

IG Valley, Madurai Main Road, Manikandam, Tiruchirappalli - 620012

# **NAAC DOCUMENTS**

**QUALITY INDICATOR FRAME WORK** 

## **CRITERION – 1**

## **CURRICULAR ASPECTS**

### SUBMITTED BY

IQAC INTERNAL QUALITY ASSURANCE CELL INDRA GANESAN COLLEGE OF ENGINEERING



#### DEPARTMENT OF MECHANICAL ENGINEERING

#### ACADEMIC YEAR 2021-22 EVEN / ODD SEMESTER

#### **1.2 Academic Flexibility (30)**

**1.2.1** Number of Certificate/Value added courses offered and online courses of MOOCs,SWAYAM, NPTEL etc. (where the students of the institution have enrolled and successfullycompleted during the last five years)

AND

**1.2.2** Percentage of students enrolled in Certificate/ Value added courses and also completed onlinecourses of MOOCs, SWAYAM, NPTEL etc. as against the total number of students during the lastfive years

VAC Title:	Grap	hene I	Battery Tech	nologi	es				
Resource Po	erson:	Trai	D Center	Sundaı	ramooi	rthi			
Date of con	duct fro	m:	06.06.2022		To:	11.06.2022	<b>Duration:</b>	30 Hours	
Organized 1	Departn	nent:	MECHAN	ICAL	ENGI	NEERING			
Participant	Year:	Mec Year	h IV,III,II r	Seme	ster:	EVEN	 of Students istered:		69
Venue: h	ttp//me	et.goo	gle.com/ack·	-bfod-z	zmp				

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## Department of Mechanical Engineering Academic Year 2021-2022 – EVEN Semester

Date: 01.06.2022

#### **DEPARTMENT CIRCULAR**

Department of Mechanical Engineering and IQAC of IGCE in Association with CADD centre, Trichy is going to organize Value added course for all II, III, IV Year students on "Graphene Battery Technologies" From 06.06.2022 to 11.06.2022, certificates will be issued to be eligible participants at the end of the course. This training is conducted through online mode

1.Mr.Balaji
Trainer,
CADD Centre,
Trichy
2.Mr.Sundaramoorthi,
Trainer,
CADD Centre,
Trichy
Online mode
GoogleMcet:meet.google.com/ack-bfod-zmp

Cc:

- Principal office
- IQAC Co-Ordinator
- Mechanical Faculties Room
- Class In charges -II, III & IV-Year
- II,III & IV-Year MECH class Rooms
- Office Notice Board.

NCIPAL

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.







## Value Added Course

"Graphene Battery Technologies"

## SYLLABUS

S.NO	TOPIC COVERED	DURATION (in hours)	DATE
1	Fundamentals of batteries	3	06.06.2022
2	Types of batteries	3	06.06.2022
3	Life cycle and efficiency of batteries	3	07.06.2022
4	Primary batteries	3	07.06.2022
5	Chemistry and technology uses in batteries	3	08.06.2022
6	Electrolyte battery applications	-3	08.06.2022
7	Secondary batteries	2	09.06.2022
8	Glass met lead acid battery	2	09.06.2022
9	Lithium iron batteries	2	10.06.2022
10	Fuels cells	3	10.06.2022
11	PEMFCand AFC batteries.	3	11.06.2022
11	Exam	1	11.06.2022
	Total Hours	30	

VAC Coordinator

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HoDX eal

Dr. G. Balakrishnon, M.E., Ph.D.,



Indra Ganesan

Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 012 Approved by AICTE, NewDellu & Affiliated to Anna University, Chennai NAAC Accredited, 2(F) Status Institution by UGC



## VALUE ADDED COURSE Graphene Battery Technologies. STUDENTS PARTICIPATION LIST

S.N		NAME	YEAR
2	81121811400		IV /MECHANICAL
3	81121811400	- James Treestreet IAL	IV /MECHANICAL
4	81121811400	The second start it.	IV /MECHANICAL
5	81121811400	Conceller 117	IV /MECHANICAL
6	81121811400	The second	IV /MECHANICAL
7	81121811400		IV /MECHANICAL
	81121811400		IV /MECHANICAL
8	811218114010	- Grippont I	IV /MECHANICAL
10	811218114011		IV /MECHANICAL
11-	811218114012	Praveen A	IV /MECHANICAL
	8.11218E+11	Rabin Singh X	IV MECHANICAL
12	811218114014	Ramesh.M	IV /MECHANICAL
13	811218114015	Rehish Bharathi S	IV /MECHANICAL
14	811218114016	Daniel 1 Tr	IV /MECHANICAL
15	811218114017	Sathish Selva A	IV /MECHANICAL IV /MECHANICAL
16	811218114018	Tamilselvan T	IV /MECHANICAL
17	811218114019	Vasanth D	IV /MECHANICAL
18	811218114020	Vikram S	IV MECHANICAL
19	811218114021	Vishnu B	IV /MECHANICAL
20	811218114022	Yogavishuvabarathi G	IV /MECHANICAL
21	811218114023	Vigneshwaran C	IV /MECHANICAL
22	811218114301	Dharmaseelan M	IV /MECHANICAL
23	811218114302	Mahamuni R	IV /MECHANICAL
24	811218114303	Naveen Kumar T	IV /MECHANICAL
25	811218114304	Ramakrishnan M	IV /MECHANICAL
26	811218114306	Subeekshiseeth Prasana D	IV /MECHANICAL
27	0.1.1.1.1	Aathilingam V	IV /MECHANICAL
28	0110701	Abimanyu C	III /MECHANICAL
29	0110101	Ajay S	III /MECHANICAL
30		Christy Lourthu Samy A	III /MECHANICAL
31		Periyasamy P	III /MECHANICAL
32		Saravana Kumar V	III /MECHANICAL
33		Siriyac Selva A	III /MECHANICAL
34	011010-	Surivaconasta A	III /MECHANICAL
35	0.0.4.5	uriyaganesh M	III /MECHANICAL
36	A	Vaithiyalingam M Vikash R	III /MECHANICAL
37			III /MECHANICAL
8	0	Hariharan R	III /MECHANICAL
9	A	lohanraj G	III /MECHANICAL
0	0.0.0.0.0	vash K	III /MECHANICAL
1		okul R	III /MECHANICAL
	w11217114702   M	adhan Murugan S	III /MECHANICAL

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.



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S.NO	REG NO	NAME	YEAR
42	81121911470		
43	811219114704		III /MECHANICAL
44	811220114001	a a station I	III /MECHANICAL
45	811220114003		II /MECHANICAL
46	811220114005		II /MECHANICAL
47	811220114008		II /MECHANICAL
48	811220114013	and an	II /MECHANICAL
49	811220114015	- month of the fit I	II /MECHANICAL
50	811220114013	The second and the second at a	II /MECHANICAL
51	811220114017	- HALL STATE AND THE	II /MECHANICAL
52		Contraction of the contraction of	II /MECHANICAL
53	811220114025	- united to a second to -	II /MECHANICAL
54	811220114026	Loganathan C	II /MECHANICAL
55	811220114032	Mohamed Ashif A	II /MECHANICAL
56	811220114039	and the second state Ivi	II /MECHANICAL
57	811220114040	Santhosh Kumar R	II /MECHANICAL
	811220114042	Saranya Sree Tr	II /MECHANICAL
58	811220114043	Saravanan M	II /MECHANICAL
59	811220114044	Sathishkumar V	II /MECHANICAL
60	811220114047	Sheik Ameer M	II /MECHANICAL
61	811220114052	Thamaraiselvan K	II /MECHANICAL
62	811220114056	Vigneswaran K	II /MECHANICAL
53	811220114057	Vijayakumar G	II /MECHANICAL
54	811220114060	Yuvaraja A	II /MECHANICAL
55	811220114302	Chellapandian R	II /MECHANICAL
6	811220114303	Jeeva Ganesh S J	II /MECHANICAL
57	811220114304	Kabilan P	II MECHANICAL
8	A	Mohamed Nafil A	II /MECHANICAL
9	0	Ruban A	II /MECHANICAL
		itaoun n	II /MECHANICAL

N-VAC Coordinator

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Mäciurai Main Road Manikandam, Trichy-620 012.

HoD/Mechanical







**Department of Mechanical Engineering** 

Academic Year 2021-2022 - Even Semester

VALUE ADDED COURSE

"Graphene Battery Technology"

## STUDENTS ATTENDANCE SHEET

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

											'				2
S.No.	Reg.No	Student's Name	Year/ Branch	1	ATE: .06.22		TE: )6.22	DA1 08.00		DA7 09.06			ATE: 06.22	NO OF	SIGNATURE
1	0110101			FN	AN	FN	AN	FN	AN	FN	4.81	TINY		SESSIONS ATTENDED	OF THE
L	811218114001	Abinash P	IV /MECHANICAL				-		2811	PIN	AN	FN	AN	ATTENDED	STUDENT
2	811218114002	Ajith Kumar M	N/ D (D (D) (D) (D)	V	V	V	V	V	V	V	V		1/	10	1.0.0
			IV /MECHANICAL	1	V		1/				-	V	V	u	online
3	811218114003	Arun Pandian M R	IV /MECHANICAL	I.V.	V	V	V.	V	V	V	V	$\checkmark$	$\checkmark$	6	online
,	811218114004	Alaguraja M	IV /MECHANICAL	V	-	V	V	V.	$\checkmark$	1/		/	1	10	
			IV /WECHANICAL	1	2	. /	./	/	/	V	V	K		ŧŪ	online
	811218114005	Balasubramani K	IV /MECHANICAL		V	V	V	. V	·V	V.	V	V	V	10	online
	811218114006	Dineshkumar K	IV /MECHANICAL	V			.2	$\sim$	V.	Ń	V	V	V	10	
	011010114000		AT MILLOHANICAL	V	V	1		/	/	1			1		online
	811218114007	Ganesapandy K	IV /MECHANICAL		1/			V	×/		V	V	V.	10	online
	811218114010	Murugappan P	IV /MECHANICAL	V		V	V	V	V	V	V	V		10	
			AT INECHANICAL,	V	V	V	1	M	1	/	-		~	1	online
						F		¥.	V		V	V		UP I	ONLAR





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1.1.1.1.1.1

Dr. G. Bahakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

S.No.	Reg.No	Student's Name	Year/ Branch		ATE: .06.22	DAT 07.06		DATE 08.06.2		DA7 09.00			ATE: .06.22	NO OF	SIGNATURE
9	811218114011	D I. T.		FN	AN	FN	AN	FN	A	FN	AN	-		SESSIONS ATTENDED	OF THE
		Prasanth R	IV /MECHANICAL	./	1/		1		Ň	PIN .	AIN	FN	AN	ATTEMDED	STUDENT
10	811218114012	Praveen A	IV /MECHANICAL	V		V	V		V	V	V	V	V	10	10:01:
11	8.11218E+11	Rabin Singh X		V	V		V	V		V	V		-		baline
12	911010114044		IV /MECHANICAL	V	V	1.1	V	-	-		~	V	V	.10	opline
	811218114014	Ramesh.M	IV /MECHANICAL	1	1	V	V	V	V	V	V	$\mathbf{V}^{*}$	<b>1</b>	10	Online
13	811218114015	Renish Bharathi S	IV /MECHANICAL	V	-	V	V	$\sim$	V	V	V	V	V	10	
14	811218114016	Santhosh K		V	$\checkmark$	V	V	Æ	A	V	V	1	/	8	Online
15	811218114017		IV /MECHANICAL	V	V	V	V		1			V	V	0	Online
16		Sathish Selva A	IV /MECHANICAL	V	1					/	V	V.	V	60	online
10	811218114018	Tamilselvan T	IV /MECHANICAL		~		V	V	~	V	~	V	V	10	online
17	811218114019	Vasanth D	IV /MECHANICAL	V	V	V	V	V	$\boldsymbol{\nu}$	~	~	V	V		
18	811218114020	Vikram S		V		V	V	V	1	./		V	./	10	online
			IV /MECHANICAL	V	1/	1	,/			V	V	V	V	10	online
	811218114021	Vishnu B	IV /MECHANICAL		/	V	-	V	V	V	~		V	10	online
20	811218114022	Yogavishuvabarathi G	IV /MECHANICAL	V		a	a	V	V	VV	1	V	V	08	
21	811218114023	Vigneshwaran C			V	V	1	V	V	VI	/		V		online
2	Data and	Million Africa, Million and Arrison	IV /MECHANICAL	/	~	V	V	ici		4	/	V		(0	online
	511210114501	Dharmaseelan M	IV /MECHANICAL	V	1	1				V	1			(0)	online
		-				V		V	<u> </u>	VI		VI		10	online



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Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesap College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

S.No.	Reg.No	Student's Name	Year/ Branch		DATE: 06.06.22		ATE: .06.22		ATE: 06.22		DATE: 9.06.22		DATE:	NO OF	
23	811218114302	Mahamuni R		FN	AN	FN	AN			-			10.06.22	SESSIONS	SIGNATO E OF TH
24			IV /MECHANICAL	1	1	1			AN	V Fr	N AL	N FN	AN	ATTENDED	STUDEN
	811218114303	Naveen Kumar T	IV /MECHANICAL		-		1	7	7	1	11	1	1 5	110	
25	811218114304	Ramakrishnan M	IV /MECHANICAL		-7	-1	1	1	1	1	1	1			onfine
26	811218114306	Subeekshiseeth Prasana D		-7	. 7	1	7	a	a				AT	10	opline
27	811219114001		V IV /MECHANICAL	~	1				_	~~	1	1	19	8	
		Aathilingam V	III / MECHANICAL	+	1	7	5	1	7	~	1	in	-	lo	online
28	811219114002	Abimanyu C	III /MECHANICAL	4	-1	1	4	-7	7	V	A		-/		online
.9	811219114003	Ajay S			1	7	-7	1	1		5	1	7	10	online
0	811219114004		III /MECHANICAL	1	1	a	a		1	M		1	7	10	online
	0110104	Christy Lourthu Samy A	III /MECHANICAL	~	И			2		M	7	$\checkmark$	7	$\mathbf{x}$	
	811219114006	Periyasamy P	III /MECHANICAL			27	1	1	-1	7	7	N	7	,	outre
2	811219114008	Saravana Kumar V		7	4	7	1	7.	7	~	-				contine
3 8	811219114010	Cining of t	III /MECHANICAL	-1	-1	7		-1	2	. 0		a	9.	.8	confire
	01101010		III /MECHANICAL	1	7	0	1		с. 	$\checkmark$	7	$\sim$	-7.	1.0	
		Suriyaganesh M	III /MECHANICAL	-		Q.	a	2	1	7	5	N	9	8	Online
8	811219114012	Validation	III /MECHANICAL	9	1	/	-	2	7	N		1	7		orline
8	811219114013	Vilmat D		1	7	1	-7	M	-	V		n.		10	Online
			III /MECHANICAL	1	1	1				V/	-7.		7	.10 4	entire
							//		1	7	a	0	2	A	onfine



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Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Gariesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

S.No.	Reg.No	Student's Name	Year/ Branch		ATE: 5.06.22	DA1 07.00		DAT 08.06.		DA' 09.0			ATE: . 06.22	NO OF SESSIONS	SIGNATUR E OF THE
				FN	AN	FN	AN'	FN	AN	FN	AN	FN	AN	ATTENDED	STUDENT
37	811219114301	Hariharan R	III /MECHANICAL	$\checkmark$	V	V	V	$\checkmark$	V	$\checkmark$	V	V	$\checkmark$	10	onlyne
38	811219114302	Mohanraj G	III /MECHANICAL	V.	V	V	V	V	V	V	$\checkmark$	V	1	10	online
39	811219114303	Sivash K	III /MECHANICAL	V		V	$\checkmark$	V	$\checkmark$	$\checkmark$	V	V	1	10	baline
40	811219114701	Gokul R	III /MECHANICAL	V	$\checkmark$	V	V	$\checkmark$	V	V	$\checkmark$	V	$\checkmark$	10	orline
41	811219114702	Madhan Murugan S	III /MECHANICAL	V	V	V	V	V	V	V	V	V	V	Ū.	online
42	811219114703	Muthukaruppan M	III /MECHANICAL	V	V	V	V	V	$\checkmark$	$\checkmark$	V	0	V	6	caline
43	811219114704	Inigo Rithish P	III /MECHANICAL	V	V	V	V	$\checkmark$	V	V	$\checkmark$	V	V	0	online
44	811220114001	Abinesh As	II /MECHANICAL	V	V	V		$\checkmark$	V.	$\checkmark$	V	$\checkmark$	V.	10	online
45	811220114003	Anbarasan M	II /MECHANICAL	V	V	V	$\checkmark$	$\checkmark$	/	$\checkmark$	V	V	V	10	phine
46	811220114005	Arunkumar M	II /MECHANICAL	V	V	V	V	V.	/	$\checkmark$	V	V	V	10	unline
47	811220114008	Balamurugan R	II /MECHANICAL	V	V	$\checkmark$	V.	$\checkmark$	V	$\checkmark$	V	V	V	lo	online
48	811220114013	Dhanushraja P	II /MECHANICAL	V	V	$\checkmark$	V	V	V	V	~	V	~	10	online
49	811220114015	Durai Pandi A	II /MECHANICAL	V	V	$\checkmark$	$\checkmark$	$\checkmark$	V.	V	V	V	V	Up.	Phline
50	811220114017	Hariharan M	II /MECHANICAL	V	V	V	V	V	V	V	V	1	V	20	online



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Dr. G. Bula, riphnan, M.E., Ph.D., Frincipal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

S.No.	Reg.No	Student's Name	Year/ Branch		DATE: 6.06.22		TE: )6.22	DA1 08.06			TÉ: 06.22		ATE: 06.22	NO OF	SIGNATUR
-				FN	AN	FN	AN	FN	AN	FN	AN	FN	AN	SESSIONS ATTENDED	E OF THE STUDENT
51	811220114020	Kanishkavardhini S	II /MECHANICAL	-1	~	7	n	$\sim$	1	1	7	~	1		- S.
52	811220114025	Kishor Kumar D	II /MECHANICAL	7	1	1	V		1		· · · ·			D	online
53	811220114026	Loganathan C	II /MECHANICAL	1		1		~		1	A	M	7	10	online
54	811220114032	Mohamed Ashif A	II /MECHANICAL	-	-		4	$\mathcal{A}$	1	1		2	1	10	online
55	811220114039	Sanjay Kumar M	II /MECHANICAL	1	4	2	1	$\checkmark$	1	1	1	A	1	9	online
56	811220114040	Santhosh Kumar R	II /MECHANICAL	1	V	1	V	$\sim$	æ	1	-1	1	1.	9	online
57	811220114042			4	2	4	$\sim$	0	5	5	1	a	1	9	online
58		Saranya Sree Tr	II /MECHANICAL	1	~	5	50	1	in	5	~	1	1	9	
	811220114043	Saravanan M	II /MECHANICAL	7	V	5	10	0	1	. 0	1	1	1	- Lo	online
59	811220114044	Sathishkumar V	II /MECHANICAL	5	V	4	$\sim$	~	n	101	5	1	1		online
60	811220114047	Sheik Ameer M	II /MECHANICAL	41										6	online
61	811220114052	Thamaraiselvan K	II /MECHANICAL	1		7	7	1'	1	~	~	1	1	6	online
62	811220114056	Vigneswaran K	II /MECHANICAL		V	7	5	1	$\mathcal{N}$	9	-7	7	1	10	online
63	811220114057	Vijayakumar G	II /MECHANICAL	7.		~	5	-1	1	2	1	~	4	10	online
64	811220114060	Yuvaraja A		1	V	$\checkmark$	1	1	5	1	A	1	5	10	online
		Turataja A	II /MECHANICAL	$\checkmark$		5	-1	1	$\mathcal{A}$	2	1	4	9	lo	online



19



Title:	Gra	pher	Report of the Battery Tech	nologie	es.			
			Mr. Abhu					
Resource	Person	1:	Co-ordinator					4
			UNIQ-MEP,					
			Trichy			Dr. G. Bhi	akrishnan, M.	E DL e
Deneur			Mr. Yasar Araf	ath		Indra Gana	Principal	с., Ph.D.,
Resource I	erson2	:	Co-ordinator				an College of Er Madurai Main	
			UNIQ-MEP,			Manikar	idam, Trichy-62	0 012.
			Trichy					
Date of con			06.06.2022	To:	11.00	5.2022	Duration:	30 Hours
Organized ]	Departr	nent :	MECHANIC	AL EN	GINEE	RING	Statution,	SV Hours
articipant	Year:	2,3,						
			4			37		
G	oogle		4			No. of Sta	idents Registe	ered : 69
enue:	loogle ] nline a	Meet						ered : 69
enue: 0	nline m	Meet	Google Meet: mee	t.google.	.com/ac	k-hfod-zm	125	
outcome o	nline m of Valu	Meet 10de (	Google Meet: mee	C). A4	41	k-bfod-zm	р	
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Indra Ganesa

COLLEGE OF ENGINEERING

Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 012 Approved by AICTE, NewDelbt & Affiliated to Anna University, Chemnel NAAC Accredited, 2(F) Status Institution by UGC





		Sample Photo	o of V	alue Adde	d Course	
Title:	Graphe	ne Battery Techn	ologie	s.	u Course	
		Mr. Abhu	_			
Resource	Person1:	Co-ordinator				
		UNIQ-MEP,				
		Trichy				
		Mr. Yasar Arafat	1.	Dr. G. Balakri	SKIDDME	h D
Resource	Person2:	Co-ordinator	n	þ	rincing	thehitey
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Name of the Student:

Year/Sem:

AU Register Number:

## Value Added Course

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ENGINEE

## "Graphene Battery Technologies"

1. The current flow through electrolyte is due to the movement of

COLLEGE OF

(A) ions

(B) holes

(C) electrons

(D) none of the above

2. If a lead-acid cell is discharged below 1.8 V the following will happen.

(A) Capacity of cell will reduce

(B) Sulphation of plates will occur

(C) Internal resistance will increase

(D) All above will occur

3. Each cell has a vent cap

(A) to allow gases out when the cell is on charge

(B) to add water to the cell if needed

(C) to check the level of electrolyte

(D) to do all above functions

Dr. G. Balak

Dr. G. Balakrishpan, M.E., Ph.D. Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

4. Following will occur if level of electrolyte falls below plates

(A) capacity of the cell is reduced

(B) life of the cell is reduced

(C) open plates are converted to lead sulphate

(D) all above





- 5. Which of the following battery is used for air-craft ?
- (A) Lead-acid battery
- (B) Nickel-iron battery
- (C) Dry cell battery
- (D) Silver oxide battery

6. Cells are connected in parallel to

- (A) increase the efficiency
- (B) increase the current capacity
- (C) increase the voltage output
- (D) increase the internal resistance

7. In a battery cover is placed over the element and sealed to the top of the battery container. This is done

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(A) to reduce evaporation of water from electrolyte

(B) to exclude dirt and foreign matter from the electrolyte

- (C) to discharge both of the above functions
- (D) to discharge none of the above functions

8. Level of electrolyte in a cell should be \_\_\_\_\_ the level of plates

(A) below

- (B) equal to
- (C) above
- (D) none of the above

9. Under normal charging rate, the charging current should be

(A) 10% of capacity

(B) 20% of capacity

(C) 30% of capacity

(D) 40% of capacity

Dr. G. Balakrishnan; M.E., Ph.D.,





10. Satellite power requirement is provided through

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- (A) solar cells
- (B) dry cells
- (C) nickel-cadmium cells
- (D) lead-acid batteries

11. A constant-voltage generator has

(A) minimum efficiency

(B) minimum current capacity

(C) low internal resistance

(D) high internal resistance

12. 48 ampere-hour capacity would deliver a current of

(A) 48 amperes for 1 hour

(B) 24 amperes for 2 hours

(C) 8 amperes for 6 hours

(D) 6 amperes for 8 hours

13. Mercury cell has which of the following characteristics ?

(A) Flat discharge current-voltage curve

(B) High power to weight ratio

(C) Comparatively longer shelf life under adverse conditions of high temperature and humidity

(D) All of the above

Dr. G. Bail an, M.E., Ph.D.,



- 14. Which of the following factors adversely affects the capacity of the lead acid battery ?
- (A) Temperature of surroundings
- (B) Specific gravity of electrolyte
- (C) Rate of discharge
- (D) All of the above
- 15. Internal resistance of a cell is reduced by
- (A) using vent plug to permit gas formed during discharge
- (B) increasing the plate area
- (C) putting plates very close together
- (D) all above methods
- 16. Trickle charging of a storage battery helps to
- (A) maintain proper electrolyte level
- (B) increase its reserve capacity
- (C) prevent sulphation
- (D) keep it fresh and fully charged
- 17. It is noticed that durum charging
- (A) there is a rise in voltage
- (B) energy is absorbed by the cell
- (C) specific gravity of H2SO4 is increased
- (D) the anode becomes chocolate brown in colour (PbCfe) and cathode becomes grey
- metallic lead (Pb)
- (E) all of the above





18. Which of the following cell has a reversible chemical reaction?

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- (A) Lead-acid
- (B) Mercury oxide
- (C) Carbon-zinc
- (D) Silver-oxide

19. Batteries are charged by

(A) rectifiers

(B) engine generator sets

(C) motor generator sets

(D) any one of the above methods

20. Cell short circuit results in

(A) low specific gravity electrolyte

(B) abnormal high temperature

(C) reduced gassing on charge

(D) all above

21. Internal short circuits are caused by

(A) Breakdown of one or more separators

(B) Excess accumulation of sediment at the bottom of the cell

(C) Both (A) and (B)

(D) None of the above

22. The substances which combine together to store electrical energy during the charge are

called \_\_\_\_\_ materials

(A) Active

(B) Passive

(C) Inert

(D) Dielectric

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.







- 23. Battery container should be acid resistance; therefore it is made up of
- (A) Glass
- (B) Plastic
- (C) Wood
- (D) All of the above

24.\_\_\_\_\_ of electrolyte indicates the state of charge of the battery

(A) Colour

(B) Mass

(C) Viscosity

(D) Specific gravity

- 25. In alkaline cell the electrolyte is
- (A) Dilute sulphuric acid

(B) Concentrated sulphuric acid

- (C) NaOH
- (D) KOH

Dr. G. Balakrishnan, M.E., Ph.D.,



#### Value Added Course

#### "Graphene Battery Technologies"

#### ANSWER KEY

1	a	6	b	11	с	16	d	21	b
2	d	7	с	12	d	17	e	22	· d
3	d	8	с	13	d	18	a	23	с
4	d	9	а	14	d	19	d	24	а
5	b	10	a	15	đ	20	d	25	b

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road

Manikandam, Trichy-620 012.

**VAC Coordinator** 

4

HoD/Mechanical





NAAC Accredited, 2(F) Status Institution by UGC Name of the Student: Proveen A AU Register Number: 811218114012

Madurai Main Road (NH-458), Manikandam, Tiruchirappalli - 620 012 Approved by AICTE, NewDelhi & Affiliated to Anna University, Chennai

ENGINEER

Value Added Course

## "Graphene Battery Technologies"

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COLLEGE OF

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(B) to add water to the cell if needed

(C) to check the level of electrolyte

(b) to do all above functions

Dr. G. Balakrishnan, M.E., Ph.D. Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

4. Following will occur if level of electrolyte falls below plates

(A) capacity of the cell is reduced

(B) life of the cell is reduced

(C) open plates are converted to lead sulphate

(D) all above





5. Which of the following battery is used for air-craft?

EGE

OF

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- (A) Lead-acid battery
- (B) Nickel-iron battery
- (C) Dry cell battery
- (D) Silver oxide battery

6. Cells are connected in parallel to

- (A) increase the efficiency
- (B) increase the current capacity
- (C) increase the voltage output
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Dr. G. Balakrishnan, M.E., Ph.D.,





10. Satellite power requirement is provided through

GE

DF

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(B) High power to weight ratio

(C) Comparatively longer shelf life under adverse conditions of high temperature and humidity

(D) All of the above

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.



- 14. Which of the following factors adversely affects the capacity of the lead acid battery ?
- (A) Temperature of surroundings
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- (C) specific gravity of H2SO4 is increased
- (D) the anode becomes chocolate brown in colour (PbCfe) and cathode becomes grey
- metallic lead (Pb)
- Call of the above





18. Which of the following cell has a reversible chemical reaction?

COLLEGE OF ENGINEERING Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 012 Approved by AICTE, NewDelhi & Affiliated to Anna University, Cheamat NAAC Accredited, 2(F) Status Institution by UGC

- (A) Lead-acid
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- (C) Carbon-zinc
- (D) Silver-oxide

19. Batteries are charged by

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(B) engine generator sets

(C) motor generator sets

(D) any one of the above methods

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(A) low specific gravity electrolyte

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(B) Excess accumulation of sediment at the bottom of the cell

(C) Both (A) and (B)

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- (B) Passive
- (C) Inert

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Dr. G. Balakrishnan, M.E., Ph.D.,





23. Battery container should be acid resistance; therefore it is made up of

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ENGINEERING

(A) Glass

(B) Plastic

(C)/Wood

(D) All of the above

24.\_\_\_\_\_ of electrolyte indicates the state of charge of the battery

(A) Colour

(B) Mass

(C) Viscosity

(D) Specific gravity

25. In alkaline cell the electrolyte is

(A) Dilute sulphuric acid

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Dr. G. Balak au, M.E., Ph.D.



Indra



Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012

**Department of Mechanical Engineering** 

Academic Year 2021-2022 - Odd Semester

VALUE ADDED COURSE ASSESSMENT SHEET

"Graphene Battery Technology"

		•	Attendance Details		VAC-MCQ TEST		OVERALL MARK(100)	
S.No.	Reg.No	Student's Name	Year/ Branch	No. of Hours Attended	Attendance Mark(100) (A)	No of Correct Answers	MCQ Mark(100) (B)	(50% of A + 50% of B)
1	811218114001	Abinash P	IV/MECHANICAL	30	100	20	80	90
2	811218114002	Ajith Kumar M	IV/MECHANICAL	30	100	18	72	86
3	811218114003	Arun Pandian M R	IV/MECHANICAL	28	93	18	72.	83
4	811218114004	Alaguraja M	IV/MECHANICAL	29	97	21	. 84	90
5	811218114005	Balasubramani K	IV/MECHANICAL	28	93	18	72	83
6	811218114006	Dineshkumar K	IV/MECHANICAL	29	97	19	76	86
7	811218114007	Ganesapandy K	IV/MECHANICAL	26	87	18	72	79





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				Attendar	ice Details	VAC-MO	CQ TEST	OVERALL MARK(100)
S.No.	Reg.No	Student's Name	Year/ Branch	No. of Hours Attended	Attendance Mark(100) (A)	No of Correct Answers	MCQ Mark(100) (B)	(50% of A + 50% of B)
8	811218114009	Karthikeyan R	IV/MECHANICAL	28	93	-17	68	81
9	811218114010	Murugappan P	IV/MECHANICAL	30	100	18	72	86
10	811218114011	Prasanth R	IV/MECHANICAL	28	93	19	76	85
11	811218114012	Praveen A	IV/MECHANICAL	28	93	21	84	89
12	·811218114013	Rabin Singh X	IV/MECHANICAL	26	87	20	80	83
13	811218114014	Ramesh.M	IV/MECHANICAL	26	87	21	84	85
14	811218114015	Renish Bharathi S	IV/MECHANICAL	28	93	18	72	83
15	811218114016	Santhosh K	IV/MECHANICAL	28	93	19	76	85
16	811218114017	Sathish Selva A	IV/MECHANICAL	26	87	18	72	79
17	811218114018	Tamilselvan T	IV/MECHANICAL	28	93	21	84	89



# Indra Ganesan COLLEGE OF ENGINEERING

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Buiakrishnan, M.E., Ph.D., LIA G Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

S.No.	Reg.No	Student's Name	Variab	Attenda	nce Details	VAC-MCQ TEST		OVERALL
			Year/ Branch	No. of Hours	Attendance Mark(100)	No of Correct	MCQ Mark(100)	MARK(100) (50% of A +
18	811218114019	Vasanth D	IV/MECHANICAL	Attended 29	(A)	Answers	(B)	50% of B)
19	811218114020	Vilmon 0	IV/MECHANICA -	29	98	22	88	84
		Vikram S	IV/MECHANICAL	28	93	20	80	0.4
20	811218114021	Vishnu B	IV/MECHANICAL	20			00	84
21	811218114022	W		30	100	21	84	89
	011210114022	Yogavishuvabarathi G	IV/MECHANICAL	28	93	20	80	
22	811218114023	Vigneshwaran C	IV/MECHANICAL			20	80	86
23	011010114004			29	98	22	88	94
	811218114301	Dharmaseelan M	IV /MECHANICAL	26	87	20	81	
24	811218114302	Mahamuni R	IV /MECHANICAL	20		20	01	84
5	811218114303	M		30	100	16	82	80
	011210114505	Naveen Kumar T	IV /MECHANICAL	30	100	18	82	0.5
6	811218114304	Ramakrishnan M	IV /MECHANICAL	30			04	85
7	811218114306	Subsolution of T		50	100	21	84	85
		Subeekshiseeth Prasana D	IV /MECHANICAL	28	93	18	83	80
8	811219114001	Aathilingam V	III /MECHANICAL	29	0.0		83	80
				27	98	19	86	. 81





COLLEGE OF ENGINEERING Medurai Main Road (NH-458), Manikandam, Tiruchirappelli - 620 012 Approved by AICTE, NewDelhi & Attiliated to Armas University: Chemnel NAAC Accredited, 2(F) Status Institution by UGC



Dr. B. Balakushnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

S.No.	Reg.No	Student's Name	Year/ Branch	Attendance Details		VAC-MCQ TEST		OVERALL
29					No. of Hours	Attendance Mark(100)	No of Correct	MCQ
29	811219114002	Abimanyu C	III /MECHANICAL	Attended 28	(A)	Answers	Mark(100) (B)	50% of B)
30	811219114003	Ajay S			93	18	72	83
30	811219114004		III /MECHANICAL	24	80	19	76	78
31		Christy Lourthu Samy A	III /MECHANICAL	26	87	10		/8
21	811219114006	Periyasamy P	III /MECHANICAL	28		18	72	79
32	811219114008	Saravana Kumar V		28	93	19	76	85
3	811219114010		III /MECHANICAL	28	93	21	84	
4		Siriyac Selva A	III /MECHANICAL	28	93	20		89
4	811219114011	Suriyaganesh M	III /MECHANICAL	24		20	80	87
5	811219114012	Vaithiyalingam M		24	80	21	84	82
5	811219114013		III /MECHANICAL	26	87	18	72	
	011219114013	Vikash R	III /MECHANICAL	27	90			79
	811219114301	Hariharan R	III /MECHANICAL			19	76	83
	811219114302	Mohanraj G		28	93	18	72	83
			III /MECHANICAL	28	93	18	72	83





Dr. G. Balakrishpon, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

				Attendar	nce Details	VAC-MO	CQ TEST	OVERALL MARK(100) (50% of A + 50% of B)
S.No.	Reg.No	Student's Name	Year/ Branch	No. of Session Attended	Attendance Mark(100) (A)	No of Correct Answers	MCQ Mark(100) (B)	
39	811219114303	Sivash K	III /MECHANICAL	26	87	21	84	85
40	811219114701	Gokul R	III /MECHANICAL	28	93	22	88	91
41	811219114702	Madhan Murugan S	III /MECHANICAL	26	87	20	80	83
42	811219114703	Muthukaruppan M	III /MECHANICAL	-28	93	21	84	89
43	811219114704	Inigo Rithish P	III /MECHANICAL	28	93	20	80	. 87
44	811220114001	Abinesh As	II /MECHANICAL	26	87	22	88	87
45	811220114003	Anbarasan M	II /MECHANICAL	28	93	19	76	85
46	811220114005	Arunkumar M	II /MECHANICAL	30	100	21	84	92
47	811220114008	Balamurugan R	II /MECHANICAL	28	93	20	80	87
48			II /MECHANICAL	26	87	21	84	85
	811220114013	Dhanushraja P	II /MECHANICAL	28	93	18	72	83
49	811220114015	Durai Pandi A	A (DECLARITORIE	20				



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Dr. C. Balakrishnan, M.E., Ph.D. Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy (\$20.0)?

				Attendance Details		VAC-MCQ TEST		OVERALL MARK(100)
S.No.	Reg.No	Student's Name	Year/ Branch	No. of Session Attended	Attendance Mark(100) (A)	No of Correct Answers	MCQ Mark(100) (B)	(50% of A + 50% of B)
50	811220114017	Hariharan M	II /MECHANICAL	28	93	19	76	85
51	811220114020	Kanishkavardhini S	II /MECHANICAL	30	100	18	72	86
52	811220114025	Kishor Kumar D	II /MECHANICAL	28	93	21	84	89
53	811220114026	Loganathan C	II /MECHANICAL	28	93	22	88	91
54	811220114032	Mohamed Ashif A	II /MECHANICAL	26	87	20	80	83
55	811220114039	Sanjay Kumar M	II /MECHANICAL	28	93	21	84	89
56	811220114040	Santhosh Kumar R	II /MECHANICAL	28	93	20	80	87
57	811220114042	Saranya Sree Tr	II /MECHANICAL	28	93	22	88	91
58	811220114043	Saravanan M	II /MECHANICAL	26	87	18	72	79
59	811220114044	Sathishkumar V	II /MECHANICAL	28	93	21	84	89
60	811220114047	Sheik Ameer M	II /MECHANICAL	28	-93	18	72	83





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Dr. 16. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

				Attendance Details		VAC-MCQ TEST		OVERALL MARK(100)
S.No.	Reg.No	Reg.No Student's Name	Year/ Branch	No. of Hours Attended	Attendance Mark(100) (A)	No of Correct Answers	MCQ Mark(100) (B)	(50% of A + 50% of B)
61	811220114052	Thamaraiselvan K	II /MECHANICAL	28	93	19	76	85
62	811220114056	Vigneswaran K	II /MECHANICAL	30	100	18	72	86
63	811220114057		II /MECHANICAL	28	93	17	68	81
		Vijayakumar G	II /MECHANICAL	28	93	18	72	83
64	811220114060	Yuvaraja A	II /MECHANICAL	26	87	19	76	81
65	811220114302	Chellapandian R					84	89
66	811220114303	Jeeva Ganesh S J	II /MECHANICAL	28	93	21		
67	811220114304	Kabilan P	II /MECHANICAL	30	100	20	80	90
68	811220114305	Mohamed Nafil A	II /MECHANICAL	30	100	21	84	92
			II /MECHANICAL	-30	100	18	72	86
69	811220114306	Ruban A						

**VAC Coordinator** 

HoD/MECHANICAL

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering Manikandam, Trichy-620 012. IG-Valley, Madurai Main Road successfully completed the value added course on "Graphene Battery to 11.06.2021(5days) during the Academic Year 2020-2021 IQAC of our institution in association with CADD CENTRE from 07.06.2021 Technologies" organized by department of mechanical Engineering and Premier Plaza, No-122, II Floor, 5&44, Bharathiar Salai, Cantonment, Tiruchirappalli, This is to certify that Mr.Sathiskumar V, II Year, MECH has CERTIFICATE OF PARTICIPATION CADD CENTRE 7 anesar CADD Cent Mr.Balaji and a CADD.

21-22/Exton

Dr. G. Balakrishnan, M.E., Ph.D., Indra Ganesan College of Engineering successfully completed the value added course on "Graphene Battery to 11.06.2021(5days) during the Academic Year 2020-2021 IQAC of our institution in association with CADD CENTRE from 07.06.2021 Technologies" organized by department of mechanical Engineering and Manikandam, Trichy-620 012. IG-Valley, Madurai Main-Road Premier Plaza, No-122, II Floor, 5&44, Bharathiar Salai, Cantonment, Tiruchirappalli, This is to certify that Mr.Saravanan M, II Year, MECH has Principal CERTIFICATE OF PARTICIPATION nora CADD CENTRE Janesan CADD Cent Sale 1 Mr.Balaji CADD.

Dr. G. BalakriShnan, M.E., Ph.D., Indra Ganesan College of Engineering successfully completed the value added course on "Graphene Battery to 11.06.2021(5days) during the Academic Year 2020-2021 IQAC of our institution in association with CADD CENTRE from 07.06.2021 Technologies" organized by department of mechanical Engineering and Manikandam, Trichy-620 012. IG Valley, Madurai Main Road Premier Plaza, No-122, II Floor, 5&44, Bharathiar Salai, Cantonment, Tiruchirappalli, Principal This is to certify that Mr.Loganathan C, II Year, MECH has CERTIFICATE OF PARTICIPATION CADD CENTRE anesan CADD Cent Mr.Balaji - Stal CADD.

Dr. G. Balakrishnan, M.E., Ph.D., successfully completed the value added course on "Graphene Battery Technologies" organized by department of mechanical Engineering and to 11.06.2021(5days) during the Academic Year 2020-2021 IQAC of our institution in association with CADD CENTRE from 07.06.2021 Indra Ganesan College of Engineering Manikandam, Trichy-620 012. IG Valley, Madurai Main Road Premier Plaza, No-122, II Floor, 5&44, Bharathiar Salai, Cantonment, Tiruchirappalli, This is to certify that Mr.Hariharan M, II Year, MECH has Principal CERTIFICATE OF PARTICIPATION CADD CENTRE anesan CADD Cent - Balasi Mr.Balaji CADD.

Dr. G. Balakrishnan, M.E., Ph.D., Indra Ganesan College of Engineering successfully completed the value added course on "Graphene Battery to 11.06.2021(5days) during the Academic Year 2020-2021 IQAC of our institution in association with CADD CENTRE from 07.06.2021 Technologies" organized by department of mechanical Engineering and Manikandam Trichv-620 012 1G-Valley, Madurai Main Road Premier Plaza, No-122, II Floor, 5&44, Bharathiar Salai, Cantonment, Tiruchirappalli, Principal This is to certify that Mr.Durai pandi A, II Year, MECH has CERTIFICATE OF PARTICIPATION nora CADD CENTRE Janesan CADD Cent Mr.Balaji - Seres CADD.

Dr. G. Balakrishnan, M.E., Ph.D., Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012. organized by department of mechanical Engineering and IQAC of our completed the value added course on "Graphene Battery Technologies" 11.06.2021(5days) during the Academic Year 2020-2021 institution in association with CADD CENTRE from 07.06.2021 to Principal Premier Plaza, No-122, II Floor, 5&44, Bharathiar Salai, Cantonment, Tiruchirappalli, This is to certify that Mr.Ruban A, II Year, MECH has successfully CERTIFICATE OF PARTICIPATION CADD CENTRE nes3 CADD Cent Mr.Balaji Ser S CADD.

21.22/C.Kar.























