



ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE New Delhi, Affiliated to Anna University, Chennai)

Accredited by NAAC

ANGUCHETYPALAYAM, PANRUTI – 607106

INTERNAL COMPONENT

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)

ANGUCHETTPALAYAM, PANRUTI - 607 106.



ATTENDANCE AND ASSESSMENT RECORD

Name of the Staff : Mrs. S. Ramya.....
Department of the Staff : Chem (SSH).....
Semester / Subject : I / ENGG. CHEM.....
Period : Sep-23 - Jan-24.....

MECH-LAB



ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

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CHEMISTRY LABORATORY: (Any seven experiments to be conducted)

COURSE OBJECTIVES:

- ❖ To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper.
- ❖ To induce the students to familiarize with electroanalytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
- ❖ To demonstrate the analysis of metals and alloys.
- ❖ To demonstrate the synthesis of nanoparticles

Cycle-1

1. Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard
2. Determination of types and amount of alkalinity in a water sample.
Split the first experiment into two
3. Determination of total, temporary & permanent hardness of water by EDTA method.
4. Determination of DO content of water sample by Winkler's method.
5. Determination of chloride content of water sample by Argentometric method.
6. Estimation of copper content of the given solution by Iodometry.
7. Estimation of TDS of a water sample by gravimetry.

Cycle-2

8. Determination of strength of given hydrochloric acid using pH meter.
9. Determination of strength of acids in a mixture of acids using conductivity meter.
10. Conductometric titration of barium chloride against sodium sulphate (precipitation titration)
11. Estimation of iron content of the given solution using potentiometer.
12. Estimation of sodium /potassium present in water using a flame photometer.
13. Preparation of nanoparticles ($\text{TiO}_2/\text{ZnO}/\text{CuO}$) by Sol-Gel method.
14. Estimation of Nickel in steel
15. Proximate analysis of Coal

TOTAL: 30 PERIODS

Name of the Staff : Mrs. S. RAMYA

Department of the Staff : CHEM (S & H)

Department of the Student : MECH (LAB)

Semester : I Sem

Subject Code & Name : BS3131 / ENGG. CHEMISTRY LAB

Period From : Sep-23 to Jan-24

To be Signed at the end of the each Assessment

Assessment Report			Model
Assessment Date			8/10/24
Report Due on			8/10/24
Signature - HoD of Students with Date			S. S. P.

To be Signed at the end of the Semester

Staff in - charge	HoD of Staff	HOD of Students	Principal
S. S. P.	S. S. P.	S. S. P.	[Signature]

ATTENDANCE

S No.	Reg. No.	Name	Attendance		
			R-1	R2	
			1	2	3
1	422123 148001	ABINAYA . K	38	31	
2	002	ABINAYAA . R	38	47	
3	004	ADHISAKTHI . I	24	34	
4	005	ANANDA SARE	40	43	
5	006	BALA . S	38	43	
6	009	BARANIDHARI	38	43	
7	010	BARATH . B	37	41	
8	011	BAVYA . B	38	39	
9	012	BHARATHI . P	35	39	
10	013	BHUVANESHA	38	41	
11	014	DEEBAEESWA	29	39	
12	016	DINESH . S . I	31	34	
13	017	FLAVARASAN	35	43	
14	018	GOKUL . S	30	41	
15	019	KALKI . J	36	39	
16	020	KANCHANA .	40	41	
17	021	KANMANI . I	39	41	
18	022	KARTHIKA .	33	41	
19	023	KEERTHIRAJ	29	33	
20	024	LAKSHMIPATH	33	39	
No. of Absentees			2	2	
Initial					

Assessment

Internal Component										Assessment	
Report -1 (R2021)					Report -2 (R2021)					CIA-1	CIA-2
Assignment	Case study	Seminar	Mini Project	Total (40)	Assignment	Case study	Seminar	Mini Project	Total (40)		
20	20			40			20	20	40	85	99
20	20			40			20	20	40	96	97
20	20			40			20	20	40	72	96
20	20			40			20	20	40	62	98
20	20			40			20	20	40	73	95
20	20			40			20	20	40	79	95
20	20			40			20	20	40	72	96
20	20			40			20	20	40	97	100
20	20			40			20	20	40	99	100
20	20			40			20	20	40	94	100
20	20			40			20	20	40	70	98
20	20			40			20	20	40	56	94
20	20			40			20	20	40	85	98
20	20			40			20	20	40	64	95
20	20			40			20	20	40	99	100
20	20			40			20	20	40	84	97
20	20			40			20	20	40	82	97
20	20			40			20	20	40	96	99
20	20			40			20	20	40	60	94
20	20			40					40	70	96
2	2			2			2	2	2	2	2

ATTENDANCE

S No.	Reg. No.	Name
21	A2212348 025	MELVIN CHAN
22	026	PRADEEP KUMAR
23	027	PRAVEENA.
24	028	PRIYA DHARS
25	030	RAJESHWAR
26	031	RINEETH S
27	032	SAHAYA AKSHI
28	033	SAKARI M
29	034	SANTHOSH K
30	035	SATHIYA PRIY
31	036	SHARON RAJ
32	037	SHYLU NIHIT
33	038	SIVADHARSHI
34	039	SIVAPRIYA M
35	040	SRINATH B
36	041	SUJITHA S
37	042	SUMIDHA K
38	043	THIRUVALLU
39	044	UDHAYA SUR
40	045	VAHITH KH
No. of Absentees		
Initial		

			Attendance			
			R-1	R-2		
			40	43		
25			1	2	3	
26			21	31		
27			36	26		
28			38	39		
29			40	41		
30			35	41		
31			30	39		
32			33	39		
33			37	36		
34			26	39		
35			34	43		
36			33	39		
37			35	38		
38			36	43		
39			40	43		
40			33	38		
41			26	34		
42			35	41		
43			25	26		
44			16	28		
45			40	38		
			22	22		

Assessment

Internal Component										Assessment	
Report -1 (R2021)					Report -2 (R2021)					CIA-1	CIA-2
Assignment	Case study	Seminar	Mini Project	Total (40)	Assignment	Case study	Seminar	Mini Project	Total (40)		
20	20			40			20	20	40	43	94
20	20			40			20	20	40	46	AA
20	20			40			20	20	40	78	94
20	20			40			20	20	40	72	90
20	20			40			20	20	40	70	100
20	20			40			20	20	40	45	98
20	20			40			20	20	40	64	95
20	20			40			20	20	40	74	100
20	20			40			20	20	40	85	99
20	20			40			20	20	40	79	100
20	20			40			20	20	40	98	99
20	20			40			20	20	40	92	100
20	20			40			20	20	40	80	99
20	20			40			20	20	40	85	99
20	20			40			20	20	40	66	96
20	20			40			20	20	40	85	97
20	20			40			20	20	40	86	99
20	20			40			20	20	40	45	94
20	20			40			20	20	40	62	98
20	20			40			20	20	40	62	98
20	20			40			20	20	40	62	98

RECORD OF

S. No.	Class Planned		Topic Name	BT
	Date	Period		
1	9/10/23	6 7	Determination of Cl^- ion in given water sample by Argentometric method	k ₂
2	30/10/23	6,7	Determination of alkalinity in water sample	k ₃
3	6/11/23	6,7	Determination of Hardness in water sample by EDTA method	k ₂
4	20/11/23	6,7	Estimation of Copper in the given solution by Iodometry method	k ₂

* BT- Bloom's Taxonomy, TA-Teaching Aids

CLASS WORK

Book Referred	Class Conducted		Reason for Deviation	TA	Staff Sign
	Date	Period			
T ₁	9/10/23	6,7	—	BB	dh
T ₁ R ₁	30/10/23	6,7	—	BB	dh
R ₁ T ₁	6/11/23	6,7	—	BB	dh
R ₁ T ₁	20/11/23	6,7	—	BB	dh

RECORD OF

S. No.	Class Planned		Topic Name	BT
	Date	Period		
5	27/11/23	6,7	Determination of dissolved oxygen by Winkler method	k ₃
6	18/12/23	6,7	Conductometric Titration of mixture of acid.	k ₂
7	29/12/23	1, 2, 3	Conductometric Titration of Na ₂ SO ₄ vs BaCl ₂	k ₃

CLASS WORK

Book Referred	Class Conducted		Reason for Deviation	TA	Staff Sign
	Date	Period			
T, R ₁	27/11/23	6,7	-	BB	dw
R, T ₁	18/12/23	6,7	-	BB	dw
R, T ₁	29/12/23	1, 2, 3	-	BB	dw
			Completed		S. B. P.

* BT- Bloom's Taxonomy, TA-Teaching Aids

Time Table

PERIOD DAY	1	2	3	4	5	6	7	8	
Monday	→					CHE CHE ←			
Tuesday									
Wednesday									
Thursday									
Friday									

Unit Completion Details

Unit No.	Unit Description	Start Date	Finish Date	No. of Hours
1				
2				
3				
4				
5				

S. d. r.
Subject In-Charge

S. d. r.
HoD of Students

D. J. S.
Principal



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COURSE OUTCOMES:

CO. No	COURSE OUTCOMES	Knowledge level
CO1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K2
CO2	To determine the amount of metal ions through volumetric and spectroscopic techniques	K2
CO3	To analyse and determine the composition of alloys.	K2
CO4	To learn simple method of synthesis of nanoparticles	K2
CO5	To quantitatively analyse the impurities in solution by electroanalytical techniques	K2

BLOOM'S TAXONOMY: K-Level [K1-Remember, K2-Understand, K3 - Apply, K4-Analyze, K5-Evaluate, K6-create]

TEXT BOOKS:

- J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbook of Quantitative Chemical Analysis (2009).

CO's-PO's & PSO's MAPPING

PROGRAM OUTCOME	COURSE OUTCOME				
	1	2	3	4	5
PO1	3	3	3	2	2
PO2	-	1	2	1	1
PO3	1	2	1	2	2
PO4	-	-	1	-	-
PO5	-	-	-	-	1
PO6	2	1	-	2	2
PO7	2	2	1	2	2
PO8	-	-	-	-	-
PO9	-	-	-	-	-
PO10	-	-	-	-	-
PO11	-	-	-	-	-
PO12	2	1	-	-	1
PSO1	-	-	-	-	-
PSO2	-	-	-	-	-
PSO3	-	-	-	-	-

Regulation 2021: 1 - low, 2 - medium, 3 - high, '-' - no correlation

Teaching Aids:

TI - Textbook	R1-Reference Book	BB-Black Board	PPT-Power Point
OHP - Overhead Projector	A-Animations	M-Models and Demo	V-Video Lecture
LI-Lecture	T-Tutorial	A1-Assignment	

ASSIGNMENT-②

NAME : P. Leelarathi

REGI NO : 422120104020

YEAR / SEM : III / VI

DEPT : CSE

SUB CODE : CS8651

SUB : Internet programming.

20/20

~~#~~

① Java script

* Java script was designed to add interactivity to HTML pages

* Java script is a scripting languages.

* A scripting language is a lightweight program language

* A Java script is usually embedded directly into HTML

Variable :

* There is one statement for declaring a variable

* syntactically the var keyword is followed comma separate list of identifiers.

* Each identifier in a variable declaration list may optionally be followed by an equals.

~~sign(=)~~ add then an arbitrary.

Types of statement in Java script :

* javascript has three types of statement.

* First, there is the expression statement, that is a statement that consists entirely of an expression. Such as $i = 5; j++;$

* Second type is the block statement, which is simply a set of statements enclosed in braces.

* Finally there are statement that begin with keywords such as var and if.

JAVA script DOM Model :

DOM stands for Document Object Model and is responsible for how various objects in a document interact with each other. DOM is document interaction developing web pages which includes objects like Paragraph, links, etc.

To change the content of an HTML use :

document . get element By Id . inner HTML = new HTML

To change the attributes of an HTML element use :

document . get element By Id . attributes = new value .

Javascript Built In Objects :

The java script objects are following .

- * Array object
- * Boolean object
- * Data object
- * Math object
- * number object
- * string object
- * Reg Exp object
- * Global properties & functions .

Array object :

- * Multiple values are stored in single variables using the Array objects
- * In javascript an array can hold different types of data flow in a single slot .

Boolean object:

- * The Boolean object is wrapper class & member of global objects
- * It is used to convert a non-Boolean value to a boolean value.

Data object:

- * At times when user need to access the current data & time & also past & future data & times
- * The data object provides a system independent abstraction of data & times.

Math objects:

- * The Math object is used to perform simple & complex & arithmetic operation
- * The Math object provides a number of properties

Number objects:

- * The number objects represents numerical data, either integers (or) floating-point number.
- * var num = new number (value).

String object:

- * In javascript all string are represented as instances of the string objects.

Reg exp object:

- * Reg exp objects used to validate the pattern of characters.

② JSON:

* JSON data format is ubiquitous in web APIs, cloud computing, NoSQL databases & increasingly also in machine learning.

- > data storage, configuration & validation.
- > data transfer b/w API client & server.
- > Restructuring input data from the user.

Data storage, configuration and validation.

in you might be familiar with the package `json files` in your node project. This is a configuration file for your project which holds important metadata.

Also JSON files can be used to store lots of data that you may need to use within your project itself.

Data transfer between API client and server:

Data transfer often occurs in JSON format as it does not burden the network in any way due to its low memory demand.

Though, this string needs to be converted.

Restructuring input data from the user:

* JSON Schema is a standard format for declaring the structure of JSON data.

* Validates exist to verify if a JSON document files within schema's constraints the values of properties are valid or not.

JSON Vs XML :

* XML or extensible markup language defines a set of rules for encoding documents in a format

* XML was the ~~old~~ alternative to JSON especially in the case of web services response.

ASSIGNMENT

2

Name: ~~S.~~ Muhammad
Anas

Dept / year: CSE / IInd

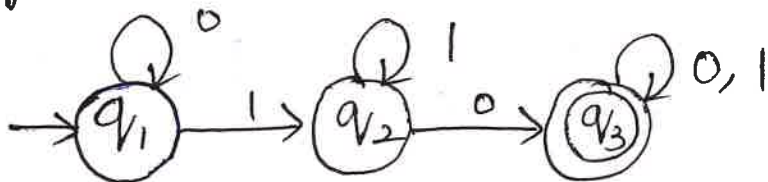
Sub. code: CS3452

Sub. Title: Theory of
Computation

$\frac{20}{20}$

Ans

1. Convert the given FA into RE using Rijk method.



Formula is

$$R_{ij}^{(k)} = R_{ij}^{(k-1)} + R_{ik}^{(k-1)} \left(R_{kk}^{(k-1)} \right)^* R_{kj}^{(k-1)}$$

$i \rightarrow$ starting node

$j \rightarrow$ final node

$k \rightarrow$ Total no. of states

$$i \rightarrow 1 \quad j \rightarrow 3 \quad k \rightarrow 3$$

Applying in this formula

$$R_{13}^{(3)} = R_{13}^{(2)} + R_{13}^{(2)} \left(R_{33}^{(2)} \right)^* R_{33}^{(2)} \rightarrow \textcircled{1}$$

$$R_{13}^{(2)} = R_{13}^{(1)} + R_{12}^{(1)} \left(R_{22}^{(1)} \right)^* R_{23}^{(1)} \rightarrow \textcircled{2}$$

$$R_{33}^{(2)} = R_{33}^{(1)} + R_{32}^{(1)} \left(R_{22}^{(1)} \right)^* R_{23}^{(1)} \rightarrow \textcircled{3}$$

$$R_{11}^{(1)} = \cancel{0} 0$$

$$R_{21}^{(1)} = \phi$$

$$R_{31}^{(1)} = \phi$$

$$R_{12}^{(1)} = 1$$

$$R_{22}^{(1)} = \cancel{1} 1$$

$$R_{32}^{(1)} = \phi$$

$$R_{13}^{(1)} = \phi$$

$$R_{23}^{(1)} = 0$$

$$R_{33}^{(1)} = \cancel{0} (0+1)$$

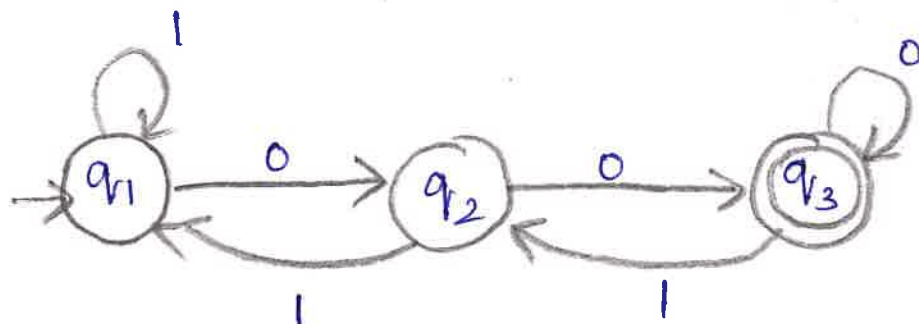
$$\begin{aligned} R_{13}^{(2)} &= \phi + 1(\cancel{0} 1)^* 0 = 1(1^*) 0 \\ &= 11^* 0 \end{aligned}$$

$$R_{33}^{(2)} = (\cancel{0} (0+1)) + \phi = \cancel{0} (0+1)$$

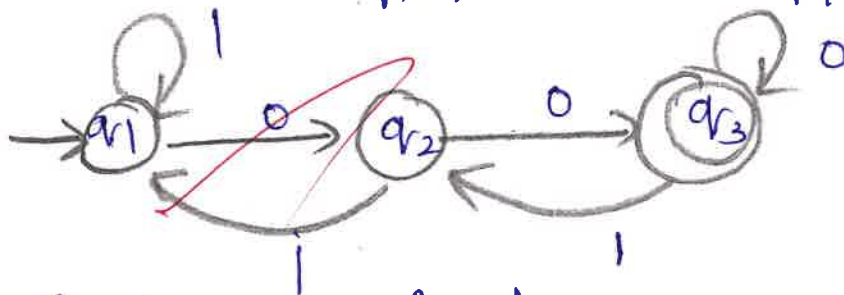
$$\begin{aligned} R_{13}^{(3)} &= 11^* 0 + 11^* 0 (0+1)^* (0+1) \\ &= 11^* 0 (0+1)^* (0+1) \\ &= 11^* 0 0^* (0+1) \\ &= 1^* 0^* (0+1) \\ &= 0^* (1^* 0 + 11^*) \\ &= 0^* (0 + 11^*) \Rightarrow R.E \end{aligned}$$

2. Find the RE for the following FA using state elimination method.

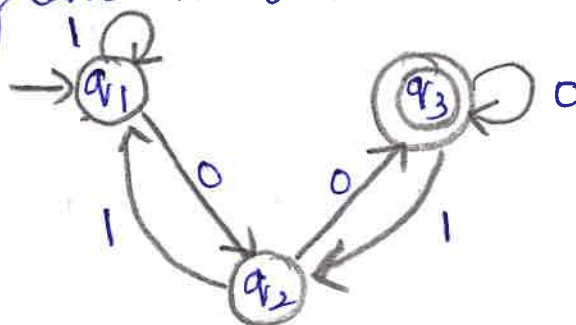
state \ I/P	0	1
→ q_1	q_2	q_1
q_2	q_3	q_1
* q_3	q_3	q_2

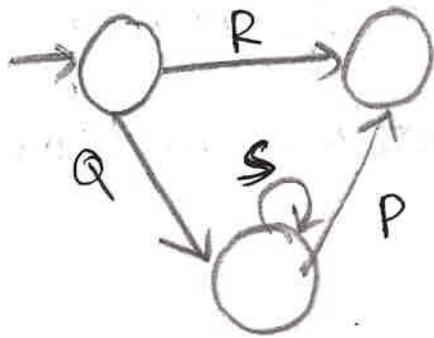


Step 1: Eliminate q_2 , consider $q_1 \rightarrow q_3$



This diagram is drawn in another angle





Here $R = \phi$, $S = \phi$, $P = 0$, $Q = 0$

$$R_1 = R + QS^*P$$

$$= \phi + 0 \cdot \phi^* 0$$

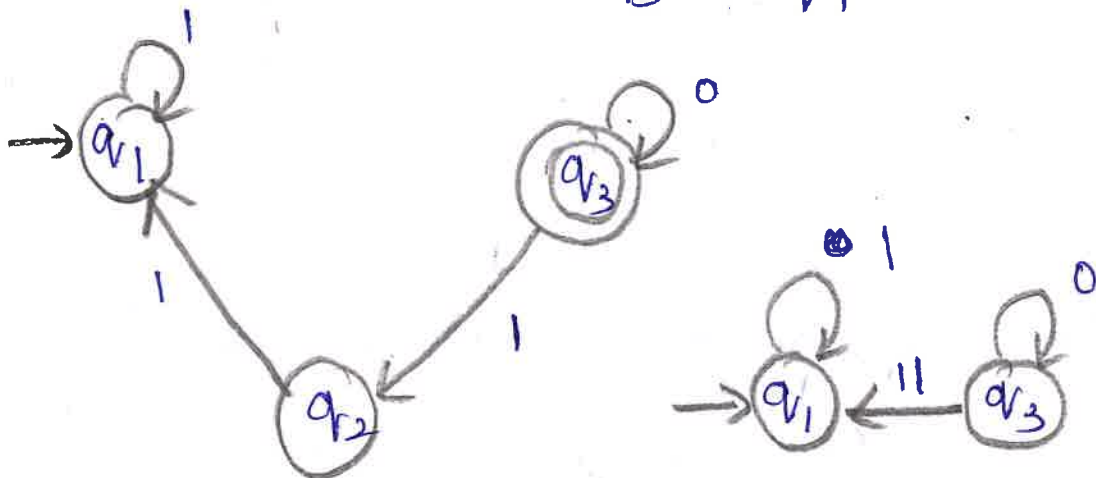
$$= \phi + 00$$

$$= 00$$

$$\therefore R_1 = 00$$



Step 2: Eliminate $q_2, q_3 \rightarrow q_1$

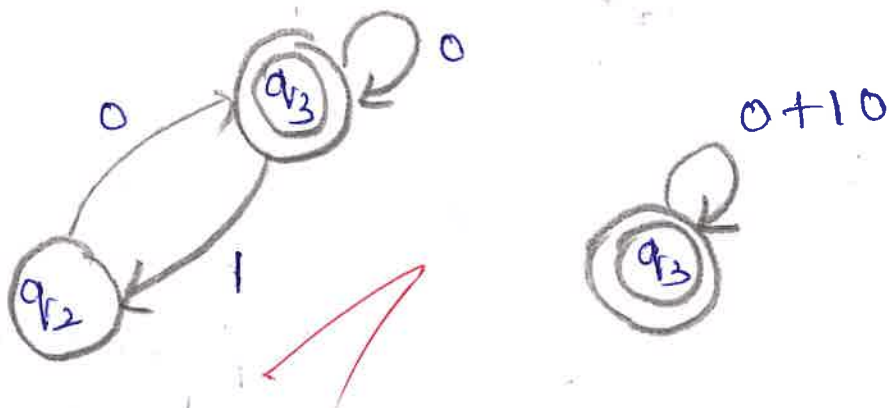


Here $R = \phi$, $S = \phi$, $Q = 1$, $P = 1$

$$\therefore R_2 = 11$$

Step 3: Eliminate q_2 in the path

$$q_3 \rightarrow q_2 \rightarrow q_3$$



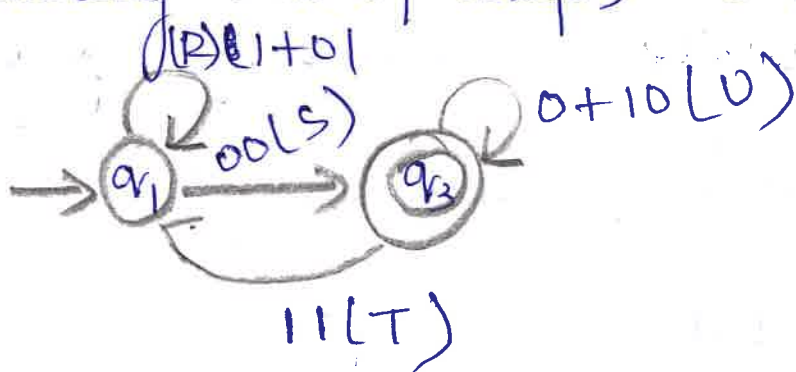
$$\therefore R_3 = 0+10$$

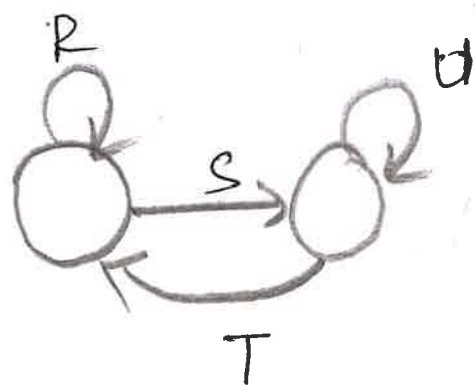
Step 4: Eliminate q_2 : $q_1 \rightarrow q_2 \rightarrow q_1$



$$\therefore R_4 = 1+01$$

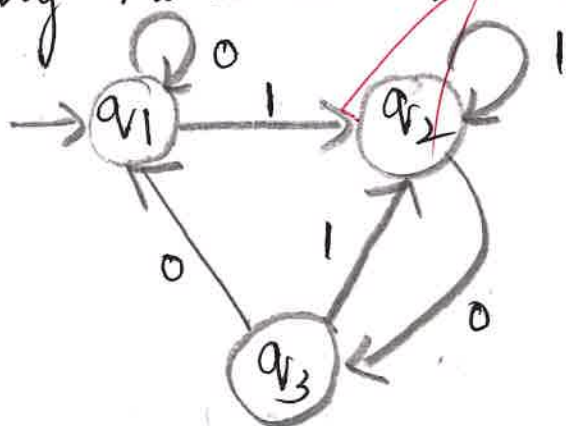
Considering all 4 steps we have





$$\begin{aligned}
 RE &= R + (SU^*T)^*SU^* \\
 &= (1+01) + (0010+10)^*11 \\
 &\quad 00(0+10)^*
 \end{aligned}$$

3. Find the RE for the following FA using Arden's theorem.



Express states in terms of transitions

$$q_1 = q_10 + q_30 + \epsilon \rightarrow \textcircled{1}$$

$$q_2 = q_21 + q_31 + q_11 \rightarrow \textcircled{2}$$

$$q_3 = q_2 0$$

subs ③ in ②

$$q_2 = q_2 1 + q_2 0 1 + q_1 1$$

$$q_2 = q_2 (1 + 0 1) + q_1 1$$

It is the form $R = Q + RP$

i.e. $Q = q_1 1, R = q_2, P = (1 + 0 1)$

so

$$R = Q + RP \Rightarrow QP^*$$

i.e. $q_2 = q_1 1 (1 + 0 1)^* \rightarrow \textcircled{4}$

Sub ③ in ①

$$q_1 = q_1 0 + q_2 0 0 + \epsilon \rightarrow \textcircled{5}$$

sub ④ in ⑤

$$\begin{aligned} q_1 &= q_1 0 + q_1 1 (1 + 0 1)^* 0 0 + \epsilon \\ &= q_1 (0 + 1 (1 + 0 1)^* 0 0) + \epsilon \end{aligned}$$

It is the form $R = Q + RP$

$$Q = \epsilon, R = q_1, P = 0 + 1(1+01)^* 00$$

$$\Rightarrow QP^*$$

$$\Rightarrow \epsilon(0 + 1(1+01)^* 00)^*$$

It is the RE, since q_1 is the final state.

~~Q~~

- **NAME: V.AJAYKRISHNA**
- **REG NO: 422122106003**
- **SUB CODE: EC3551**
- **SUBJECT: TRANSMISSION LINE AND RF SYSTEM**
- **CASE STUDY: 1**
- **ECE-3rd YEAR(5th-SEM)**

20
20

COMPLETED
V.Vishal Kumar

smith chart

☆ Introduction

The Smith chart is a graphical tool used extensively in electrical engineering, particularly in the field of radio frequency (RF) engineering and microwave engineering. It provides a convenient way to visualize complex impedance and reflection coefficients, making it easier to analyze transmission lines and matching networks.

☆ Basics of the Smith Chart

The Smith chart is essentially a polar plot that represents normalized impedance or admittance. The horizontal axis typically represents the real part of the impedance, while the vertical axis represents the imaginary part. Each point on the chart corresponds to a specific impedance value, allowing engineers to easily see how changes in load affect performance.

☆ Reflection Coefficient and Impedance Matching

In transmission line theory, when an incident wave encounters a discontinuity (like a load), part of that wave is reflected back towards the source. The reflection coefficient (Γ) quantifies this phenomenon and is defined as:

$$\Gamma = \frac{Z_L - Z_0}{Z_L + Z_0}$$

where Z_L is the load impedance and Z_0 is the characteristic impedance of the transmission line. The magnitude of Γ indicates how much power is reflected versus transmitted

☆ Using the Smith Chart for TLRF Analysis

To utilize the Smith chart for analyzing TLRF, follow these steps:

- **Normalize Impedance:** Convert your load impedance Z_L into normalized form by dividing it by Z_0 :

$$z = \frac{Z_L}{Z_0}$$

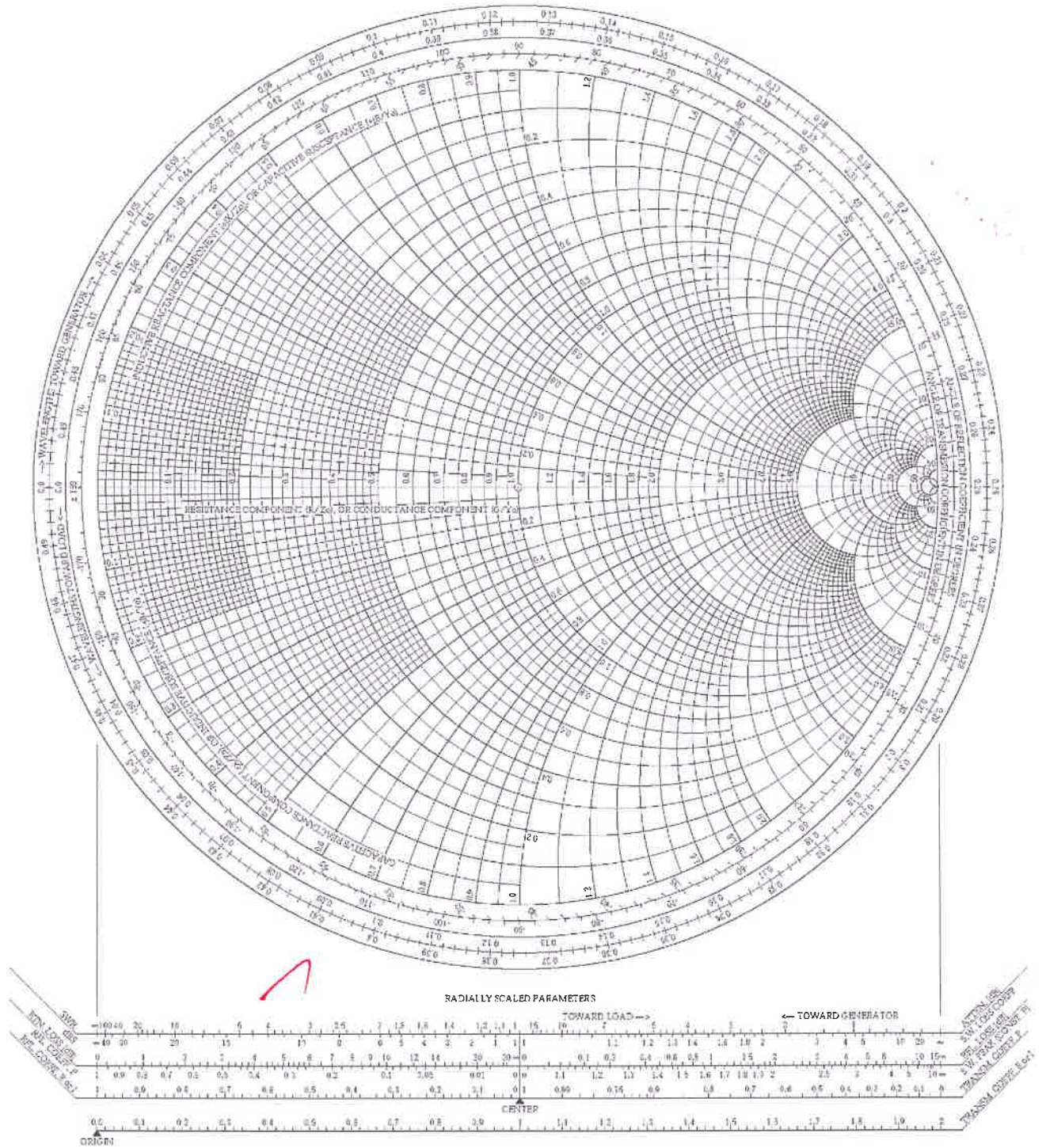
- **Locate on Smith Chart:** Plot this normalized impedance on the Smith chart. This point will provide information about both reflection coefficient and standing wave ratio (SWR).
- **Determine Reflection Coefficient:** From this point, you can read off the corresponding reflection coefficient directly from the chart.
- **Analyze Matching Networks:** If your goal is to match impedances, you can use additional components such as capacitors or inductors to move around on the Smith chart towards a point where Γ approaches zero (indicating maximum power transfer).

☆ Applications in RF Design

The Smith chart is invaluable for designing RF circuits because it allows engineers to visualize how different components affect overall system performance without extensive calculations. For instance, when designing antennas or amplifiers, one can quickly assess how various configurations will impact reflection coefficients and thus optimize designs accordingly.

The Complete Smith Chart

Black Magic Design



☆ Conclusion

In summary, the Smith chart serves as an essential tool for visualizing and analyzing transmission line reflection factors, enabling engineers to efficiently design systems with optimal performance characteristics by facilitating easy calculations related to impedance matching and signal integrity

V. H. H. T. 2024



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ANGUCHETTPALAYAM, PANRUTI – 607106

MINI PROJECT

REGISTER NO: 422122106002

DEPT: BE: ECE

YEAR/SEM: II/IV

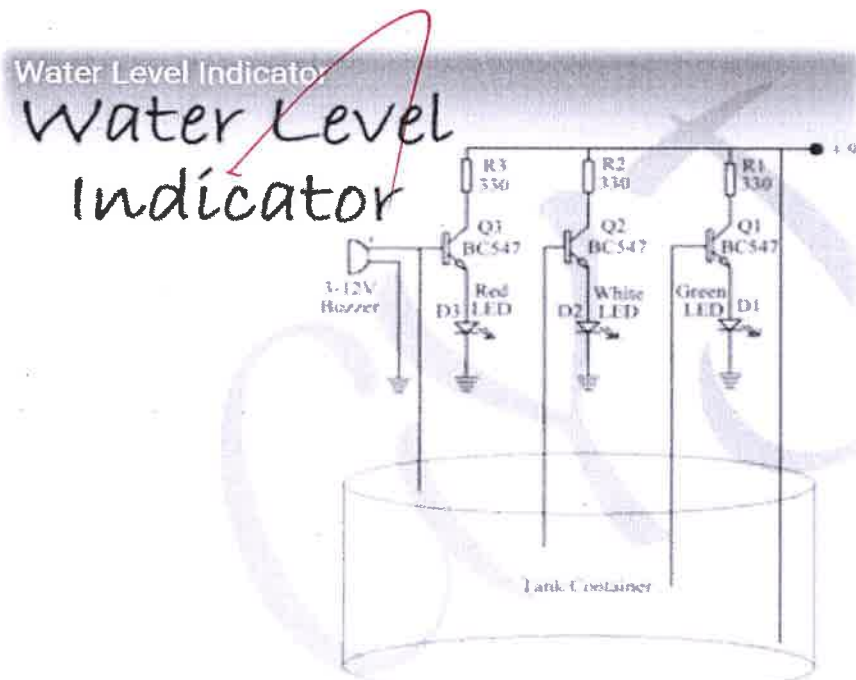
20
20

Matthews

Water Level Indicator Alarm

ABSTRACT

This **simple transistor based water level indicator circuit** is very useful to indicate the water levels in a tank. Whenever tank gets filled, we get alerts on particular levels. Here we have created 6 levels; we can create alarms for more levels. We have added 6 LEDs to indicate initial six levels (A, B, C, D, E, F), and one Buzzer to indicate FULL level (F). When tanks gets filled completely we get beep sound from Buzzer. Water tank overflow is a common problem which leads to the wastage of water. Though there are many solutions to it like ball valves which automatically stop the water flow once the tank gets full. But being electronics enthusiastic wouldn't you like an electronic solution for it? So here is a simple circuit which will detect the water level and will raise an alarm upon getting the water tank full or a preset level.



DESCRIPTION

When the water level reaches to Point A in the tank, the positive side of the battery gets connected to the base of the Transistor Q1 through the water. So when a positive voltage has been applied to the base of the Transistor Q1, it gets into ON state and current starts flowing from collector to emitter. And LED glows. You can see resistors (R1, R2, R3, R4, R5, R6) at the base of each transistor, which is used to limit the maximum collector current. Generally a transistor gets its ON state fully when a voltage of 0.7 V is applied to the base. There are also resistors (R4, R5, R6) with each of the LEDs, to drop the voltage across LEDs, otherwise LED may blow up. Generally a transistor gets its ON state fully when a voltage of 0.7 V is applied to the base. Same phenomenon happens when water level reaches to Point B. As soon as water level reaches to Point B, a positive voltage gets applied to the Transistor Q2, it gets ON and current started flowing through LED glows. With same principle, LED glow when water level reaches to Point C. And finally Buzzer beeps when water level reaches to F.

Application-

- 1.The water level indicator is used in Hotels, Home apartments, commercial complex, and in factories
- 2.used to measure the fuel level in motor vehicles.
- 3.liquid level indicator in huge companies

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STUDENT SEMINAR



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

CIRCULAR

2023 - 2024

CIR. No.: SACET/EEE/CIR/

Date: 02. 04. 2024

It is informed that the **student seminar** will be held for III Year / VI Sem students at control system lab. All interested staff and students are invited for the seminar.

Name of the Student : ABITHA A

Register Number : 422121105001

Year/ Semester : III/VI

Date : 03.04.2024

Topic of the Seminar : SULFUR HEXAFLUORIDE (SF6) CIRCUIT BREAKER

HOD

Head of the Department
Dept. of Electrical & Electronics Engineer
St. Anne's College of Engineering & Technol
Anguchettypalayam, Panruti-607106.



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INTRODUCTION

- Sulfur hexafluoride (SF₆) is used as the arc quenching medium.
- SF₆ gas is an electronegative and has a strong tendency to absorb free electrons. The contacts of the breaker are opened in a high-pressure flow of sulfur hexafluoride gas, and an arc is struck between them.
- The gas captures the conducting free electrons in the arc to form relatively immobile negative ions.
- This loss of conducting electrons in the arc quickly builds up enough insulation strength to extinguish the arc.
- The SF₆ breakers have been found to be very effective for high power and high voltage service.

CONSRUCTION

- It consists of high pressure SF₆ reservoir, puffer chamber, and an arc -quenching nozzle.
- fixed and moving contacts are placed inside the puffer chamber.
- An operating mechanism is used to open and close the contacts.
- The high pressure SF₆ gas is stored in reservoir and released into puffer chamber when needed.



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WORKING

- During normal condition the high pressure SF₆ gas is contained in the reservoir and the contacts are closed.
- When any fault occurs the operating mechanism opens the contacts and at same time a valve releases a controlled amount of SF₆ gas from the reservoir into the puffer chamber.
- Rapid release of SF₆ gas generates high -pressure flow creates blast effect, cooling and quenching the arc.
- Arc is extinguished, and the contacts are fully opened.

DIAGRAM

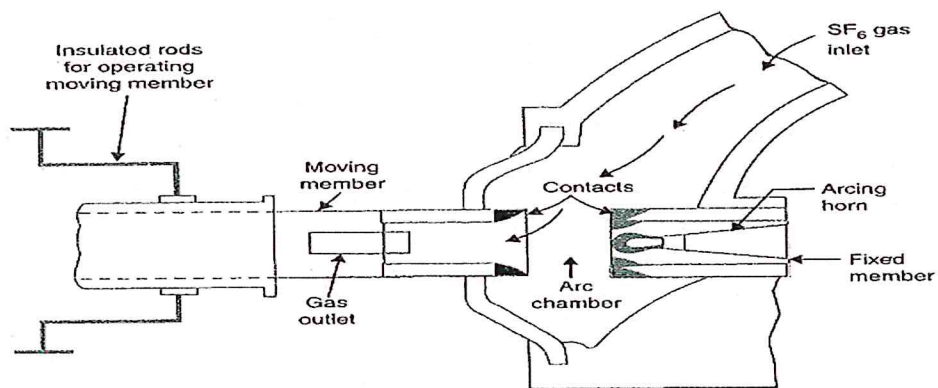


Fig. 19.11



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ADVANTAGES OF SF6 CIRCUIT BREAKER

- High dielectric strength
- Compact design
- Good performance
- Long service
- Low maintenance
- Good arc quenching properties
- Suitable for high voltage
- Less environmental impact

APPLICATIONS OF SF6 CIRCUIT BREAKERS

- **Power Transmission and Distribution:** SF6 circuit breakers are commonly used in high - voltage power systems to protect transformers, circuit lines, and other critical equipment.
- **Industrial Plants:** They are used in industrial facilities to protect electrical equipment from short circuits and overloads.
- **Railways:** SF6 circuit breakers are used in railway electrification systems to ensure reliable power distribution.
- **Substations:** SF6 circuit breakers are employed in substations to control and protect the electrical grid.
- **Power Generation:** SF6 circuit breakers can be used in power generation facilities for generator protection.
- **Renewable Energy:** They are used in renewable energy systems like wind farms and solar power plants.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

STUDENT SEMINAR EVALUATION SHEET

Name of the Student : **ABITHA A**

Register Number : **422121105001**


Year/ Semester: **III/VI**

Date : **03.04.2024**

Topic of the Seminar : **SULFUR HEXAFLUORIDE (SF6) CIRCUIT BREAKER**

	PRESENTATION CONTENT (10)	PRESENTATION STYLE (10)	ANSWERING QUESTIONS (10)	REMARKS
Class Incharge	9	9	8	good
HOD	8	9	8	Good


CLASS IN-CHARGE


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PHOTO

