Maa Bharti P.G. College, Kota

Session 2021-22

Submitted by:

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Class: M.Sc. Chemistry II Sem

Subject: Physical Chemistry

Topic: Partial Molar Quantities

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B Sharma 18/8/22

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Acknowledgement

i would like to express my special thanks of gratitude to my teacher as well as our principal who gave me the golden opportunity to do this wonderful project on the topic (partial molar quantities)

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Partial molar Quantities

partial molar quantities can be succinctly described as the effect that a change in a single component has on the particular thermodynamic property.

Partial Molar Volume:-

the molar volume of water Vm is about 18 cm3/mol. Thus, if we add a mole of water to a larger body of water, it's volume will increase by 18 cm3. However, if we add that same amount of water to a large volume of ethanol the total volume will only increase by 14 cm3.

In general, partial molar volumes do not remain constant if the composition of the mixture changes. However, since V is a state function, the final equation should be valid no matter how the solution was prepared.

While volumes are always positive, partial molar volumes need not be. for example, the partial molar volume of $MgSO_4$ in a large volume of water is –1.4 cm3/mol. This means that as we add this salt to water, the volume actually goes down.

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This makes sense if we recall that the ordering effect of solvation tends to reduce the volume of the solvent and in this case, the solid solute contributes very little. So the net effect is a small reduction of the total volume.

Partial Molar Gibbs Energy:-

We have already seen this quantity if the form of a chemical potential. The additional factor is that there are more than one components in the state in question, thus, for component j of the mixture.

The chemical potential of a substance is the slope of the total Gibbs energy of a mixture with respect to the amount of substance of interest. In general, the chemical potential varies with composition, as shown for the two values at a and b. In this case, both chemical potentials are positive.

Under constant temperature and pressure, The change is Gibbs energy can be replaced by the maximum additional (non-expansion) work available from the system wadd,max. So

This latter equation is useful for determining the work we can extract from an electrochemical process as the composition changes, for example.

We recall the Gibbs defining equation can be written as $G = U + pV - TS$. Thus, we can write $U = -pV + TS + G$. The equation for an infinitesimal change in U is.....

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We recall the Gibbs defining equation can be written as $G = U + pV - TS$. Thus, we can write $U = -pV + TS + G$. The equation for an infinitesimal change in U is.....

dU

= –pdV – Vdp + SdT + T dS + dG
= –pdV – Vdp + SdT + T dS + (Vdp – SdT + mAdnA + mB dnB + ...)

= –pdV + T dS + mAdnA + mB dnB + ...

and, for constant volume and entropy,

= mAdnA + mB dnB + ...

Thermodynamics of Mixing

Consider two ideal gases, A and B with amounts nA and nB , respectively both at temperature T and pressure p. The chemical potential for each pure gas can be calculated via equation 5.4 where, by comparing with equation 4.47 and substituting m directly for Gm. we get In this case, m^o is the chemical potential of the pure substance at standard pressure p^o (= 1 bar). Thus, the Gibbs energy for the system is given using equation

After mixing, the individual partial pressures change because of the change in volumes so we get
After mixing, the change in Gibbs energy can be easily determined as Now, we replace pi/p with xi and ni with xin

The Chemical Potential of Liquids

We need to understand the way Gibbs energy changes with composition. These concepts will be important in understanding chemical equilibrium

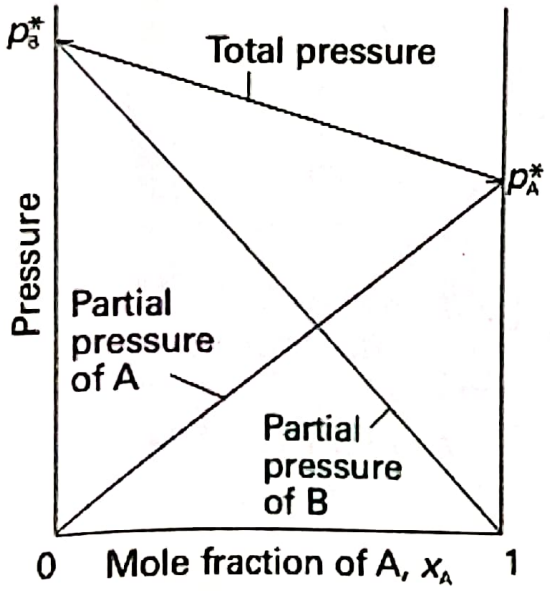
Ideal Solutions

We will designate thermodynamic properties of pure substances with an asterisk *.

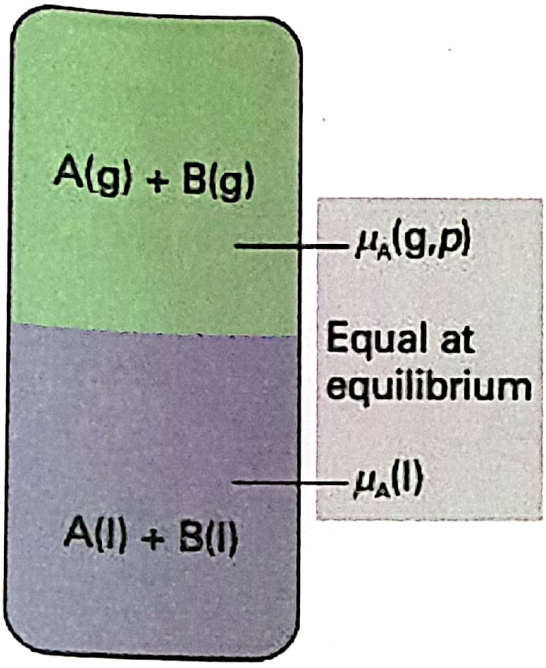
Thus, the chemical potential of pure A at non standard conditions is

If there is a second substance present then the equation reverts back to equation 6.14 (without the *).

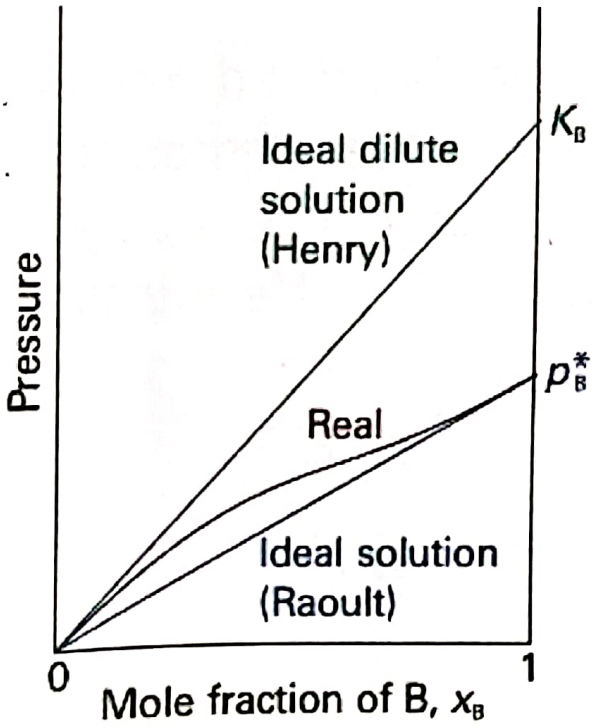
We can combine these two equations to eliminate the need for the standard conditions.



Now, if our system is that of a gas in equilibrium with a liquid, the pressures are vapour pressures, pA*, being the vapour pressure of the pure liquid A and p being the vapour pressure of A in solution.

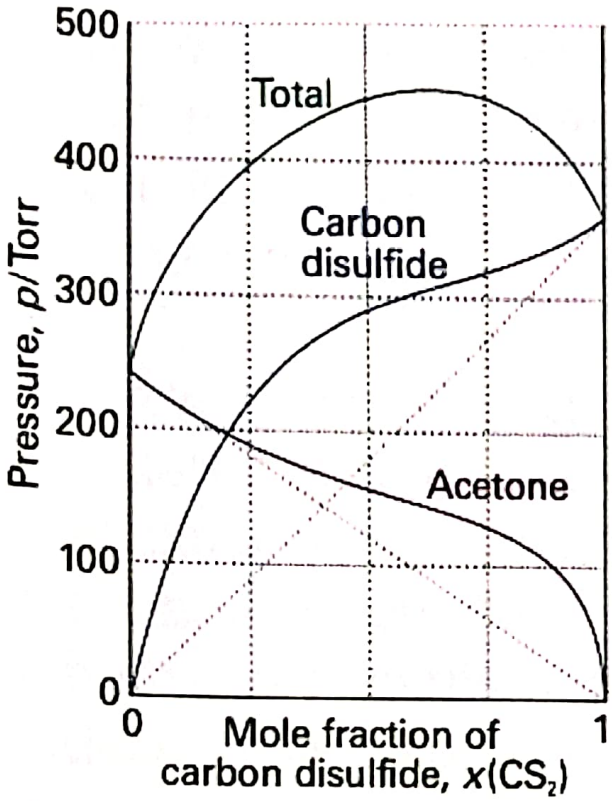


Raoult's Law states that the partial pressure of a vapour component in equilibrium with it's solution is proportional to the mole fraction in solution, pA = c pA*. Thus, we can rewrite equation



Ideal dilute solutions:-

While most solutions do not obey this law exactly, the quality of the fit between experiment and this law improves as the mixture tends to purity of the given component.



On the other hand, solutions that are very dilute in the given component can also be approximated by a straight line; just not the same slope (constant of proportionality). Such solutions follow Henry's Law.

Some solutions deviate quite far from Raoult's Law to the extent that they have a maximum or minimum in the vapour pressure at some intermediate concentration.

Consider the solution of carbon disulfide with acetone. The intermolecular forces of the solution are significantly reduced compared to the individual pure liquids and hence, the vapour pressures are increased for both components well above what Raoult's Law predicts. This solution is quite far from ideal behaviour.

Example:

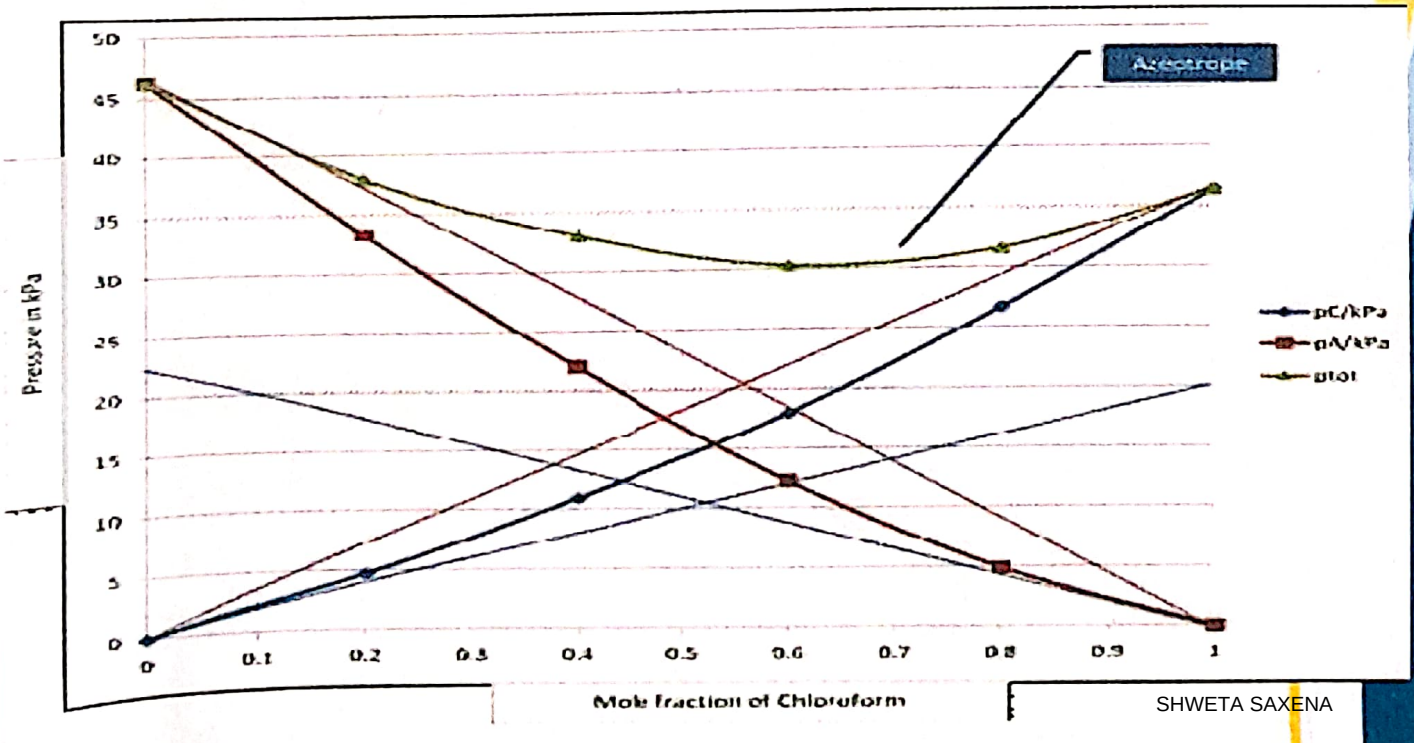
A series of solutions of propanone (acetone) and trichloromethane (chloroform) were measured at 35°C. The following vapour pressures were measured.

xc	0	0.20	0.40	0.60	0.80	1
pC/kPa	0	4.7	11	18	26.7	36.4
pA/kPa	46.3	33.3	22	12.3	4.9	0

What is Henry's Law constants for acetone and chloroform in this solution and show that the solution behaves like Raoult's law for dilute solutions.

By plotting the data and tracing straight lines along Raoult's Law positions (red), we see that the solution follows Raoult's Law best when the particular component is nearly pure.

When the given component is very dilute, the line does not follow Raoult's Law but can still be approximated by straight lines (blue). The two slopes (K constants) are approximately 23.3 for acetone and 22.0 for chloroform.



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1. www.google.com
2. ncert
3. advanced physical chemistry book

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Maa Bharti P.G. College

Session:- 2022-23

Name : Kanika Prajapati

Class : M.Sc. II nd Sem.

Deparment : Chemistry

Topic : Drugs And Alcohol Addiction

Submited to: (Shamu)
Dr. Shamu Mathur mam

Submited by:
Kanika prajapati

CERTIFICATE

This is to certify that this "Chemistry Investigatory Project" on the topic "Drug Addiction" has been successfully completed by kanika Prajapati of class M.Sc. chemistry IInd sem. under the guidance of Mrs. Shani mathur mam in paticular fulfilment of the curriculum of university of kota.

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ACKNOWLEDGEMENTS

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals.

I would like to thank my principal Dr. Shweta Saxena and college for providing me with facilities to do my project.

I am highly indebted to my chemistry teacher Mrs. shanu mathur mam for her invaluable guidance which has sustained my efforts in all the stages of this project work.

I would also like to thank my parents for their support and encouragement.

My thanks and appreciation also go to my fellow classmates and the laboratory assistant in developing the project and to the people who have willingly helped me out with their abilities.

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OBJECTIVE

To Study drugs, their Classification, addictive nature and prevention from addiction.

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PROJECT REPORT ON DRUGS

DEPENDENCE

Drugs are prescribed by physicians for the prevention or treatment of ~~disease~~ diseases, or for increasing the physical and mental performance and are withdrawn as soon as desired effect is achived. Repeated use of certain drugs on a periodic or continuous basis may make the body dependence. Such drugs are called psychotropic drugs. They act on the brain and alter behaviour, consciousness, and capacity of perception. Hence, they are also termed mood-altering drugs. Some people start taking drugs without medical advice due to one reason or the other and become drugs dependent.

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INTRODUCTION TO

"DRUGS ADDICTION"

"Drug Addiction" phrase is made by two words:

(I) Drug
(II) Addiction

What is meant by a drug?

Any substance, other than food, used in the prevention, diagnosis all aviation or treatment of a disease is called a drug. A drug may also be defined as a chemical which, when taken is some way after the body function. The drugs is also know as a medicien. Generally, the term drugs applied to any stimulating or depressing substance that can be habitaating or addictive.

Meaning of Addition:-

Addidion is the habitual, psychological and physialogical dependence on a substance or practice. which is beyond Voluntary Contral. A person whom is habitual to a substance or a practise, especilly a harmfull one, is called an addict.

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CLASSIFICATION of DRUGS

There are a large number of drugs on which people become dependent. These are classification into four major groups: Sedative and tranquilizers. Opiate narcotics stimulants and hallucinogens.

Types OF Drug	Examples	Effect
Sedative and Tranquillizers	Barbiturates, Benzodiazepines	Depress CNS activity gives a feeling of calmness, relaxation drowsiness.
Opiate Narcotics	Opium, Morphine Codeine, Heroin	Suppress brain activity relaxed pain.
Stimulant	Amphetamines, Caffeine, Cocaine	Make a person more wakeful, alert and active cause excitement.
Hallucinogens	Lsa, Mescalin, psilocybin, Ganja, Charas, Hashish	Alter throughts feeling, and pre perception

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COMBINATION OF DRUGS AND ALCOHOL

Some addicts use mixtures of drugs to have immediate 'kid' or 'charge'. Simultaneous use of drug and alcohol are taken together, each double the effect of other. A mixture of Cocaine and heroin called speedball gives a spontaneous kicks of cocaine and prolonged pleasure of heroin.

Combination	Effect
1. Alcohol + Barbiturate	Markedly ~~is~~ increased the depressant effect.
2. Alcohol + Antihistamines	Marked drowsiness.
3. Alcohol + Valium	Dramatically increases sedative effects.
4. Alcohol + Marijuana or Hashish	Decrease coordination increased reaction time impaired judgment.
5. Alcohol + Aspirin	Increased changes of damage to gastric mucosa.

How does drug addiction begin ?

Their are many factors that leads people to drug addition.

1. Curiosity: frequent references to drugs by public media create curisity for having a personal experience of the drugs.

2. Frustration and Depression: Some people staert taking drugs to get relief from frustration and depression.

3. The desire for more Work: Students some times takes drugs to ~~keep~~ keep awake the whole night to prepare for the examination. It is not desirable as it may cause a mental breakdown.

4. Looking for a different World: A wrong notion that the drugs open up a new world tempts some young ocles to start taking - drugs.

5. Relief from Pain: A prolonged use of pain-relieving drugse with physician's advice at times leads to addition.

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6. Family History: Children may take to drugs by seeing their elders in the family.

7. Excitement and Adventure: The young take to drugs to satisfy their ~~Instict~~ Instinct for excitement and adventure.

SOCIAL DISEASE ~ SMOKING DRINKING AND USE OF DRUGS

Smoking and drinking and use of drugs frequently or regularly are social diseases. They adversely affect the health of the addicts and the socity. Young people take to these habit for fun, show off curiosity, as an advanture or feeling of freedom, or as a gesture of defiance against the elders who themselves indulge in this activities but check the youngesters. Other factors that makes people take to these vices are the inability to face problems of life indifference shown by members of the family and encouragement or pressure by friends.

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A temporary escape from the life problem and mental relaxation felt on taking the drugs in the beginning increase person's interest in them. Soon they become habitual and find in difficult to leaves. The daily dose to get the desired effect increase with time.

As in other countries, the menace of drug addiction is spreading in India also. A large number of our young men and women have taken to intoxicants. About 87.6 ~~percent~~ persent drug addicts are between the ages of 14 and 25 years.

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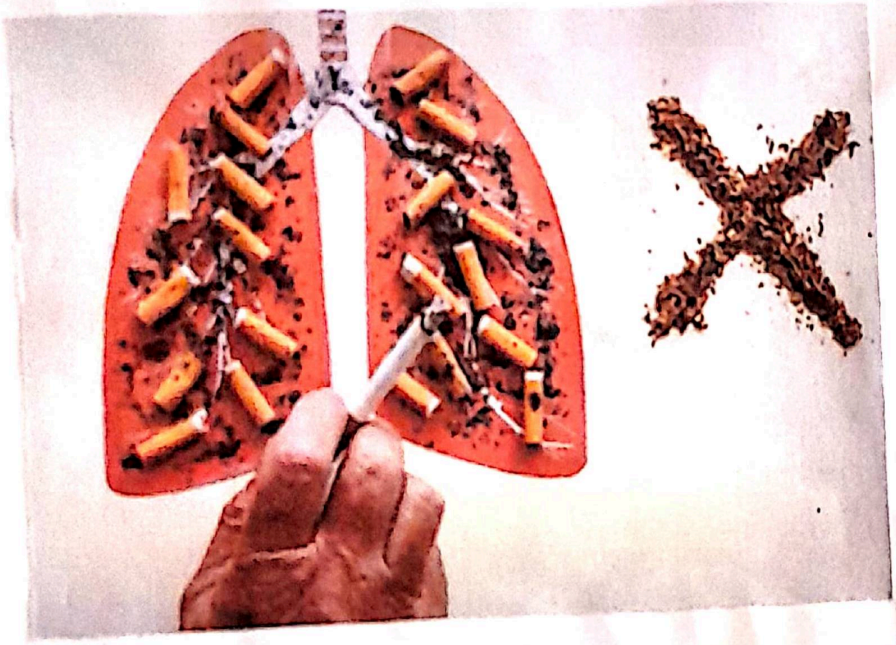

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TOBACCO

Source :

It is a native of south Africa, where the Red India first started Smoking. Now the tobacco plant has spread the would over. it has large quote to lanceolate leaves and terminal clusters of tubular, white or pink flower.

Modes of Use :

Tobacc is used for smoking, Chewing and Snuffing. Its main stimulating component is poisonous Volatile alkaloid nicotine. Inhaling tobacco smoke from cigars. Cigarettes, ~~tidi~~ biddies tobacco wrapped. In a piece of leaf. Tobacco Smoke is drawn directly from the piece of leaf. Tobacco Smoke is draw directly from the pipe and through water is bubble-bubble. Smoking may give some temporay relief to the strained nerves. but in the long run, it proves a dangerous health hazard. The quantity of nicotine Cotained in one day cigar may prove fatal if injected in inhaled.

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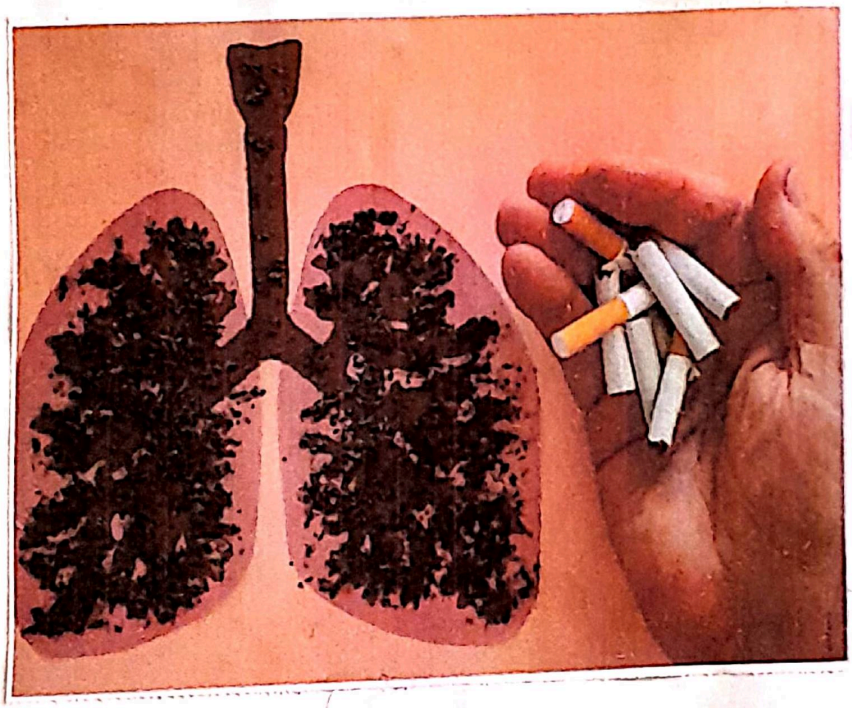

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EFFECT OF NICOTINE :-

Nicotine is a low Concentration,

i) Stimulates Conduction of nerve impulses.
ii) Relaxes the muscles.
iii) Releases adrenaline, increasing heart beat rate and pressure.
iv) Increased blood pressure due to smoking Chances the risk of heart diseases.
v) Retards foetal growth in expecting mothers and.
vi) Causes tobacco addiction. High Concentration of nicotine paralyzers nerve cells.

Other Harmful Components of Tobacco Smoke:
Besides the poisonous nicotine, the tobacco smoke contains carbon - monoxide, polycyclic aromatic hydrocarbons and tar.

Other Effects:-
i) Smoking effects economy:- A smoker not only waste money but also runs the risk burns and fires.
ii) Smoking mars personality: Teeth may become stained lips may get discolored and breath become foul. A person with a cigarette hanging from the mouth looks odd.

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ALCOHOL

Source:

Ethyl alcohol, or ethanol, flammable, colourless liquid having a penetration odour and burning taste. It is one of the products of the distillation of fermented grains, fruit juices and starches with the help of yeast enzymes. It is the principal constitution and the intoxicating principle of wines.

Modes of Use:

Alcohol is taken in low concentration, as the beer, toddy, and wine and in relatively high concentration as arrack, brandy, whiskey rum, gin, vodka etc.

Addiction:

Addiction to alcohol is called alcoholism. Alcoholics are found in all society section of society. Alcohol causes intoxication and thus, acts as a poison. The drinkers begain with small doses, but many of them soon start consuming large doses an becomes addicts.

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Why people Take to Drinking :-

The drinker offers one or more of the following reasons for starting drinking.

i) Social pressure
ii) Desire for excitement.
iii) Feeling of independence
iv) Liking of taste
v) Desire to escape from such realities of life as disappointments and failure and
vi) The desire to offset the hardships and monotony of daily life.

What happen when Alcohol is Consumed?

Alcohol is quickly absorbed in the stomach and upper parts of small intestine and reaches all the tissue in minutes. Its oxidation starts at once and a large amount of heat in produced. since heat in produced. Since heat in produced. Since heat is not needed in the body, it is taken up the blood and carried to the skin for dissipation. Since the receptors of heat are located in the skin. the rush of blood to the skin gives a false impression of warmth in the body. The blood supply of internal organs in greatly reduced resulting in fall of temperature in them.

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CONCLUSIONS

Drugs use and addition causes a lot of diseases and disability in the world. Recent advances in neuroscience may help improve policies to reduce the harm that use of tobacco, alcohol and other psychoactive drugs impose on society.

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