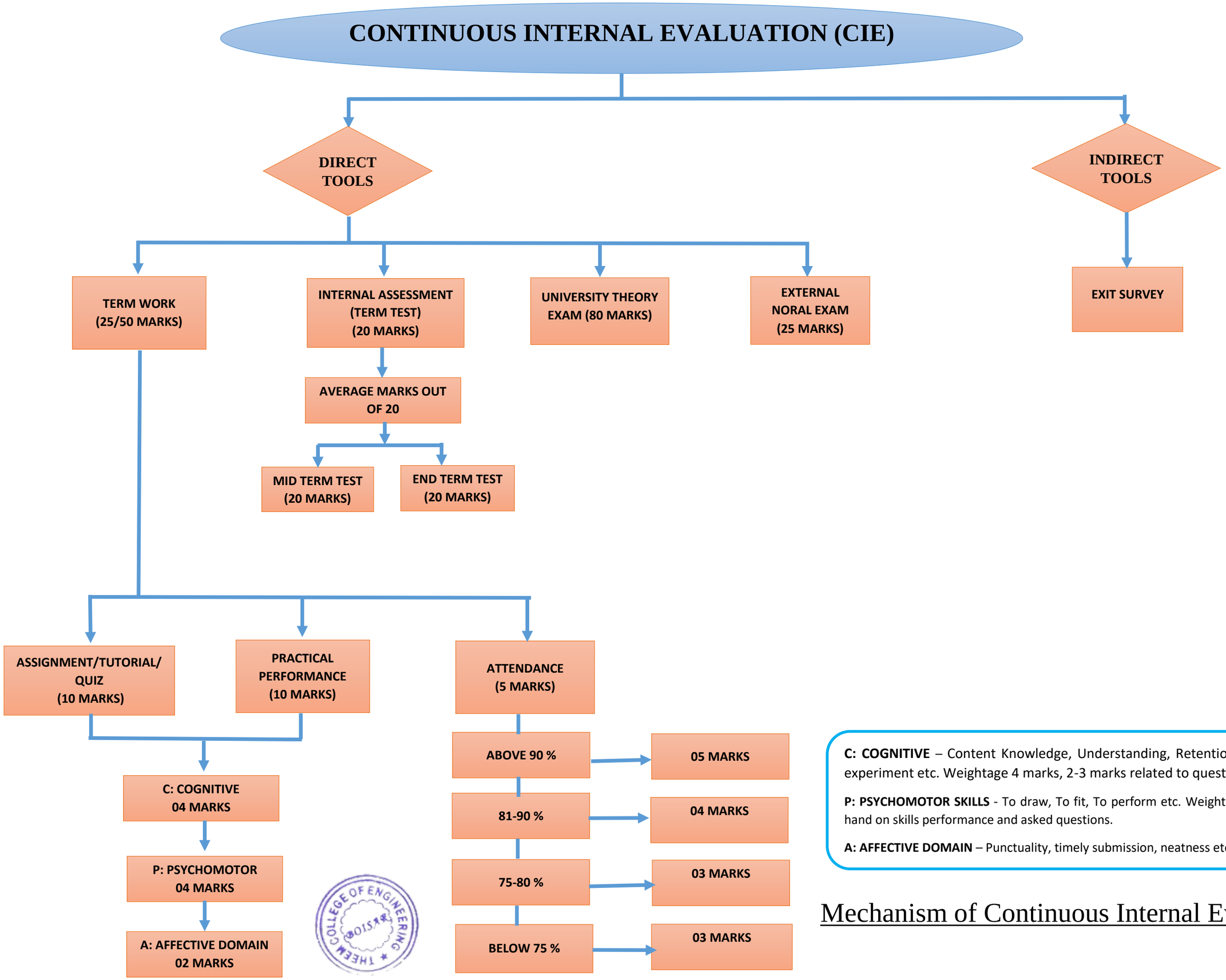

C: COGNITIVE – Content Knowledge, Understanding, Retention parameter of the experiment etc. Weightage 4 marks, 2-3 marks related to question to be asked.

P: PSYCHOMOTOR SKILLS - To draw, To fit, To perform etc. Weightage 4 marks. Observe hand on skills performance and asked questions.

A: AFFECTIVE DOMAIN – Punctuality, timely submission, neatness etc. Weightage 2 marks

Mechanism of Continuous Internal Evaluation (CIE)

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Department of Electronics and Telecommunication Engineering

Continuous assessment
(Experiment /Assignment / Tutorial /Project activity etc.)

- Candidate shall be assessed continuously for his sincerity, punctuality, and discipline along with the understanding of facts, principles, theories and application.
- Term Work and presentation for each practical made by candidates shall be assessed on following parameters.
  C: Cognitive – Content Knowledge, Understanding, Retention parameters of the experiment etc. Weightage 4 marks, 2-3 related questions to be asked.
  P: Psychomotor Skills – To draw, To fit, To perform etc. Weightage 4 marks. Observe hands on skills performance & ask questions.
  A: Affective Domain – Such as punctuality, Timely submissions, Neatness etc, weightage 2 marks.

PARAMETER	C	P	A	Total	Sign. With Date
MARKS OBTAINED					
MAX.MARKS	4	4	2	10	

1. Each practical should be assessed for maximum of 10 marks.
2. Total marks of practical work are calculated at the end of the term and converted to a base as per teaching Examination Scheme.
3. Record of continuous assessment of candidates should be maintained by lecturer in charge and kept in the custody of Head of the Department after completion of the term.
4. Marks obtained by candidate after assessment of each practical work shall be shown to candidate for improvement in subsequent practical.
5. Term work marks shall not be kept confidential. Marks obtained by candidate in term work after continuous assessment shall be displayed on notice board and true marks are sent to MU.

Experiment No. 4: Estimation of copper in brass Iodometrically

R.H.S.

Aim:

To Estimate amount of copper in brass Iodometrically.

Apparatus:

10 ml Pipette, 250 ml conical flask, burette, 250 ml standard measuring flask, filter paper.

Theory:

The chief components of brass are copper & zinc but small quantities of tin & other metals are also usually present. The copper content varies from 50 to 90% copper present in bras is converted to copper sulphate first which in turns is converted in to cuprous iodide. The cuprous iodide solution is titrated with standard sodium thiosulphate solution using starch as an indicator.

Reaction:

- [A] $- Cu + 4HNO_3 \longrightarrow Cu(NO_3)_2 + NO_2 + H_2O$

$Cu(NO_3)_2 \xrightarrow{\Delta} CuO + NO_2$

$CuO + H_2SO_4 \text{ (dil)} \longrightarrow Cu SO_4 + H_2O$

[B] $- 2Cu SO_4 + 4KI \longrightarrow Cu_2I_2 + 2 K_2 SO_4 + I_2$

$I_2 + 2 Na_2S_2O_3 \longrightarrow 2NaI + Na_2S_4O_6$

Reagents:

- 0.1 N (approx), Sodium thiosulphate solution, 10% KI solution, conc. HCl, 0.1N $K_2Cr_2O_7$ solution, acetic acid, solid Na_2CO_3 and starch indicator.

Procedure:

Part: I Standardisation of Sodium Thiosulphate Solution

1. Pipette out 10ml of standard 0.1N $K_2Cr_2O_7$ solution in 250 ml conical flask. Add about 3 ml of conc. HCl and 10ml of 10% KI solution to it. Shake well.
2. Titrate the liberated iodine against 0.1N $Na_2S_2O_3$ solution from the burette using freshly prepared starch indicator till it becomes blue to green.

Reaction:

- $K_2Cr_2O_7 + 14 HCl \longrightarrow 2 KCl + 2CrCl_3 + 3Cl_2 + 7H_2O$

$Cl_2 + 2KI \longrightarrow 2KCl + I_2$

$I_2 + 2 Na_2S_2O_3 \longrightarrow 2NaI + Na_2S_4O_6$

Part: II Estimation Of Copper In Brass

1. Dissolved given sample (accurately weighted) of brass in conc. HNO_3 in 250 ml beaker (This treatment of precipitation tin as metastannic acid but, copper & zinc are dissolved).
2. Metastannic acid is filtered out and the washing is collected in 250 ml beaker.
3. Copper nitrate solution is converted to copper sulphate by evaporating the solution with conc. H_2SO_4 nearly to dryness & extracted with water and diluted to 250ml in standard measuring flask.
4. Pipette out 25ml in standard measuring flask of the diluted solution in a conical flask.
5. Add pinch of solid Na_2CO_3 till it gets slightly turbid.
6. Dissolve the turbidity by adding 2N acetic acid drop wise till it becomes clear.
7. Add 10 ml of 10% KI solution and shake it well. Add starch indicator & titrate it against $Na_2S_2O_3$ solution from the burette till it becomes blue to colourless.

Result:

Normality of sodium Thiosulphate = 0.1 N

Percentage of copper in the given brass sample is 33.86%

.....

L.H.S.

Observation:

Part: I Standardisation of Thiosulphate Solution

Solution in burette	$Na_2S_2O_3$ solution(0.1N)
Pipette solution	10ml $K_2Cr_2O_7$ + 3 ml conc HCl. + 10ml of 10% KI solution.
Indicator	2 drops starch indicator
Endpoint	Blue to peacock green.
Pilot reading	..10. ml to ..11.. ml

Sr.No.	Burette reading			Constant reading (V_1) in ml
	Initial	Final	Diff.	
1	0	10	10	10ml
2	0	10	10	
3	0	10	10	

Calculation:

Part: I

$Na_2S_2O_3 = K_2Cr_2O_7$

$N_1V_1 = N_2V_2$

$N_1 = \frac{N_2V_2}{V_1}$

V_1 = Vol. of Sodium thiosulphate Solution at end point.

N_1 = Normality of Sodium thiosulphate Solution.

V_2 = Vol. of $K_2Cr_2O_7$ Solution.

N_2 = Normality of $K_2Cr_2O_7$ Solution.

= ..0.1 N

∴ Normality of $Na_2S_2O_3$ = ..0.1.. N

Part: II Estimation of Copper (Cu)

Solution in burette	$Na_2S_2O_3$ solution (0.1N)
Solution in conical flask	5ml Brass alloy soln. + pinch $Na_2CO_3/CaCO_3$ + drop-by-drop CH_3COOH + 5 ml KI soln. till turbidity is dissolved
Indicator	2 drops starch indicator
Endpoint	Brown to Milky white
Pilot reading	..3.. ml to [4]0... ml

Sr.No.	Burette reading			Constant reading (Y) in ml
0	Initial	Final	Diff.	
1	0	8	8	08ml
2	0	8	8	
3	0	8	8	

Calculation:

Part: II

5 ml of diluted brass solution = Y ml of N_1 $Na_2S_2O_3$ solution.

500 ml of diluted brass solution = Yx100ml of N_1 $Na_2S_2O_3$ soln.

1000 ml of 1N $Na_2S_2O_3$ solution ≡ Eq Wt. Copper (in gms) = 63.5gms

Y x 100 ml N_1 $Na_2S_2O_3$ = $\frac{63.5 \text{ gms x Y x } 100\ N_1}{1000}$ = $\frac{63.5 \times 8 \times 10 \times 0.1}{1000}$

= Z gms of copper = 0.508

4.5 gms of brass contains Z gms of copper

∴ 100 gms of Brass contain = $\frac{Z \times 100 \text{ gms of Cu}}{4.5}$ = $\frac{0.508 \times 100}{1.5}$

= 33.86% of copper.

= 33.86%

Parameter	C	P	A	Total	Sign. With Date
Marks Obtained	4	3	02	09	Amol
Max. Marks	4	4	2	10	

Experiment No. 5: Preparation of biodiesel from edible oil

R.H.S

Aim:

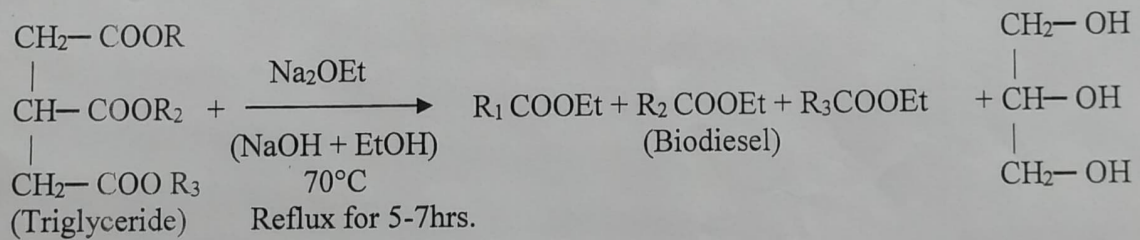
Preparation of Biodiesel from edible oil.

Theory:

The conversion of fats edible oil into Fatty acid. Methyl esters (FAME) or fattyacid ethyl ester in presence of catalytic amount of sodium hydroxide or potassium hydroxiee and Methyl alcohol or Ethyl Alcohol is known as biodiesel.

Fats and oils are triglycerides. The alcoholic reagents and catalysts convert theses triglycerides to fatty acid methyl or ethyl ester and glycerol is produced as by product. Biodiesel is separated and distilled off to get pure biodiesel.

Reaction:



Procedure: -

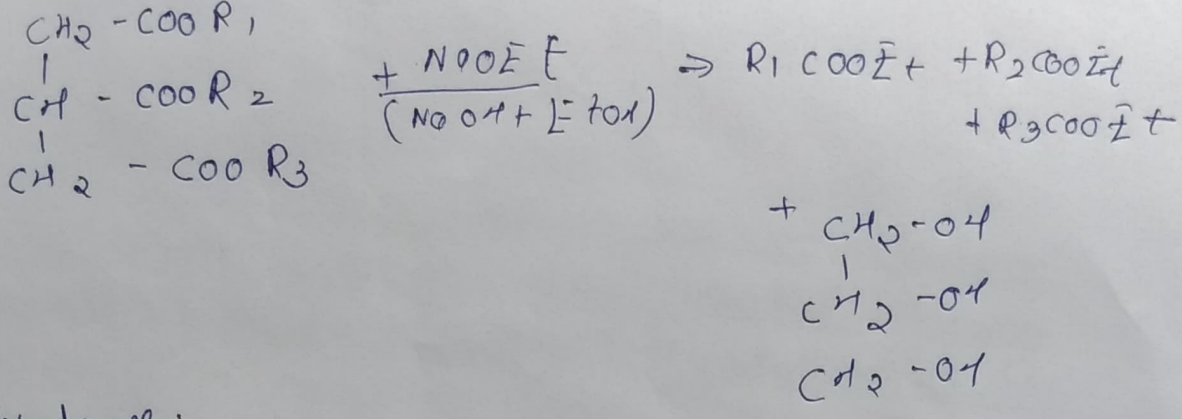
Take 100gms of edible oil or any other vegetable oil in a round bottom flask (250ml capacity). Add 1-2ml of 9M sodium hydroxide solutions and 15ml of ethyl alcohol. Reflux the mixture at 70°C for 1½ hrs. Check the material for conversion after cooling. If needed continue reflux even after stipulated time period. Cool the mixture after conversion. Separate two layers of biodiesel and glycerol.

Wash the upper oily layer to free it from residual catalyst the liquid material thus obtained is biodiesel or bio oil.

Precautions:

1. Take cooked vegetable oil after filtration.
2. Vegetable oil should be free from acid.
3. During reflux vapor of alcohol should not come out of the water condenser.
4. After separation of oily layer it should be properly washed.

Result: .....



advantages:

1) Biodiesel is cheaper
2. It does not give out particulate pollutants.
3. It has certain extent of lubricity

Parameter	C	P	A	Total	Sign. With Date
Marks Obtained	03	04	02	09	
Max. Marks	4	4	2	10	