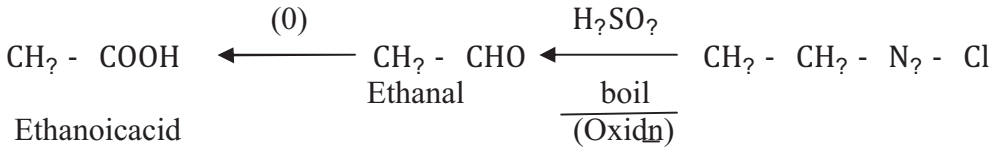


Name the 'E' product from the set - I series of reaction and what is its I.U.P.A.C Name? The procedure in above said reactions imposes particular way of working problem on a student. If the chart helps him and it does not contain unanticipated errors. Other typical CAI programmes are illustrated in

Reaction Set No. II:

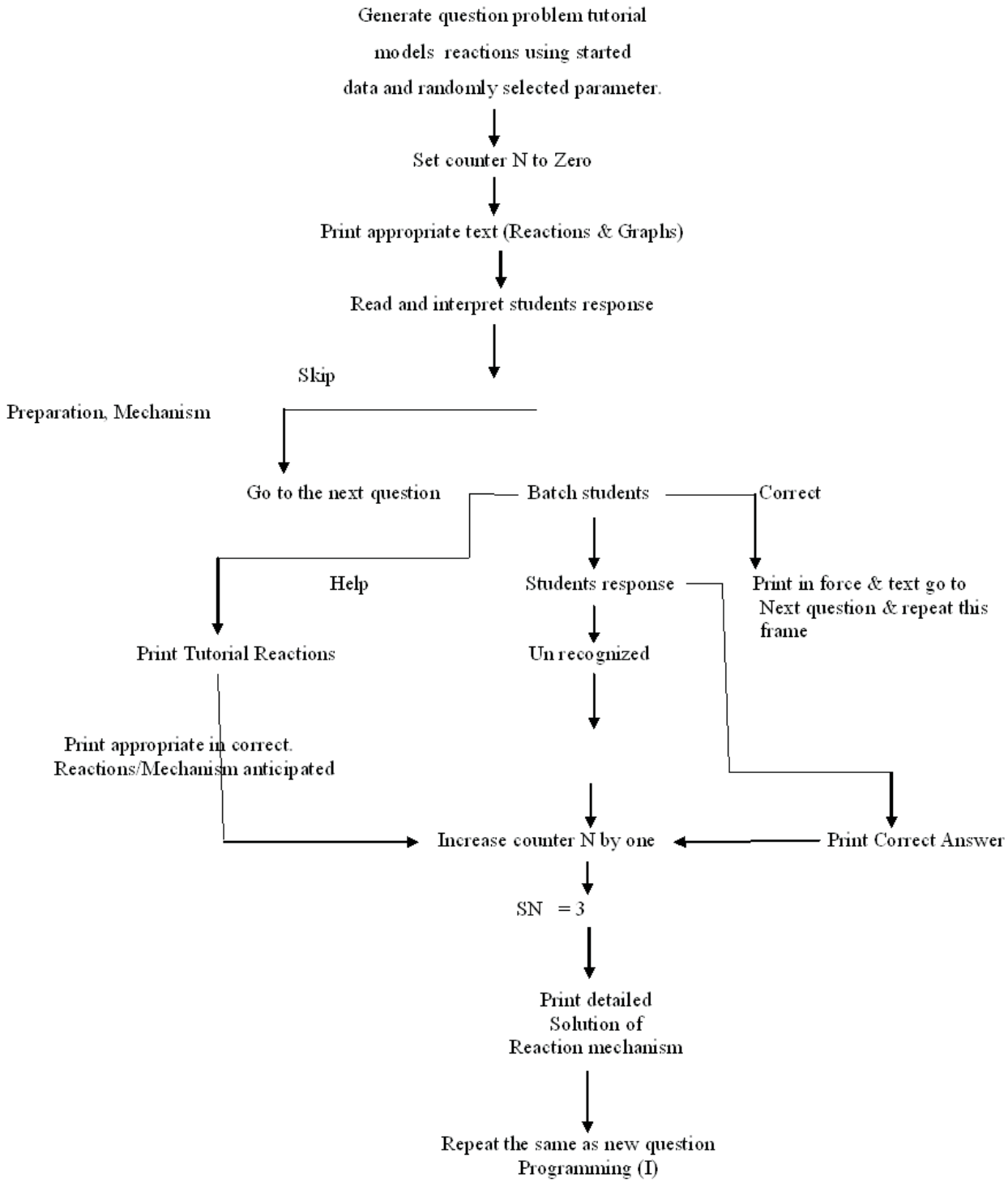


aq/alc



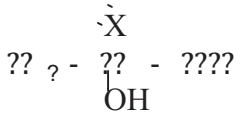
The student can initiate a branch to the quiz question by responding skip or obtain a marge detailed Programme using help of counter, keeps track of how many times the students h as attempted to answer the question after the third try a detailed answer is given and a new problem of the same type is generated in th e case of more complicated in Complex reactions in correct responses might be to branch to a model upon the comple tion of such model the programme return to new problem of the type that had caused difficult previously a brief i llustration of how a programme would interact with student of the drill on molecular formula, functional groups, se ries of reactions.

1.7 PROGRAMME



A possible CAI branching strategy is used to prepare Periodic table and ask the name of the Carbon i n the Periodic table. The response of Carbon would cause the Computer to print good or ok to flag carbon in the data file so it will not be selected a gain and to present the symbol for another element in a Periodic table in correct response to 'C' is an unanticipated response might cause the Computer to give the correct answer without flagging the symbol

in the data file the response help might do the s ame thing although for same symbols these based Latin names for example, Auaurriummore easily explain by using Computer CAI with example of Optical isomerism of Lactic acid

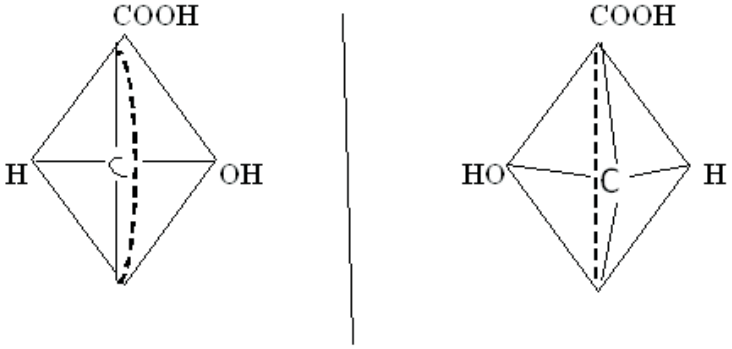


i) Star (Astric mark) indicates the asymmetric carbon.
ii) X = $2^?$ by Label-Vent - Hoff's formula
X = Optical active isomers
n = Number of asymmetric Carbon
X = $2^?$ ∴n = 1.
X = 2 Optical isomerspossible.

St _ I St _ II

d (+) l ( )

OR

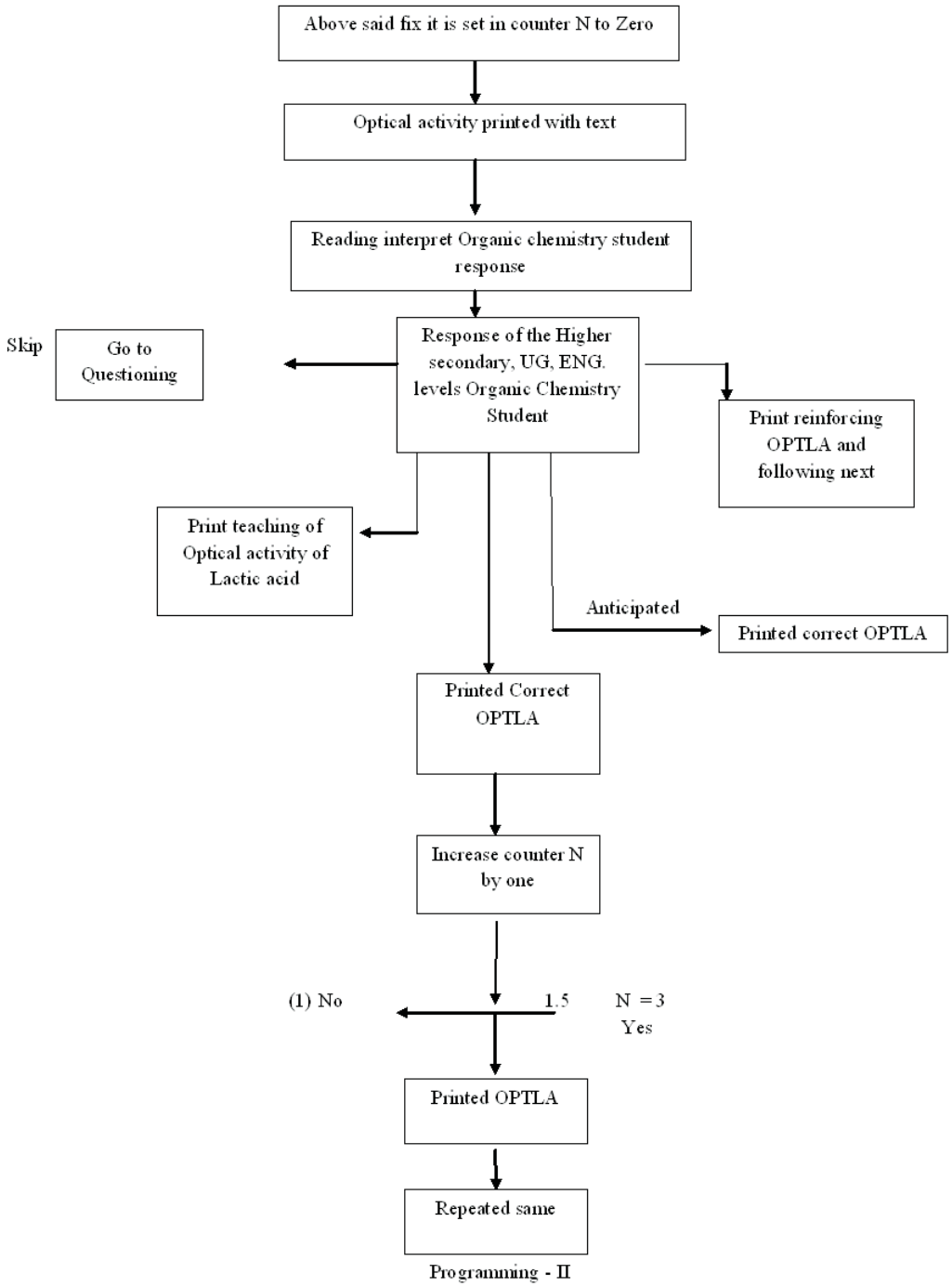


St _ I St _ II

d (+) (-)

iii) St? I rotates the PPL [Plane of Polarized light to the right] is called dextrorotatory compounds (d).
iv) St? rotates the PPL to the lelt (Anti clock wise) direction, laevorotatory compound (l)
v) St? I and St? II is called enantiomers.

vi) Equal amounts of St ? I and St ?II form is known as racemic mixture (optical in active). This is explaining with the help of programming II.



Programming - II

1.8 PROLOGUE PROGRAMMING LOGIC

Prologue is a language that created by the grouped intelligence Artifcial of Marseillein 1972 in an attempt to incorporated in Computer language the latest development is mathematical logic by the Robinson Princ iple of

resolution. The language gave rise to considerable interest with the artificialintelligence. It is used for understanding of the following examples :

Describing Facts and Rules

Ex :

Alcohol (-O H) ---------- :-

Alcohol is called the predict and OH alcohol, arrangement both are identifies and the combination of the two is a term. It predict [that alcohol liquid/solid] state [Alcohol-OH].

The respose to this query would be - ?? ?? = liquid/Solid

Prologue, would findvalues, unless it were specifically instructed, that one solution its required. Searching for all possible solution is achieved though a fundamental operation of Prologue called"Bachk tracking"

Alcohol (- ??): ⟶

Phenol (- ??): ⟶

State Alchol liquid ⟶ :

……

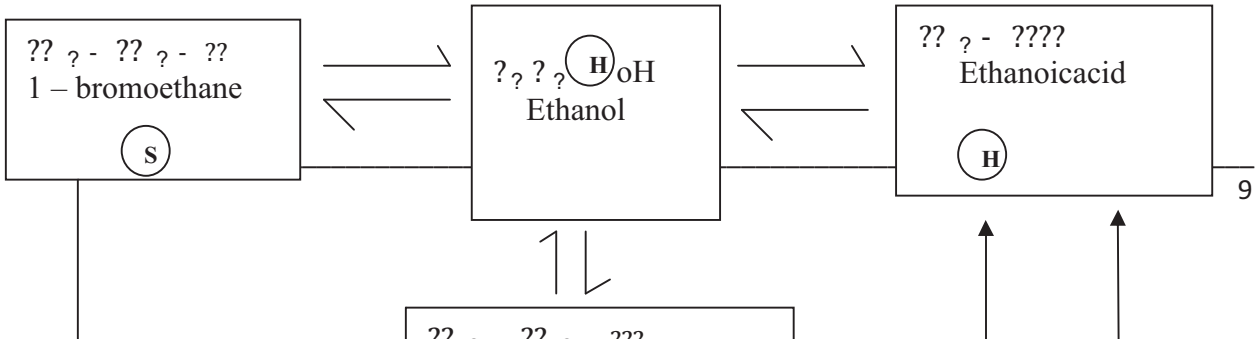
……

The query Alcohol – ?? would give Neutral, Acidic as answers. The facts as stated above not dependent on any other conditions. There is nothing on the right of the arrow, but one may write a clause condition on the right of the arrow such as :

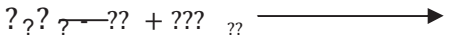
Mono hydroxyl (- ??) ⟶ OH :

Which is read; ' OH' is monohydroxy if - 'OH' is a Alcohol i.e. any value of - ?? will satisfy the term monohydroxy (- ??) If it satisfy the term Alcohol. Prologue is an deductive -rule, Prologue are to be asked to identify the solid, liquids, gases, semi solids, semliquids, functional group (s) is a very efficient language for writing data. This is demonstrated by the graph of the functional group transformation.

Convert (S.T.) ⟶ Path T,R (nils),



S = Starting Compound
T ort = Target group (Product or Tail of list)
r Or R = Reagent
H = intermediate
Data Rection:



This technique can be proved by conducting test and highlighted by graphs.

1.9 CONCLUSION

Communication through 'CAI' Progrmme is more significant in chemistry (Organic & other branches) tea ching at higher secondary, U.G., and Engineering levels.

- It is effective for five to Ten Students.
- Learners are unable to follows logic.
- Symbols, Reactions, Reaction -Mechanism, Theorietical and Conversions, transformations, Constitutions etc. are well predicted.
- (Computer) 'C A I's' are monetirising by master computers so it is helpful teaching technique in Science, Teachnalogy& Engineering for learners.
- It is applicable to Science, Engineering, Agricultural, Medical, Social Science fields.
- It is effective and efficient teaching technique which give empathy knowledge for learners.
- It helps for easy to coverthe syllabus and repeatation.
- It helps to reduce over burdining to learners.
- Learners are more easily operate, easily understand and easy to score their marks.

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