P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE
RAJAPALAYAM – 626 108, Tamil Nadu

(Government Aided Autonomous Institution)

DIPLOMA IN ENGINEERING AND TECHNOLOGY

First Year curriculum & syllabus

N2 – SCHEME

IMPLEMENTED FROM 2021 – 2022

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

(Government Aided Autonomous Institution)

Diploma in Engineering and Technology

(Implemented for Students admitted from Academic Year 2021 – 2022 onwards)

N2 Scheme – Regulations

1. Description of the Course:

a). Full Time (3 Years)

- The Course for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters * and First Year is common to all Engineering Branches.
- Each semester will have 16 Weeks duration of study with 35 hours per week.
- The Curriculum for all the 6 semesters of Diploma courses (Engineering and Modern Office Practice) have been revised and revised curriculum is applicable for the candidates admitted from 2021 – 2022 academic year onwards.

2. Condition for Admission:

Condition for admission to the Diploma courses shall be required to have passed in the S.S.L.C Examination of the Board of Secondary Education, Tamil Nadu.

(OR)

The Anglo Indian Higher School Examination with eligibility for Higher Secondary Course in Tamil Nadu.

(OR)

The Matriculation Examination of Tamil Nadu.

(OR)

Any other Examination recognized as equivalent to the above by the Board of Secondary Education, Tamil Nadu.

Note: In addition, at the tune of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time.

3. Admission to Second Year: (Lateral Entry)

A Pass in H. Sc. (academic) or (vocational) Courses mentioned in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board with eligibility for University Courses of study or equivalent examination & Should have studied the following Subjects.

A Pass in 2 Years ITI with appropriate Trade or Equivalent examination.

S. No.	Courses	H. Sc. Academic	H. Sc. Vocational		Industrial Training Institute Courses.
			Subject Studied		
			Related Subjects	Vocational Subjects	
1.	All the Regular Courses	Physics and Chemistry as Compulsory along with Mathematics / Biology	Maths / Physics / Chemistry	Related Vocational Subjects Theory & Practical	2 Years Course to be passed with appropriate Trade.
2.	Diploma Course in Modern Office Practice	English & Accountancy English & Elements of Economics English & Elements of Commerce	English & Accountancy English & Elements of Economics English & Management Principles & Techniques. English & Typewriting.	Accountancy & Auditing Banking Business Management Co-operative Management International Trade Marketing & Salesmanship Insurance & Material Management Office Secretary ship.	-----

- For the Diploma Courses related with Engineering Technology, the related equivalent subjects prescribed along with Practical may also be taken for arriving the eligibility.

- Branch will be allotted according to merit through Counselling by the respective Principal as per communal reservation.

- For admission to the Textile Technology and Modern office Practice Diploma Courses the candidates studied the related subjects will be given first preference.

- Candidate who have studied Commerce Subjects are not eligible for Engineering Diploma Courses.

4. **Age Limit:** No Age limit.

5. **Medium of Instruction:** English

6. **Eligibility for the Award of Diploma:**

No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3 academic years, if he/she admitted in First Year and two years if admitted under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Courses are as follows:

Diploma Course	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years

7. **Subjects of Study and Curriculum outline:**

The subjects of study shall be in accordance with the syllabus prescribed both for Theory and Practical subjects from time to time. The curriculum outline is given in Annexure – I.

8. Examinations:

Autonomous End Examinations for all subjects in all semesters under the prescribed scheme of examinations will be conducted at the end of each semester.

The internal assessment marks for all the subjects, both Theory and Practical will be awarded on the basis of continuous internal assessment conducted during the semester concerned. For each subject, 25 marks are allotted for internal assessment and 100 marks are allotted for Autonomous End Examination and reduced to 75 marks

Total Marks for result are $25 + 75 = 100$ Marks

Note: 80% of attendance is compulsory to write examination.

9. Evaluation Systems:

The following Evaluation System (Both Theory and Practical) will be followed for N2 – Scheme for the students admitted from the academic year 2021-2022 onwards.

A. Theory Subjects (I, II and III Year Students):

I	Internal Assessment	25 Marks
II	External Assessment for Theory Subjects will be conducted for 100 Marks and will be reduced to 75 marks.	75 Marks
	Total =	100 Marks

I. Internal Assessment:

The Internal Assessment marks for a total of 25 marks are to be distributed as follows:

a).	Periodic Tests	10 Marks
b).	Assignment	5 Marks
c).	Online Quiz	5 Marks
d).	Seminar Presentation	5 Marks
	Total =	25 Marks

(a) Periodic Tests (10 Marks)

Periodic Test	Unit	When to conduct	Duration	Marks
CAT – 1	Unit – 1 & 2 (or) any two units	End of 6th week	2 Hours	50 Marks
CAT – 2	Unit – 3 & 4 (or) any two units	End of 12th week	2 Hours	50 Marks
CAT – 3	Unit – 5 (or) any one unit	End of 15th week	1 Hour	25 Marks
Model Exam	Full Portion	End of 16th week	3 Hours	100 Marks

- The model Exam covering all the five units as per end exam pattern will be conducted prior to practical end examination.
- Any student who scores poor marks in Periodic tests (CAT-1,2,3), he/she has to undergo repeat tests to improve his/her performance.
- The total marks (225 Marks) of all the tests will be converted for **10 marks** and awarded to the students.

CAT – Question Pattern:

Type	Number of Question	Marks
Part – A	10 questions out of 15 (10 x 2) Marks	20
Part – B	2 questions x 15 Marks (or) each 8 and 7	30
	Total =	50

b) Assignment: (5 Marks)

Three assignments are to be submitted by the students for a total of 50 marks and the break up details are given below:

Assignment 1 (Unit 1 & 2 (or) any two units)	20 Marks
Assignment 2 (Unit 3 & 4 (or) any two units)	20 Marks
Assignment 3 (Unit (or) any one unit)	10 Marks
Total	50 Marks

- Five Question from one unit
- The marks scored in assignment will be converted to **5 marks**.

c) Online Quiz : (05 Marks)

Test	Unit	When to Conduct	Questions	Time	Marks
Online Quiz – 1	Unit – 1 & 2(or) any two units	End of 6th week	30	40 min.	30
Online Quiz – 2	Unit – 3 & 4(or) any two units	End of 12th week	30	40 min.	30
Online Quiz – 3	Unit – 5 (or) any one unit	End of 15th week	15	20 min	15

- Equal Weightage will be given for all Units.
- The average of all the tests will be converted to **05 marks.**

d) Seminar Presentation: (5 marks)

1. The Students have to select the topics from their subjects which will help to improve their grasping capacity as well as their capacity to express the subject in hand.

2. The students will be allowed to prepare the material for the given topic using the Library or Internet and they will be permitted to present seminar.

3. For First and Second year, the students will be permitted to present the seminar as a group not exceeding six members and each member of the group should participate in presentation.

4. For Third year, the student should present the seminar individually.

5. For each theory subject minimum of one seminar presentation is mandatory and carries 5 marks.

6. The respective subject faculty may suggest topics to the students and will evaluate the submitted material and the seminar presentation (2 ½ marks for the material submitted in writing and 2 ½ marks for the seminar presentation)

First and Second Year:

Seminar	Member	Topic	Marks	
			Witten Material	Seminar
Seminar – 1	5 to 6	Subject	2.5	2.5

Third Year:

Seminar	Member	Topic	Marks	
			Witten Material	Seminar
Seminar – 1	Individual	Subject	2.5	2.5

Instructions:

- All the test Papers, Assignment Papers / Notebooks and the seminar presentation written material after getting the signature with date from the students must be kept in safe custody in the department for verification and audit.
- It should be preserved for one semester after publication of Autonomous Results and produced to the flying squad and the inspection team at the time of inspection / verification.

II. External Assessment (End Examination) :

I Year Students : (Question pattern)

S.#	Type	Question Number	Description	Marks Allotted	Total Marks
1	Part – A	1 to 20	15 Questions are to be answered out of 20 questions. (From each unit, a maximum of four questions must be asked)	Each Question carries 2 Mark	15 x 2 = 30 Marks
2	Part – B	21 to 25	1. **Descriptive type answer questions:** Each question in PART – B will have 3 Sub divisions. Out of these 3 Sub questions, 2 questions are to be answered for 7 marks each. 2. Out of the 3 Sub questions in PART – B, one sub question can	Each Question carries 14 Marks	05 x 14 = 70 Marks

			be on problems pertaining to the following: Analytical ability/ logical ability /diagnostic ability/ conceptual ability relevant to the syllabus of the subject concerned. (Note: If the subject doesn't have problems, no need to include questions related to problems) 3. Equal weightage is to be given to the whole syllabus.		
				Total =	100

- Clark's table will not be permitted for the Board Examinations.
- Examinations will be conducted for 100 marks and will be reduced to 75 marks.

II & III Year Students: (Question pattern)

S. No.	Type	Question Number	Description	Marks Allotted	Total Marks
1	Part – A	1 to 20	15 Questions are to be answered out of 20 questions (From each unit, a maximum of four questions must be asked)	Each Question carries 2 Mark	15 x 2 = 30 Marks
2	Part – B	21 to 25	1. All the Five Questions should be of either or pattern. Students have to answer all these five questions. Each question carries 14 marks.	Each Question carries 14 Marks	05 x 14 = 70 Marks

			2. Based on the discretion of the question paper setter, two seven mark questions (with sub divisions "a" & "b") or one 14 marks question can be asked). One 7-mark sub question can be based on problem to test the analytical ability/ logical ability /diagnostic ability/ conceptual ability relevant to the subject. 3. (Note: If the subject doesn't have problems, no need to include questions related to problems). 4. Equal weightage is to be given to the whole syllabus.		
				Total =	100

- Examinations will be conducted for 100 marks and will be reduced to 75 marks

B. Practical Subjects: (I, II and III Year Students)

I. Internal Assessment:

The internal Assessment marks (25 marks) for practical subjects are to be calculated as follows:

a).	Observation and Practical related works	10 Marks
b).	Worksheets	5 Marks
c).	Seminar	10 Marks
	Total =	25 Marks

- The observation containing record of every completed exercise should be submitted by students before the subsequent practical class and marks will be awarded for each exercise subject to a maximum of **10 marks.**
- A Worksheet related to each exercise has to be answered and submitted by each student before the subsequent practical class and will be evaluated for **5 marks.**
- For each practical subject minimum of two seminars are to be given and the average marks scored should be reduced to **10 marks.**
- Presentation is mandatory for all and it is reviewed by the faculty concerned.

First Year, Second Year & Third Year:

Seminar	Member	Marks	
		Witten Material	Seminar
Seminar – 1	5 to 6	5	5
Seminar – 2	5 to 6	5	5

- At the end of each semester, the average marks of all the exercises for Observation, Worksheet and Seminar are to be calculated to arrive at the internal assessment mark for practical. $(10 + 5 + 10 = 25$ Marks)
- The students have to submit the Observation Note Book / File for End Examination.
- All the marks awarded for Observation, Worksheet and Seminar should be entered in the Personal Log Book of the staff concerned.

II. External Examination: (End Examination)

The End Examination will be conducted by both Internal Examiner and External Examiner for a duration of 3 hours for 100 Marks and reduced to 75 marks

III. Project Work:

The students of Diploma Course have to do a Project Work as part of the curriculum and in partial fulfilment for the award of Diploma. The Project work must be reviewed twice in the same semester.

a). Internal Assessment Mark for Project Work & Viva Voce: (25 Marks)

Project Review – I	10 Marks
Project Review – II	15 Marks
Total =	25 Marks

b). Allocation of Marks for Project Work & Internship in End Examinations:

Viva Voce	30 Marks
Demonstration / Presentation	25 Marks
Project Report	25 Marks
Internship Report	20 Marks
Total =	100 Marks

- Examination will be conducted for 100 marks and will be reduced to 75 marks

c). Internship Report: (20 Marks)

- The internship training for a period minimum of two weeks shall be undergone by every candidate at the end of III / IV / V semester during vacation.
- The certificate shall be produced along with the internship report for evaluation.
- The evaluation of internship training shall be done along with final year "Project work & Internship" for 20 marks.
- The internship shall be undertaken in any Industry / Government or Private certified agencies which are in social sector / Government skill centres / Institutions / Schemes.

d). Report (Project & Internship)

A neatly prepared Project Report as per the format has to be submitted by individual student during the Project work & Internship Autonomous End Examination.

10. Physical Education:

As per the recommendation of MHRD and under Fit India Scheme, the Physical education is introduced to encourage students to remain healthy and fit by including physical activities and sports.

11. Scheme of Examinations:

The Scheme of examinations for subjects is given in **Annexure – II.**

12. Criteria for Pass:

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study successfully in our institution and pass all the subjects prescribed in the curriculum.

2. A candidate shall be declared to have passed the examination in a subject if he/she secures not less than 40% in theory subjects and 50% in practical subjects out of the total prescribed maximum marks including both the Internal Assessment and the Autonomous Examinations marks put together, subject to the condition that he/she secures at least a minimum of 30 marks out of 75 marks in the Autonomous End Theory Examinations and a minimum of 35 marks out of 75 marks in the Autonomous End Practical Examinations

13. Classification of candidates:

First Class with Superlative Distinction:

A candidate will be declared to have passed in ***First Class with Superlative Distinction*** if he/she secures not less than 75% of the marks in all the subjects and passes all the semesters in the first appearance itself and passes all subjects within the stipulated period of study of 3 years (Full Time) without any break in study.

First Class with Distinction:

A candidate will be declared to have passed in *First Class with Distinction* if he/she secures not less than 75% of the aggregate marks in all semesters put together and passes all the semesters except the I and II Semester in the first appearance itself and passes all subjects within the stipulated period of study of 3 years (Full Time) without any break in study.

First Class:

A candidate will be declared to have passed in *First Class* if he/she secures not less than 60% of the aggregate marks in all semesters put together and passes all subjects within the stipulated period of study 3 years (Full Time) without any break in study.

Second Class:

All other successful candidates will be declared to have passed in *Second Class* only.

14. Duration of a period in the Class Time Table:

The duration of each period of instruction is 1 hour and the total period of instruction hours excluding interval and Lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical). The total duration per Semester will be 16 weeks.

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ANNEXURE – I

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY SYLLABUS

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 Scheme

CURRICULUM OUTLINE

FIRST SEMESTER:

Col. No.	Subject Code	Subjects	Hours Per Week		
			Theory	Practical	Total
1.	40011	Communicative English – I	5		5
2.	40012	Engineering Mathematics – I	7		7
3.	40013	Engineering Physics – I	5		5
4.	40014	Engineering Chemistry – I	5		5
5.	40015	Workshop Practical – I		3	3
6.	40016	Engineering Physics – I Practical		2	2
7.	40017	Engineering Chemistry – I Practical		2	2
8.	40018	Basics of Computer Practical		3	3
			22	**10**	**32**
Extra Co-curricular Activities		Physical Education			2
		Library			1
		Total			**35**

SECOND SEMESTER:

Col. No.	Subject Code	Subjects	Hours Per Week		
			Theory	Practical	Total
1.	40021	Communicative English – II	4		4
2.	40022	Engineering Mathematics – II	7		7
3.	40023	Engineering Physics – II	4		4
4.	40024	Engineering Chemistry – II	4		4
5.	40025	Engineering Graphics		3	3
6.	40026	Engineering Physics – II Practical		2	2
7.	40027	Engineering Chemistry – II Practical		2	2
8.	40028	Basics of Industries and Workshop Practical – II	2	3	5
		ELS	1		1
			22	**10**	**32**
Extra Co – Curricular Activities		Physical Education			2
		Library			1
		Total			**35**

ANNEXURE – II

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY SYLLABUS

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 Scheme

SCHEME OF EXAMINATIONS

FIRST SEMESTER:

Col. No.	Subject Code	Subjects	Examination Marks		Total Marks	Minimum Pass Marks	Duration of Exam (Hrs)
			Internal	External (converted to 75)			
1.	40011	Communicative English – I	25	100	100	40	3
2.	40012	Engineering Mathematics – I	25	100	100	40	3
3.	40013	Engineering Physics – I	25	100	100	40	3
4.	40014	Engineering Chemistry – I	25	100	100	40	3
5.	40015	Workshop Practical – I	25	100	100	50	3
6.	40016	Engineering Physics – I Practical	25	100	100	50	3
7.	40017	Engineering Chemistry – I Practical	25	100	100	50	3
8.	40018	Basics of Computer Practical	25	100	100	50	3

SECOND SEMESTER:

Col. No.	Subject Code	Subjects	Examination Marks		Total Marks	Minimum Pass Marks	Duration of Exam (Hrs)
			Internal	External (converted to 75)			
1.	40021	Communicative English – II	25	100	100	40	3
2.	40022	Engineering Mathematics – II	25	100	100	40	3
3.	40023	Engineering Physics – II	25	100	100	40	3
4.	40024	Engineering Chemistry – II	25	100	100	40	3
5.	40025	Engineering Graphics	25	100	100	50	3
6.	40026	Engineering Physics – II Practical	25	100	100	50	3
7.	40027	Engineering Chemistry – II Practical	25	100	100	50	3
8.	40028	Basics of Industries and Workshop Practical – II	25	100	100	50	3

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY SYLLABUS

(Students admitted from Academic Year 2021 – 2022 onwards)

List of Equivalent Subjects for N-Scheme in N2-Scheme

FIRST SEMESTER:

N – Scheme		N2 – Scheme	
Subject Code	**Subject**	**Subject Code**	**Subject**
30011	Communication English – I	40011	Communicative English – I
30012	Engineering Mathematics – I	40012	Engineering Mathematics – I
30013	Engineering Physics – I	40013	Engineering Physics – I
30014	Engineering Chemistry – I	40014	Engineering Chemistry – I
30015	Workshop Practice – I	40015	Workshop Practical – I
30016	Engineering Physics – I Practical	40016	Engineering Physics – I Practical
30017	Engineering Chemistry – I Practical	40017	Engineering Chemistry – I Practical
30018	Basics of Computer Practical	40018	Basics of Computer Practical

SECOND SEMESTER:

N – Scheme		N2 – Scheme	
Subject Code	**Subject**	**Subject Code**	**Subject**
30021	Communication English – II	40021	Communicative English – II
30022	Engineering Mathematics – II	40022	Engineering Mathematics – II
30023	Applied Mathematics		Not Equivalent
30024	Engineering Physics – II	40023	Engineering Physics – II
30025	Engineering Chemistry – II	40024	Engineering Chemistry – II
30026	Engineering Graphics	40025	Engineering Graphics
30027	Engineering Physics – II Practical	40026	Engineering Physics – II Practical
30028	Engineering Chemistry – II Practical	40027	Engineering Chemistry – II Practical
30029	Workshop Practice – II	40015	Workshop Practical – I

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[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of Diploma in Engineering and Technology
Subject Code : 40011
Semester : I
Subject Title : Communicative English – I

TEACHING AND SCHEME OF EXAMINATION

No. of Weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours/ Week	Hours/ Semester	Internal Assessment	Board Examinations	Total	
COMMUNICATIVE ENGLISH - I	5	80	25	100*	100	3 Hrs.

***Examination will be conducted for 100 marks and will be reduced to 75 marks.**

Units and Allocation of Hours

S. No.	Unit	Time
1.	Unit – I	15
2.	Unit – II	15
3.	Unit – III	15
4.	Unit – IV	13
5.	Unit - V	15
Test & Model Exam		7
	Total =	80

Note: All the five units will have the topics **"Functional Grammar and Usage, Vocabulary Enrichment, Situational English, Creative English & English for Scholarly Presentation/Fluency"**

English for Scholarly Presentation/Fluency	
Prose	"A Snake in the Grass" by R.K. Narayan
	"Of Parents and Children" by Francis Bacon
Poetry	"The Secret of Machines" by Rudyard Kipling
	"The Road Not Taken" by Robert Frost

Rationale:

- With the advent and supremacy of the Internet, smart phones, e-Commerce and Social Media in global communication, English has metamorphosed itself with new dimensions to get the communicator's thoughts, feelings and interactions dressed in alien colours.
- To execute the tasks in Technical Environment, whether academic, professional or social, proficiency in English plays a vital role and a requisite for communication skills has gained momentum both for e-communication, higher studies abroad and placement in MNCs.
- Amazing and inconceivable developments in technology has led various industries to coin and employ their own new words every day and hence revision of syllabus, especially to cater to the need for essential updated vocabulary has become in evitable.
- In addition to the retention of certain functional grammar parts to attest accuracy in communication, new components such as vocabulary enrichment, situational English, Creative English and English for Scholarly Presentation have been introduced to equip the learners to cope up with revamping technical scenario.

General Objective:

The main objective of this course is to make the student express himself in oral and written communication effectively. The employers expect that student should be able to spell and construct simple sentences correctly. Moreover, they need to be fluent in English, be aware of the rules of written genres such as, official letters, emails, etc. At the end of the course, the student will be able to get practical command of English which will be useful to him/her in the work place.

Specific Objectives:

- To develop the knowledge and understanding of grammar and their use in writing
- To develop the ability of comprehending and responding to the situation
- To develop the creativity of students
- To make student understand basic sentence structure and content by reading text book so that he can write simple sentences of his/her own
- To develop their writing skill

Course Outcome

The students will be able to:

1. Frame sentences with correct grammar and syntax.
2. Use proper words or phrases in sentences while communicating with others.
3. Write effective sentences for professional communications such as official letters, email, etc.

4. Present information persuasively with the best sequence, words and structures.
5. Present ideas concisely, clearly and effectively in written communication.

COMMUNICATIVE ENGLISH – I
Detailed Syllabus

Unit	Name of the Topics	Hours
I	**Functional Grammar and Usage** • Parts of Speech • Functional Units **Vocabulary Enrichment** • Word Conversion (selective 25 words) **Situational English** • Dialogue for Day to Day Situations **Creative English** • Review Writing (**Books:** 'Thoughts to Build on' – Kop Meyor, 'You Can Win' – Shiv Khera, Wings of Fire – Kalam & 'My Experiments with Truth' – Mahatma Gandhi **Movies:** Life of Pie, Gandhi & Wall-E **TV Program:** Any educative programme) **English for Scholarly Presentation/Fluency** • "A Snake in the Grass" by R.K. Narayan	15
II	**Functional Grammar and Usage** • Use of Main Verb & Auxiliary Verb • Application of Tense Forms (Simple Present, Present Continuous, Present Perfect, Simple Past, Past Continuous, Past Perfect, Simple Future, Future Continuous only) **Vocabulary Enrichment** • Collocation - Noun with Verb, Adjective with Noun (Selective 25 collocations) **Situational English** • Short Messages for e-Communication **Creative English** • Visual Description **English for Scholarly Presentation/Fluency** • "The Secret of Machines" by Rudyard Kipling	15
III	**Functional Grammar and Usage** • Framing Yes / No Questions • Framing Wh-Questions	15

	Vocabulary Enrichment • Homophones (selective 25 homophones) **Situational English** • Letter Writing for Academic Purpose (Leave Application, Requisition for Bona fide Certificate, Applying for TC) **Creative English** • Advertisement Writing **English for Scholarly Presentation/Fluency** • "Of Parents and Children" by Francis Bacon	
IV	**Functional Grammar and Usage** • Application of Active Voice and Passive Voice **Vocabulary Enrichment** • One-word Substitution (Textual) • Idiomatic expressions for Daily Life (frequently used 25 expressions) **Situational English** • Writing the Essentials **Creative English** • Word Cloud	**13**
V	**Functional Grammar and Usage** • Use of Prepositions **Vocabulary Enrichment** • Frequently Used Phrasal verbs (selective 25 phrasal verbs) **Situational English** • Comprehension **Creative English** • Transforming Verbal Passage into Graphics **English for Scholarly Presentation/Fluency** • "The Road Not Taken" by Robert Frost	**15**

Reference Books

Glossaries

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http://dictionary.tamilcube.com/
https://www.lexilogos.com/english/tamil_dictionary.htm

Grammar

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2. Visual Guide to Grammar and Punctuation, DK Publishing, 2017
3. English Grammar in Use, Raymond Murphy, Cambridge University Press, 2019
4. Intermediate English Grammar, Raymond Murphy, Cambridge University Press, Second Edition.

5. Essential English Grammar, Raymond Murphy, Cambridge University Press, New edition.

Motivation

1. An Autobiography; Or, The Story of My Experiments with Truth, Mahatma Gandhi, Penguin Books, 2001
2. You Can Win, Shiv Khera, New Dawn Press, 2004
3. Thoughts to Build on- Kop Meyor
4. Wings of Fire – A.P.J.Abdul Kalam

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

COMMUNICATIVE ENGLISH – I

MODEL QUESTION PAPER

Time: 3 Hrs. **Maximum Marks: 100**

I. Answer any Ten of the following: **(10x4=40)**

1. Frame a sentence by using the parts of speech given below:

a. Adjective : brilliant
b. Verb : live
c. Noun : office
d. Adverb : well

2. Frame a sentence for the first two patterns and write the patterns of the last two:

a. S+V+O+A
b. S+V+C+A
c. She was tired
d. People elected him the new president

3. Make use of each of the following main verb or auxiliary verb to make four sentences of your own.

a. Bring
b. Have
c. Discuss
d. Is

4. Frame four sentences by using the subject - Children and verb - play in the following tense forms:

a. Simple Present
b. Past Continuous
c. Present Perfect
d. Simple Future

5. Frame four Yes/No questions for the given situations:

a. Context: Talking to your friend about next week exam
b. Context: Talking to your sister at home
c. Context: Talking to your teacher about weekend classes
d. Context: Talking to your uncle about his arrival

6. Ask four WH questions to the following people you contact:

a. To the bus conductor
b. To your HOD
c. To your mother
d. To your college librarian

7. **Fill in the blanks by writing suitable active or passive form of the verb given in bracket:**
    a. The report _____ to the Head of the Committee.(submit)
    b. He has _____ from Delhi. (return)
    c. The data on computer _____ by somebody in his absence.(access)
    d. About 150 injured people in the hospital. (admit)
8. **Fill in the blanks by using suitable prepositions:**
    a. The meeting will be held_____ Tuesday.
    b. His continuous lecture _____ three hours bored everyone.
    c. Candidates _____ hall ticket will not be permitted into the exam hall.
    d. I will be available here Monday _____ Friday.
9. **Write down any four possible derivatives of the following word.**
    Collect
10. **Match the following and form collocations:**
    a. Heavy - Ambassador
    b. Fast - a record
    c. bottle up - News
    d. Make - Food
    e. Have - your emotions
    f. Break - a difference
    g. Hot - Rain
    h. Brand - a headache
11. **Frame a sentence for the homophones given below:**
    Peace - Piece
12. **Write one word substitutes for the following:**
    a. Rest or sleep in the early afternoon
    b. Statements which are ordinary, uninteresting, and unimportant
    c. Future generations especially the descendants of a specific person
    d. an undesirable event such as an accident
13. **Frame a sentence for each of the following idioms:**
    a. Once in a blue moon
    b. At the eleventh hour
    c. Beat about the bush
    d. A fish out of water
14. **Frame a sentence for each of the following phrasal verbs:**
    a. Take care of
    b. Log in
    c. Go through
    d. Call off

II. Answer any Four of the following: (4x5=20)

1. Complete the Dialogue

Friend 1: Hi Ranjani, _____?

Friend 2: I didn't expect a heavy traffic. Sorry for coming late.

Friend 1: _____ as we planned?

Friend 2: Sure! I'm very much interested in shopping. But Where is Geeta? _____?

Friend 1: _____

Friend 2: What happened to her? Anything serious?

Friend 1: Her father is not feeling well and has been admitted in the hospital.

Friend 2: _____ Shall we go to the hospital now?

Friend 1: That sounds right. It's Vijaya Hospital just a mile away from here.

2. Write a short message to your friend asking him to send study materials for the forthcoming examinations.

3. Draft a letter to your HOD requesting him to issue bona fide certificate for opening a savings bank account.

4. Write the essentials for the purchase of a mobile phone.

5. Read the passage below and answer the questions that follow

Information technology (IT) is the use of computers to store, retrieve, transmit, and manipulate data or information. IT is typically used within the context of business operations as opposed to personal or entertainment technologies. IT is considered to be a subset of Information and Communications Technology (ICT). An information Technology system (IT system) is generally an information system, a communication system or, more specifically speaking, a computer system – including all hardware, software and peripheral equipment – operated by a limited group of users.

Humans have been storing, retrieving, manipulating, and communicating information since the Sumerians in Mesopotamia developed writing in about 3000 BC, but the term information technology in its modern sense first appeared in a 1958 article published in the Harvard Business Review; authors Harold J. Leavitt and Thomas L. Whisler commented that "the new technology does not yet have a single established name. We shall call it Information Technology (IT)".

The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Several products or services within an economy are associated with information technology, including computer hardware, software, electronics, semiconductors, internet, telecom equipment, and e-commerce.

Questions:

a. Humans have been storing information for more than 5000 years – True or False

b. Who coined the term 'Information Technology'?

c. The term 'Information Technology' was first used in _____.

d. What do you mean by 'Information Technology'?
e. Name the products and services that are associated with 'Information Technology'.

III. Answer any Four of the following: (4x5=20)

1. **Write a review of the book "My Experiments with Truth" in about 50 words.**

2. **Describe the picture below in about 50 words.**

3. **Write an advertisement for a Home Appliance Showroom highlighting Diwali festival offers.**

4. **Frame 5 sentences using any five words from the given word cloud.**

5. **Read and transform the following passage into any graphic.**

A survey was conducted to study people using different browsers in Europe. Five browsers – Firefox, Chrome, Opera, Safari and Internet Explorer were selected for this purpose to see the impact of browsers on the Internet Users. It was found that as much as 37.9 % people used Firefox that was the highest of all other browsers accessed through the Net. Next came the Internet Explorer that was used by 36.9% of people, a little less than that of Firefox. Next to Internet Explorer, Chrome was accessed by 15.5% of the internet users. The number of users of the remaining two browsers equally fell around 4.55%. It was also found that all other browsers were used by less number of people who were around less than 1 percentage.

IV. Answer any Four of the following in about 50 words each. (4x5=20)

1. Bring out the observations of Bacon on the duties of Parents towards children.
2. What is the theme of the poem 'The Secret of Machines?
3. Explain the irony at the end of the prose 'A Snake in the Grass'.
4. Which road did the poet choose and why?
5. Describe the character Dasa.
6. What are the similarities and dissimilarities between humans and animals according to Bacon?

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of Diploma in Engineering and Technology

Subject Code : 40012

Semester : I

Subject Title : ENGINEERING MATHEMATICS – I

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGINEERING MATHEMATICS – I	7 Hrs	112 Hrs	25	100*	100	3 Hours

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	Topic	Time (Hrs)
I	Algebra	20
II	Complex Numbers	20
III	Trigonometry and Analytical Geometry	20
IV	Differential Calculus- I	20
V	Differential Calculus-II	20
	Test , Model Exam & Tutorial	12
	Total	112

RATIONALE:

This subject being a branch of "logic" is classified as one of the basic sciences and intends to teach students basic facts, concepts and principles of mathematics as a tool to analyze Engineering Problems Mathematics lay down foundation for understanding core technology subjects.

OBJECTIVES:

This subject helps the students to develop logical thinking which is useful in comprehending the principles of all other subjects. Analytical and systematic approach towards any problem is developed through learning of this subject. Mathematics being a versatile subject can be used at every stage of human life. The student will be able to acquire knowledge of algebra, complex numbers trigonometry, analytical geometry and differentiation. Students develop the ability to apply these solve technical problems to execute management plans with precision.

COURSE OUTCOME:

After completion of this course it is expected that the student will be able to:

- Solve Simultaneous equations and apply Binomial theorem.
- Find Modulus and Amplitude, calculate the roots of a complex numbers.
- Find the trigonometric ratios of multiple angles, transform Sum into Product and also find the equations of conics.
- Calculate limits and differentiate any function.
- Calculate the derivatives, form differential equations and find Partial derivatives.

ENGINEERING MATHEMATICS-I
DETAILED SYLLABUS

Unit	Name of the Topics	Hours
I	**ALGEBRA** **1.1 MATRICES AND DETERMINANTS:** MATRICES: Definition, Concept and Types of Matrices. OPERATIONS ON MATRICES: Multiplication of a Matrix by a scalar, Addition/Subtraction of two Matrices. Multiplication of two Matrices - properties. Reducing a Matrix into triangular and echelon form. Transpose of a Matrix and its properties. DETERMINANTS: Definition and Evaluation of 2^{nd} and 3^{rd} order Determinants. Properties of determinants, product of Determinants. Determinant of a square Matrix – singular and non – singular Matrices - simple problems. **1.2 APPLICATIONS OF MATRICES AND DETERMINANTS:** Co-factor, Adjoint of Matrix, Inverse of Matrix and Rank of a matrix – Simple problems. Solution of simultaneous equations using Cramer's rule - Matrix Inversion method - Gaussian Elimination method – simple problems. Characteristic Equation – Eigen Values and Eigen Vectors of a real matrix – consistency and inconsistency of system of linear equations. **1.3 BINOMIAL THEOREM:** Introduction – Factorial, Permutation and Combinations – Values of nP_r and nC_r. Statement of Binomial theorem for positive integral index. Expansion of Binomial - Finding general term – Middle term – Coefficient of x^n and Term independent of x – Binomial Theorem for rational index up to -3. Applications of binomial theorem – Finding the remainder, digits of a number and greatest term – simple problems	6 7 7

II	**COMPLEX NUMBERS** **2.1 ALGEBRA OF COMPLEX NUMBERS** Introduction – Complex Numbers – Conjugates – Algebra of complex numbers (without geometrical proof), Properties of complex conjugates - Modulus and Amplitude - Polar and Euler form of a complex number – Simple problems. Argand Diagram – Collinear points, four points forming square, rectangle, rhombus and parallelogram only - Simple problems. **2.2 DE MOIVRE'S THEOREM** De Moivre's Theorem (Statement & Applications) – related simple problems. **2.3 ROOTS OF COMPLEX NUMBERS** Finding the n^{th} roots of unity – solving the equations of the form $x^n \pm 1 = 0$ where n ≤ 7 - Simple problems. APPLICATIONS OF COMPLEX NUMBERS An application of Complex numbers: AC Circuits - Definitions – Impedance and Admittance - Simple Problems	**7** **6** **7**
III	**TRIGONOMETRY AND ANALYTICAL GEOMETRY** **3.1 TRIGONOMETRIC RATIOS OF COMPOUND ANGLES AND MULTIPLE ANGLES** Trigonometric functions – Properties of Trigonometric functions- $\sin(A \pm B)$, $\cos(A \pm B)$ and $\tan(A \pm B)$ expansions [without proof]-Problems using above expansions.– Trigonometric ratios of Multiple and Sub multiple angles- Simple problems **3.1 SUM AND PRODUCT FORMULAE AND INVERSE TRIGONOMETRIC FUNCTIONS** Sum and Product formulae - Inverse Trigonometric Functions – Principal value – Properties of Inverse Trigonometric functions – simple problems. **3.3 ANALYTICAL GEOMETRY** **CONICS** Definition of a Conic- Condition for conic (i) for circle: $a = b$ and $h = 0$ (ii) for pair of straight line $\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = 0$ (iii) for parabola : $h^2 - ab = 0$ (iv) for ellipse : $h^2 - ab < 0$ and	**7** **6** **7**

	(v) for hyperbola : $h^2 - ab > 0$– Simple problems. Equation of tangents to the circle. Family of circles -Concentric circles – Orthogonal circles (condition only) – contact of circles - simple problems.	
IV	**DIFFERENTIAL CALCULUS - I** **4.1 LIMITS** Introduction to Calculus - The calculation of limits – Theorems on limits – Limits at infinity – Limits of rational functions – Trigonometrical limits – other limits – Applications of limits – Simple problems. **4.2 DIFFERENTIATION** The derivative of a Function – Differentiation of constant, $x^n, sinx, cosx, tanx, cotx, secx, cosecx, logx$, e^x, a^x, $\sin^{-1} x$, $\cos^{-1} x$, $\tan^{-1} x$ $\cot^{-1} x$, $\sec^{-1} x$, $cosec^{-1}x$(Formulae only) – Differentiation rules:$u \pm v, uv. uvw, \frac{u}{v}$ & Chain rule-Simple problems. **4.3 DIFFERENTIATION METHODS** Differentiation by Substitution method – Differentiation of Implicit functions – Logarithmic differentiation – Derivatives of parametric functions – Differentiation of one function with respect to another function – Simple problems.	6 7 7
V	**DIFFERENTIAL CALCULUS – II** **5.1 SUCCESSIVE DIFFERENTIATION** Successive differentiation upto second order (parametric form not included). Definition of differential equation, order and degree, formation of differential equation. Simple problems **5.2 GEOMETRICAL APPLICATIONS** Curvature and Radius of curvature (cartesian form only) - Envelope of family of curves – Simple problems. **5.3 PARTIAL DIFFERENTIATION** Definition - Partial Differentiation of two variables upto second order only -simple problems. Jacobian and its properties. Euler's theorem for homogeneous function – Simple problems.	6 7 7

Reference Books:

1. Higher Secondary +1 Mathematics volume I&II. Tamil Nadu Text book corporation.
2. Higher Secondary +2 Mathematics Volume I&II. Tamil Nadu Text book corporation.
3. Engineering Mathematics V. Sundaram, R. Balasubramanian
4. Engineering Mathematics – I C.B.Gupta ,A.K.Malik, New age international Publishers, 1st edition – 2008.
5. Differential Calculus S. Balachandra Rao, CK Shantha New age Publishers
6. Probability Theory and Stochastic Process B.Prabhakara Rao, TSR Murthy, BS Publishers.
7. Vectors and Geometry GS. Pandey, RR Sharma, New age international publishers.
8. Engineering Mathematics – I Guruprasad Samanta, New age international publishers, 2nd edition 2015.
9. Engineering Mathematics Reena Garg, Khanna publishing house, New Delhi, Revised edn. – 2018.
10. Engineering Mathematics Volume I P. Kandasamy and K. Thilagavathy, S. Chand & Company Ltd.

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING MATHEMATICS – I

MODEL QUESTION PAPER

Time: 3 Hrs. **Max. Marks: 100**

Part – A

Answer Fifteen questions. All questions carry equal marks. (15×2=30)

1. If $A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 0 \\ 3 & 6 \end{bmatrix}$ $find\ 2A + B$
2. Show that the matrix $\begin{pmatrix} 1 & 2 & -3 \\ 3 & 4 & 5 \\ 4 & 8 & -12 \end{pmatrix}$ is singular
3. Find the eigen values of $\begin{pmatrix} 1 & 2 \\ 0 & 2 \end{pmatrix}$
4. Find the general term in the expansion of $\left(x + \frac{1}{x}\right)^{10}$
5. Find the real and imaginary part of $\frac{1}{1+i}$
6. Simplify: $\frac{cos5\theta + isin5\theta}{cos3\theta + isin3\theta}$
7. Solve : $x^3 - 1 = 0$
8. The voltage and current of a circuit are given by the Complex numbers 2+j and 3-2j respectively. Find the impedance of the circuit.
9. Find the value of $3sin30^o - 4\sin^3 20^o$
10. Prove that $\tan^{-1}\left(\frac{2x}{1-x^2}\right) = 2\tan^{-1} x$
11. Show that the circles $x^2 + y^2 - 2x + 4y - 3 = 0$ and $x^2 + y^2 - 2x + 4y + 5 = 0$ are concentric circles
12. Show that the equation $4x^2 + 10xy + y^2 - 2x + 5y - 3 = 0$ and represents a hyperbola.
13. Find $\lim_{x \to 2} \frac{x^4 - 16}{x - 2}$
14. Find $\frac{dy}{dx}$ if $y = e^x logx$
15. Differentiate: $x^2 siny = c$
16. Find $\frac{dy}{dx}$ if $x = rcost,\ y = rsint$
17. Find $\frac{d^2y}{dx^2}$ if $y = e^{2x}$
18. Form the differential equation of $y^2 = 4ax$ by eliminating the constant 'a'
19. Find the envelope of the family of straight lines $y = mx + am^2$
20. If $u = 2x^3 + 3xy$, find $\frac{\partial u}{\partial x}, \frac{\partial u}{\partial y}$

Part-B

Answer All the questions, choosing any two subdivisions from each questions. All subdivisions carry equal marks. (5×14=70)

21. (a). Find the inverse of $\begin{pmatrix} 1 & 1 & -1 \\ 2 & 1 & 0 \\ -1 & 2 & 3 \end{pmatrix}$

(b). Solve the equations $3x + y - z = 2$, $2x - y + 2z = 6$ and $2x + y - 2z = -2$ by Cramer's rule.

(c). Find the coefficient of x^{32} in the expansion of $\left(x^4 + \frac{1}{x^3}\right)^{15}$

22. (a). Find the polar form of $\frac{5-i}{2-3i}$

(b). Simplify using Demoivre's theorem: $\frac{(cos2\theta - isin2\theta)^7 (cos3\theta + isin3\theta)^{-5}}{(cos4\theta + isin4\theta)^2 (cos5\theta - isin5\theta)^{-6}}$

(c). Two impedance $Z_1 = 10 + 6i$ and $Z_2 = 8 - 12i$ are connected in parallel across 200 volts , 50 cycles per second A.C mains Calculate the magnitude of the current in each branch and magnitude of the total current in the circuit.

23. (a). If $A + B = 45^o$, prove that $(1 + tanA)(1 + tanB) = 2$, and hence deduce the value of $\tan 22\frac{1^o}{2}$

(b). Prove that $(cos\alpha - cos\beta)^2 + (sin\alpha - sin\beta)^2 = 4 \sin^2\left(\frac{\alpha-\beta}{2}\right)$

(c). Show that the circles $x^2 + y^2 - 2x + 6y + 6 = 0$ and $x^2 + y^2 - 5x + 6y + 15 = 0$ touch each other.

24. (a). Suppose that the diameter of an animal's pupils is given by $f(x) = \frac{80x^{-0.2}+45}{2x^{-0.2}+9}$, Where x is the identity of light and f(x) is in mm. Find the diameter of the pupils with (a) Minimum (b) Maximum light.

(b). Differentiate (i) $y = x^2 e^x sinx$ (ii) $\frac{1+cosx}{1-cosx}$

(c). Find the derivative of x^x with respect to $xlogx$

25. (a). If $y = x^2 sinx$, then prove that $x^2 y_2 - 4xy_1 + (x^2 + 6)y = 0$

(b). Find radius of curvature at $\left(\frac{1}{4}, \frac{1}{4}\right)$ on the curve $\sqrt{x} + \sqrt{y} = 1$

(c). Verify Euler's theorem for the function $u = x^3 - 2x^2y + 3xy^2 + y^3$

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P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of Diploma in Engineering and Technology
Subject Code : 40013
Semester : I
Subject Title : ENGINEERING PHYSICS – I

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGINEERING PHYSICS – I	5 Hrs	80 Hrs	25	100*	100	3 Hours

*Examination will be conducted for 100 marks will be reduced to 75 marks.

Topics and Allocation of Hours:

S. No	Topic	Time (Hrs)
1	SI Units and Statics	15
2	Properties of Matter	15
3	Dynamics – I	15
4	Dynamics – II	14
5	Sound and Magnetism	14
6	Test + Model Exam	7
	Total =	**80**

OBJECTIVES:

At the end of the study of I Semester the student will be able to

- Understand the importance of SI units and dimensional formulas.
- Acquire broad ideas about resultant, moment of a force and torque of a couple.
- Understand the elastic property and the types of modules of elasticity.
- Explain the surface tension of liquids and viscosity of fluids.
- Acquire knowledge about projectile motion, circular motion and its application.
- Understand the concepts of simple harmonic motion.
- Gain the Knowledge about rotational kinetic energy and angular momentum.
- Acquire broader ideas about variation of acceleration with respect to height and its importance in launching satellites.
- Understand the propagation of sound, ultrasonic, Doppler effect, SONAR and acoustics of buildings.
- Explain the importance of hysteresis of magnetic materials and its uses.
- Solve simple problems involving expressions derived in all the above topics.

COURSE OUTCOMES:

After successful completion of the course students will be able to

1.	Discuss the fundamental knowledge about SI units, dimensional formula, derive & describe resultant vector quantity, torque of the force and solve the problems involving expressions.
2.	Describe elastic property, types of modulus of elasticity and derive the expression for surface tension, viscosity of liquid and solve the problems involving expressions.
3.	Derive expressions for projectile motion, circular motion, its applications and solve the problems involving expressions.
4.	Explain rotational kinetic energy, angular momentum of rigid body, derive the acceleration due to gravity with respect to altitude, its importance in launching of satellite and solve the problems involving expressions.
5.	Discuss how sound energy is propagated, acoustics of buildings, identify the selection of magnetic material and solve the problems involving expressions.

ENGINEERING PHYSICS – I
DETAILED SYLLABUS

UNIT – I

S I UNITS AND STATICS (15 Hours)

1.1. UNITS AND MEASUREMENT (5 Hours)

Unit – Definition – Fundamental Quantities – Definition – Seven fundamental quantities, their SI units and symbol for the units – Supplementary quantities – plane angle and solid angle, their SI units and symbol for the units. Derived physical quantities – Dimensional formula for length, mass and time – Derivation of dimensional formula for area, volume, density, velocity, momentum, acceleration, force, impulse, work or energy and power. Uses of dimensional formula. Conventions followed in SI units. Multiples & sub-multiples and prefixes of units. Unit conversions (Horse power to Watt & Calorie to Joule) – Applications of the method of dimensional analysis.

1.2. STATICS (10 Hours)

Scalar and Vector quantities – Definitions and examples – Concurrent forces and coplanar forces – Definition – Resolution of a vector into two perpendicular components – Resultant and equilibrant – Definitions – Parallelogram law of forces – statement – Expressions for magnitude and direction of the resultant of two forces acting at a point with an acute angle between them – Lami's theorem – Statement and explanation – Experimental verification of parallelogram law of forces and Lami's theorem. Simple problems based on expressions for magnitude and direction of resultant.

Moment of a force – Clockwise and anti-clockwise moments – Principle of moments – Couple – Torque acting due to a couple – Experimental determination of mass of the given body using principle of moments.

UNIT – II

PROPERTIES OF MATTER (15 Hours)

2.1. ELASTICITY (5 Hours)

Elastic and plastic bodies – Definition – stress, strain – Definitions – Hooke's law – statement – three types of strain – Elastic and plastic limit – Young's modulus, Bulk modulus, Rigidity modulus – Definitions – Uniform and non-uniform bending of beams – Experimental determination of the Young's modulus of the material of a beam by uniform bending method – Poisson's ratio – Simple problems based on stress, strain and Young's modulus – Applications of elasticity.

2.2. VISCOSITY (5 Hours)

Viscosity – Definition – Coefficient of viscosity – Definition, SI unit and dimensional formula – Stream line flow, turbulent flow – Explanation – Critical velocity – Reynolds

number – Definition – Similarities between water flow and current flow – Experimental comparison of co-efficient of viscosity of two low viscous liquids – Terminal velocity – Definition – Experimental determination of coefficient of viscosity of a highly viscous liquid by Stokes' method – Practical applications of viscosity – Practical applications of Stoke's law.

2.3. SURFACE TENSION (5 Hours)

Surface tension & angle of contact – Definitions – Expression for surface tension of a liquid by capillary rise method – Experimental determination of surface tension of water by capillary rise method – Practical applications of capillarity. – Applications of Surface tension. – Simple problems based on expression for surface tension.

UNIT – III

DYNAMICS – I (15 Hours)

3.1. STRAIGHT LINE MOTION (2 Hours)

Introduction – Newton's laws of motion – Fundamental equations of motion for objects – Horizontal motion – falling freely – thrown vertically upwards.

3.2. PROJECTILE MOTION (5 Hours)

Projectile motion, angle of projection, trajectory, maximum height, time of flight and horizontal range – Definitions – Expressions for maximum height, time of flight and horizontal range – Condition for getting the maximum range of the projectile. Path of the projectile (the trajectory) is a parabola – Examples of projectile motion. – Simple problems based on expressions for maximum height, time of flight and horizontal range.

3.3. CIRCULAR MOTION (8 Hours)

Circular motion, angular velocity, period and frequency of revolutions – Definitions – Relation between linear velocity and angular velocity – Relation between angular velocity, period and frequency – Normal acceleration, centripetal force and centrifugal force – Definitions – Expressions for normal acceleration and centripetal force. Banking of curved paths – Angle of banking – Definition – Expression for the angle of banking of a curved path ($\tan\theta = \frac{v^2}{r\,g}$) – Simple harmonic motion, amplitude, frequency and period – Definitions. Simple problems based on expression for centripetal force and angle of banking – Applications of centripetal force and centrifugal force.

UNIT – IV

DYNAMICS – II (14 Hours)

4.1. ROTATIONAL MOTION OF RIGID BODIES (7 Hours)

Rigid body – Definition – Moment of inertia of a particle about an axis – moment of inertia of a rigid body about an axis – expressions – Radius of gyration – Definition – Expression for the kinetic energy of a rotating rigid body about an axis – Angular momentum – Definition – Expression for the angular momentum of a rotating rigid body about an axis – Law of conservation of angular momentum – Examples.

4.2. GRAVITATION (3 Hours)

Newton's laws of gravitation – Acceleration due to gravity on the surface of earth – Expression for variation of acceleration due to gravity with altitude.

4.3. SATELLITES (4 Hours)

Satellites – Keplers law of planetary motion – statements – Natural and artificial – Escape velocity and orbital velocity – definitions – Expression for escape velocity and orbital velocity – Polar and Geostationary Satellite – Uses of artificial satellites. Simple problems based on expressions for escape velocity and orbital velocity.

UNIT – V

SOUND AND MAGNETISM (14 Hours)

5.1. SOUND (9 Hours)

Wave motion – Introduction and definition – Audible range – Infrasonic – Ultrasonic – Progressive waves, longitudinal and transverse waves – Examples – Amplitude, wave length, period and frequency of a wave – Definitions – Relation between wavelength, frequency and velocity of a wave – Stationary or standing waves.

Vibrations – Free & forced vibrations and resonance – definitions and examples – Laws of transverse vibrations of a stretched string – Sonometer – Experimental determination of frequency of a tuning fork.

Acoustics of buildings – Echo – Reverberation, reverberation time, Sabine's formula for reverberation time (no derivation) – Coefficient of absorption of sound energy – Difference between Musical Sound and Noise – Noise pollution. – Doppler effect – Definition and Applications – Ultrasonic and its uses – SONAR. Simple problems based on expression for frequency of vibration

5.2. MAGNETISM (5 Hours)

Pole strength – Definitions – Magnetic moment, intensity of magnetization, magnetizing field intensity, magnetic induction, permeability, hysteresis, saturation, retentivity and coercivity – Definitions – Method of drawing hysteresis loop of a

specimen using a solenoid – Uses of Hysteresis loop. Simple problem based on intensity of magnetization. Types of magnetic materials (dia, para, ferro) and their applications.

Text Book :

1) Physics – Higher secondary – First year – Volume I & II – Tamil Nadu Text book Corporation 2004
2) Intermediate physics – Volume I & II – Anwar Kamal – Foundation books private Ltd. 2008

Reference Book :

1) Physics – Resnick and Haliday – Wisley Toppan publishers – England
2) Engineering Physics – B.L.Theraja – S. Chand Publishers
3) A text book of sound – R.L. Saighal & H.R. Sarna – S. Chand & Co.
4) Mechanics – Narayana Kurup – S. Chand Publishers.

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P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEEERING PHYSICS – I

MODEL QUESTION PAPER - I

Time : 3 Hrs **Max. Marks : 100**

PART – A

Answer any FIFTEEN of the following question **15 x 2 = 30**

1. What are the uses of dimensional formula?
2. Write Lami's theorem.
3. What are the uses of dimensional formula?
4. State the Principle of moments.
5. State Hooke's Law.
6. Explain streamline motion.
7. Why rain drops are spherical in shape?
8. Give the practical applications of viscosity.
9. Obtain the condition for maximum range of the projectile.
10. Define angle of projection.
11. Define angle of banking.
12. Define simple harmonic motion.
13. Define radius of gyration.
14. State the law of conservation of angular momentum.
15. State Newton's law of gravitation.
16. Define orbital velocity.
17. Define Doppler effect.
18. What is reverberation?
19. Define resonance.
20. Define Magnetic moment.

PART – C

Answer the following questions, choosing any two subdivisions from each questions. All subdivisions carry equal marks. 5 x 14 = 70

21.(a). State the conventions to be followed in SI units.

(b). Describe an experiment to verify the Lami's theorem.

(c). If the resultant of two equal forces is $\sqrt{3}$ times a single force, find the angle between them.

22.(a). Derive an expression for the surface tension of the liquid by capillary rise method.

(b). Describe an experiment to compare the co-efficient of viscosities of two liquids.

(c). A wire of length 2 m and area of cross section 0.008 m^2 is stretched by a force of 100 N. If the increases in length of the wire is 0.05 mm. Calculate the stress, strain acting on the wire and its Young's modulus.

23.(a). Derive an expression for maximum height, time of flight of a projectile.

(b). Derive an expression for the angle of banking of a curved path.

(c). A ball weighing 0.5 kg tied to one end of a string of length 2 m is whirled at a constant speed of 10 ms^{-1} in a horizontal plane. Calculate the centripetal force on the ball.

24.(a). Derive an expression for angular momentum of a rigid body rotating about an axis.

(b). Derive an expression for escape velocity of a satellite on the surface of the earth.

(c). Explain Polar and Geostationary satellite.

25.(a). Describe an experiment to determine the frequency of a tuning fork using sonometer.

(b). Explain the method to draw hysteresis loop of a specimen taken in the form of a rod, using solenoid.

(c). The length, breadth and the thickness of a magnet are 150mm, 20mm and 10mm respectively. Calculate the intensity of magnetisation, if its magnetic moment is 9×10^{-6} Am^2.

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P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEEERING PHYSICS – I

MODEL QUESTION PAPER - II

Time : 3 Hrs **Max. Marks : 100**

PART – A

Answer any FIFTEEN of the following questions. **15 x 2 = 30**

1. Define Dimension of a physical quantity?
2. What is the difference between scalar and vector quantities?
3. State Parallelogam law of force.
4. Define moment of force.
5. Define Young's modulus.
6. Explain turbulent motion.
7. Define co-efficient of viscosity.
8. Define surface tension.
9. Define time of flight of a projection.
10. State Newton's law of motion.
11. What is the difference between centripetal force and centrifugal force?
12. Define angular velocity.
13. Define moment of inertia of a rigid body.
14. Define escape velocity.
15. Write any two uses of artificial satellite.
16. What is mean by Geostationary satellite?
17. Define longitudinal wave motion.
18. Write the laws of vibration in a stretched string.
19. Explain free vibration and forced vibration.
20. Define intensity of magnetisation.

PART – C

Answer the following questions, choosing any two subdivisions from each questions. All subdivisions carry equal marks. 5 x 14 = 70

21.(a). Derive the expressions for the magnitude and directions of the resultant of two forces acting at a point with an acute angle.

(b). Describe the experiment to determine the mass of a given body by using principle of moments.

(c). If the resultant of two equal forces inclined to each other at 60° is $8\sqrt{3}$N, find those two forces.

22.(a). Describe an experiment to determine the co-efficient of viscosity of a high viscous liquid by Stoke's method.

(b). Derive an expression for the surface tension of the liquid by capillary rise method.

(c). Calculate the surface tension of water if it rises to a height of 4.2 cm in a tube dipped in it. Radius of the capillary tube is 3.5×10^{-4} m

23.(a). Derive an expression Normal acceleration and centripetal force of a body having uniform circular motion.

(b). Derive an expression for angle of banking for a vehicle moving along curved track.

(c). A body is thrown with a velocity of 49 ms^{-1} at an angle of projection 45°. Calculate its maximum height, time of flight and range.

24.(a). Derive an expression for kinetic energy of a rigid body rotating about an axis.

(b). Obtain an expression for the variation of acceleration due to gravity with altitude.

(c). Calculate the escape velocity of the satellite on the surface of the moon if its radius is 2000 km and acceleration due to gravity on the surface of the moon is 1.7 ms^{-2}.

25.(a). Write a note on acoustics of building.

(b). Explain how the magnetic materials are selected for temporary and permanent magnets.

(c). The moment of a bar magnet is 0.6 Am^2 and its volume is 3×10^{-5} m^3. Calculate the intensity of magnetisation of the magnet.

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P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of diploma in Engineering and Technology
Subject code : 40014
Semester : I
Subject Title : Engineering Chemistry – I

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
ENGINEERING CHEMISTRY – I	5 Hrs	80 Hrs	25	100*	100	3 Hrs.

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours:

UNIT	Topic	Time (Hrs)
I	Basic concepts in Chemistry	15
II	Surface Chemistry	15
III	Minerals and Metallurgy	15
IV	Industrial Chemistry	14
V	Chemistry of Engineering Materials	14
Test & Model Exam		7
Total =		80

OBJECTIVES:

The objective of this Course is to make the student to:

1. Study about the importance of Engineering Chemistry in industry.
2. Know about atomic structure, periodic classification of elements and theory of acids and bases.
3. Learn about colloidal particles, nano-particles and catalysis.
4. Know about basic concepts of metallurgy, extraction of metals and powder metallurgy.
5. Acquire knowledge about nuclear chemistry, cement, ceramics and abrasive.
6. Know about refractories and glass.
7. Know about polymer materials and rubber.

COURSE OUTCOMES:

Students will be able to

1. Describe the structure of an atom, periodic classification of elements, isotopes and isobars, the types of bonding and the application of pH in industries.
2. Explain the types of colloids, the importance of colloids and nano particles and catalysis in daily life.
3. Explain the metallurgical process of titanium and tungsten, manufacture of steel, heat treatment of steel and the application of powder metallurgy.
4. Elaborate the nuclear energy processes, manufacture of cement, white pottery and glass
5. Describe the application of polymers, rubber and composite material.

ENGINEERING CHEMISTRY-I
DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**1.1Atomic Structure and Chemical Bonding:** Fundamental particles – proton – electron – neutron – atomic number– mass number – isotope, isobar-examples - extra nuclear part – filling up of electrons – auffbau principle –s–p–d– f orbitals electronic configuration – definition of atomic mass, molecular mass, equivalent mass, valency (definitions only) – octet rule – electrovalent bond – sodium chloride formation – covalent bond – formation of ammonia.	6
	1.2 Periodic Table: Modern periodic law – periodic classification of elements – features of modern periodic table – properties of s–p–d–f block elements.	4
	1.3 Acids and Bases: Properties of acids and bases – Lowry Bronsted theory – limitation and application - Lewis concept of acids and bases – advantages - Conjugate pair - definition examples – pH and pOH – Definition – Numerical problems – Indicator – Definition – Buffer solution – Definition – Types of buffer solution with examples – Application of pH in industries	5
II	**2.1 Colloids:** Colloids – Definition – True solution and Colloidal solution – Differences – Types of colloids – Lyophilic and Lyophobic colloids – Differences – Properties – Tyndall effect – Brownian movement – Electrophoresis and Coagulation – Industrial applications of colloids – Smoke Precipitation by Cottrell's method, Purification of water, Cleansing action of soap, Sewage disposal – tanning – and artificial rain.	6
	2.2 Nanotechnology: Nano particles – definition – properties – application of Nanotechnology – Engineering – medicine – biomaterial.	4
	2.3 Catalysis: Catalyst – Definition – Positive – Negative catalyst – Definition – Types of catalysis – Homogeneous and Heterogeneous – Promoter – Catalyst poison – active centre – Definition – Characteristics of a catalyst – Industrial applications of catalysts.	5

III	**3.1 Minerals and Metallurgy:** Mineral – Minerals of Tamilnadu – Sources and Uses (Basic concepts only) – Mineral, ore – definition-distinction between mineral and ore - Concept of roasting, smelting and calcinations - Extraction of iron – Blast furnace – cast iron – steel manufacture – Bessemer converter – heat treatment of steel – hardening – annealing – tempering - Distinction between cast iron, wrought iron and stainless steel.	6
	3.2 Metallurgy of Tungsten and Titanium: Extraction and uses of Tungsten and Titanium	4
	3.3 Powder Metallurgy: Definition – Powder metallurgical process – Preparation of Metal Powder – Atomization – Reduction of Metal Oxide – blending – compacting – sintering – finishing – Applications of Powder Metallurgy.	5
IV	**4.1 Nuclear Chemistry:** Nuclear reaction – Differences between nuclear reaction and ordinary chemical reaction – Radioactive decay – alpha emission – beta emission – gamma emission - properties of alpha, beta and gamma rays – half-life period – simple problems– Group displacement law and its application – Problems based on Group displacement law – Nuclear fission –nuclear fusion – chain reaction - Distinction between fission and fusion reaction - Problems based on energy calculation in nuclear fission reaction - components nuclear reactor, reactor core, nuclear reactor coolant, Control rods, neutron moderator – steam turbine – Application of radioactive isotopes - Reactions taking place in sun and star.	6
	4.2 Cement and Ceramics: Definition – Manufacture of Portland Cement – Wet Process – Setting of Cement (No equation) – Ceramics – White pottery – Definition – Manufacture of White pottery – Uses – Definition of glazing – purpose – Method – Salt glazing – liquid glazing.	4
	4.3 Refractories and Glass: Definition – requirements of a good refractory – types with examples and uses – uses of silica, fire clay and alumina. Composition of Glass – Manufacture of Glass – annealing of glass – varieties of glass – Optical glass, wind shield glass and Photo chromatic glass.	4
V	**5.1 Polymer:** Definition – Natural polymer – Rubber – Defects of natural rubber – Compounding of rubber – Process of reclamation of rubber	6

	- Ingredients and their functions – Vulcanization –Plastics – types – Types of polymerization-Addition and condensation polymerization - Thermoplastics and Thermosetplastics – Differences – Homopolymer and co-polymer-examples - Mechanical properties of plastics – Advantages of plastics over traditional materials - Polymers in Surgery – Biomaterials – Definition – Biomedical uses of Polyurethane, PVC, Polypropylene and Polyethylene - Reinforced plastics - definition and examples.	
	5.2 Abrasives: Definition – classification – hardness in Moh's scale – Natural abrasives – Diamond, Corundum, Emery and Garnet. Synthetic abrasives – Carborundum – Boron carbide manufacture – properties and uses.	4
	5.3 Composite Materials: Definition – examples – Classification of composites – Advantages over metals and polymers – General application	4

Reference Books:

1. Introduction to Engineering Chemistry, Shradha Sinha , S S Dara & Sudha Jain, S.Chand Publishers, 2004.
2. S.Chand's Engineering Chemistry, S S Dara, Sudha Jain & Shradha Sinha, 2005.
3. A Textbook of Engineering Chemistry, Dr. Uday Kumar, 2013.
4. Chemistry – Higher Secondary – 1 st and 2nd year, Vol. I & II, Tamil Nadu Text Book Corporation, 2018.
5. Engineering Chemistry Fundamentals and Applications, Shikha Agarwal, Cambridge University Press, 2019.
6. Government of India, Geological Survey of India, Geology and Mineral Resources of The States of India Part VI – Tamil Nadu and Pondicherry

Website references:https://bookboon.com/en/fundamentals-of-chemistry-ebook

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY-I
MODEL QUESTION PAPER - I

Time: 3hrs **Max. Marks: 100**

PART –A

I. Answer any FIFTEEN of the following questions: **(15 X 2 = 30)**

1. What are isotopes and isobars?
2. State auffbau principle.
3. What are buffer solutions? Give an example.
4. State Octet rule.
5. What is coagulation?
6. What is Brownian movement?
7. Distinguish between homogeneous and heterogeneous catalysis?
8. What is catalyst poison?
9. Define powder metallurgy.
10. What is meant by annealing of steel?
11. What is smelting?
12. Name the methods of preparation of metal powder.
13. What is radio activity?
14. Define half-life period.
15. Write a short note on salt glazing.
16. Write the uses of silica bricks.
17. Distinguish between addition and condensation Polymerisation.
18. What is vulcanization?
19. Write the advantages of composite materials?
20. What are reinforced plastics?

PART –B

II. Answer the following questions by choosing any TWO subdivisions from each question.

Each question carries 14 marks. **(5 X 14 = 70)**

17. a) Explain the ionic bond formation in sodium chloride (NaCl).
    b) Write the properties of d block elements.
    c) Highlight any seven applications of pH in industries.

18. a) Distinguish between lyophilic and lyophobic colloids.
    b) Highlight the industrial applications of colloids.
    c) Highlight any seven applications of nano-particles in various fields.

19. a) Describe the metallurgy of titanium
    b) Highlight the application of powder metallurgy.
    c) Write a short note heat treatment of steel.

20. a) Distinguish between nuclear fission and fusion.
    b) Describe the steps involved in manufacture of white pottery.
    c) List the requirement of good refractory material.

21. a) Distinguish between thermoplastics and thermoset plastics.
    b) Write the mechanicals properties of plastics
    c) Highlight the advantages of composite over metals and polymer.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY-I
MODEL QUESTION PAPER - II

Time: 3hrs **Max. Marks: 100**

PART –A

I. Answer any FIFTEEN of the following questions: **(15 X 2 = 30)**

1. Define equivalent mass of an element.
2. Write the electronic configuration of $_{19}K^{39}$.
3. What are f-block elements?
4. Calculate the pH of 0.02 N HCl.
5. What is electrophoresis?
6. What is Tyndall effect?
7. Distinguish between true solution and colloidal solution.
8. What is a negative catalyst? Give an example.
9. Define powder metallurgy.
10. What is meant by hardening of steel?
11. What is roasting?
12. Distinguish between mineral and ore.
13. What are control rods?
14. List the purpose of glazing.
15. Write a short note on liquid glazing.
16. What are refractories?
17. Distinguish between homo polymers and hetero polymers.
18. List the defects of natural rubber.
19. Write a short note on Moh's scale of hardness of abrasives.
20. What are applications of composites?

PART –B

II. Answer the following questions by choosing any TWO subdivisions from each question.

Each question carries 14 marks. **(5 X 14 = 70)**

17. a) Explain the theories of acid and bases.
    b) Write the features of Modern periodic table.
    c) Highlight any seven applications of pH in industries.

18. a) Distinguish between lyophilic and lyophobic colloids.
    b) Write the characteristics of a catalyst.
    c) Highlight any seven applications of nano-particles in various fields.

19. a) How is tungsten extracted from Wolframite?
    b) Highlight the application of powder metallurgy.
    c) Describe the steps involved in the manufacture of steel.

20. a) Compare the properties of alpha, beta and gamma rays.
    b) Describe the steps involved in manufacture of white pottery.
    c) Write the reactions taking place in sun and star.

21. a) Distinguish between addition and condensation polymerisation.
    b) Write a short note on synthetic abrasives.
    c) Highlight the application of polymers in medicine.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY
(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of Diploma in Engineering and Technology

Subject Code : 40015

Semester : I

Subject Title : WORKSHOP PRACTICAL – I

Objectives:

- To use the tools and equipment's related to Fitting and Carpentry workshops
- To learn to draw the sketches and to prepare the matting parts in the Fitting workshop
- To prepare the wooden jobs and to fabricate parts and /or assembles in the Carpentry workshop
- To perform drilling and tapping operations
- To understand the importance of precision and accuracy

Course Outcomes:

After the completion of the course the students will be able to

1. Prepare mating parts using sketches with precision and accuracy
2. Fabricate wooden parts and /or assemblies using sketches with precision and accuracy
3. Perform drilling and tapping operations

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
WORKSHOP PRACTICAL – I	3 Hrs	48 Hrs	25	100*	100	3 Hours

*Examination will be conducted for 100 marks will be reduced to 75 marks.

Note:

The students should be given training in both sections. All the exercises should be completed. The students should maintain records in a workbook for the concerned trades and the same must be submitted during the Board Practical Examinations.

DETAILED SYLLABUS

Fitting & Carpentry

Bench work:

Metal work (Fitting) and Wood work (Carpentry) – Selection of material – Types of materials - Holding Devices - Striking Tools - Cutting Tools - Measuring and Marking tools- Power tools. Steps/procedures to prepare a part. Safety precautions in workshop.

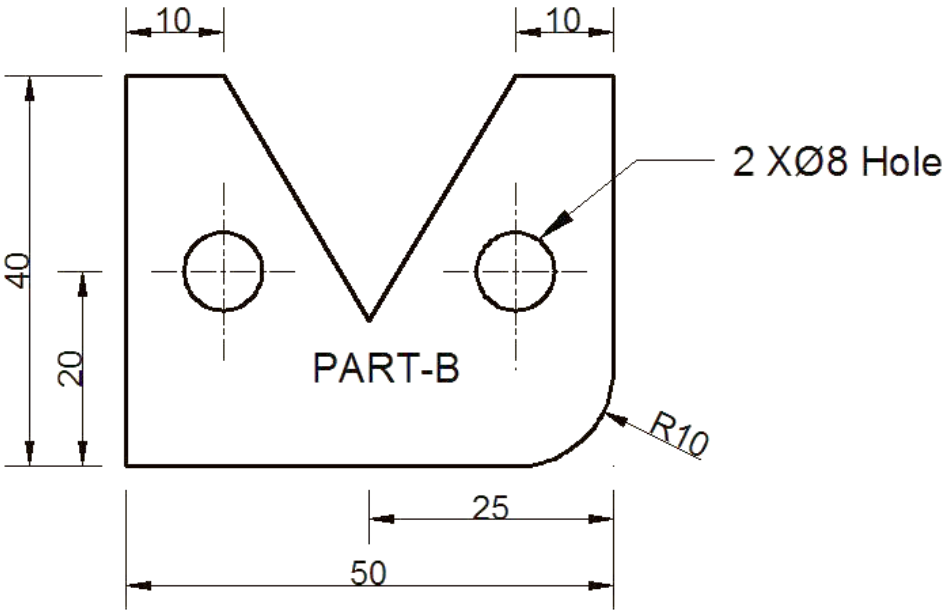
PART – 1: FITTING

- General Safety precaution inside the workshop.
- Study about First Aid.
- Study of Hand tools and Measuring instruments.
- Marking and Punching practice.
- Hacksaw cutting practice.
- Filing and fitting practice.
- Drilling and tapping practice.

Note: Practices should be given to cover the above area. At the end, the students should be able to do the following exercises for the board practical examinations.

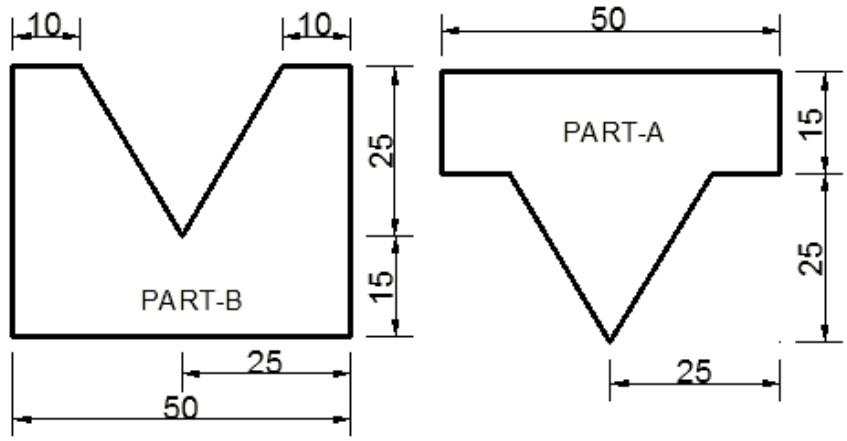
Exercise No. 1

Raw material: 55mm X 45mm X 3mm thick M.S Flat - 1 No.



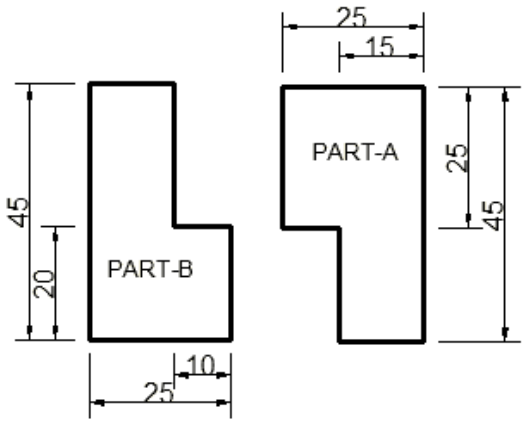
Exercise No. 2

Raw material: 55mm X 45mm X 3mm thick M.S Flat - 2 Nos.



Exercise No. 3

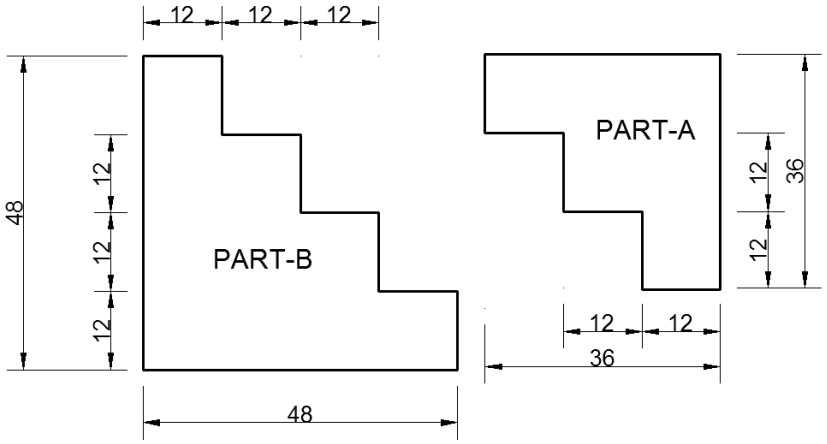
Raw material: 50mm X 30mm X 3mm thick M.S Flat - 2 Nos.



Exercise No. 4

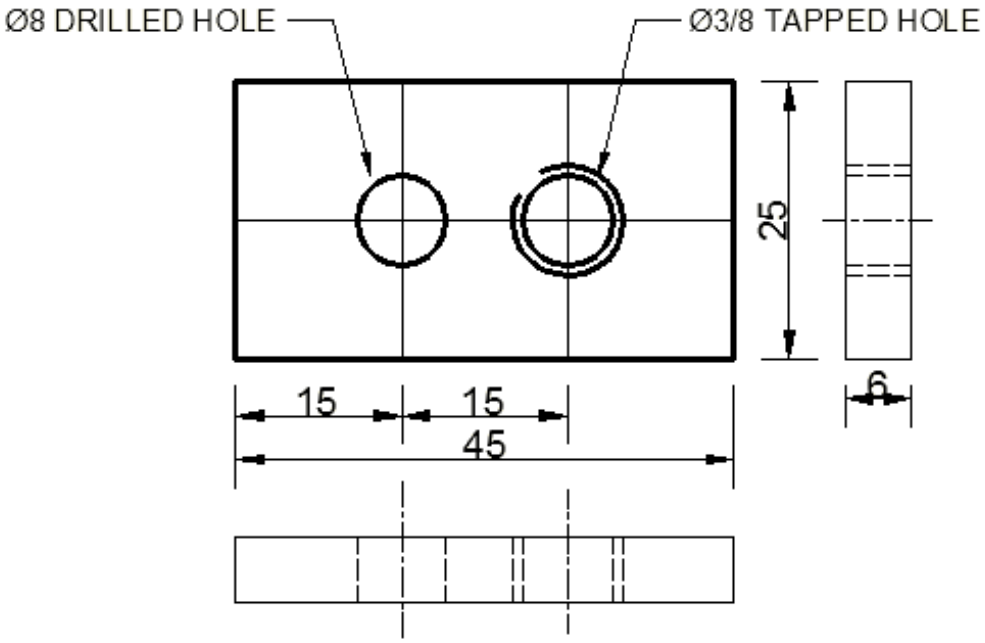
Raw material: 1.50mm X 50mm X 3mm thick M.S Flat - 1 No.

2.40mm X 40mm X 3mm thick M.S Flat - 1 No.



Exercise No. 5

Raw material: 50mm X 25mm X 6mm thick M.S Flat - 1 No.



Note:

50mm X 40 mm X 3mm thick plate can be used for the above joints.

45mm X 25 mm X 6mm thick plate can be used for the drilling and tapping operations. All the exercises should be given for the board practical examinations.

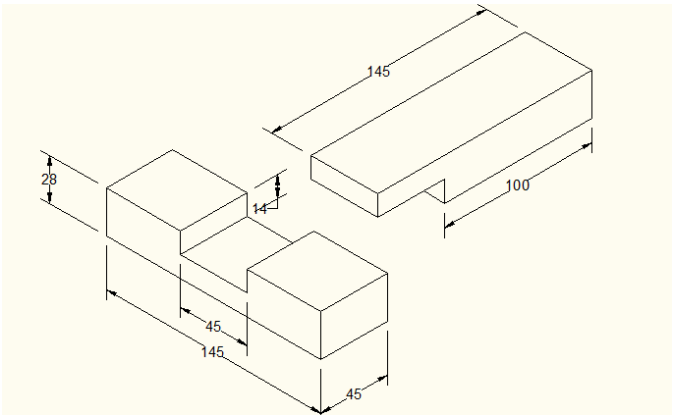
Drilling and Tapping operations should be exercised in the Fitting section itself.

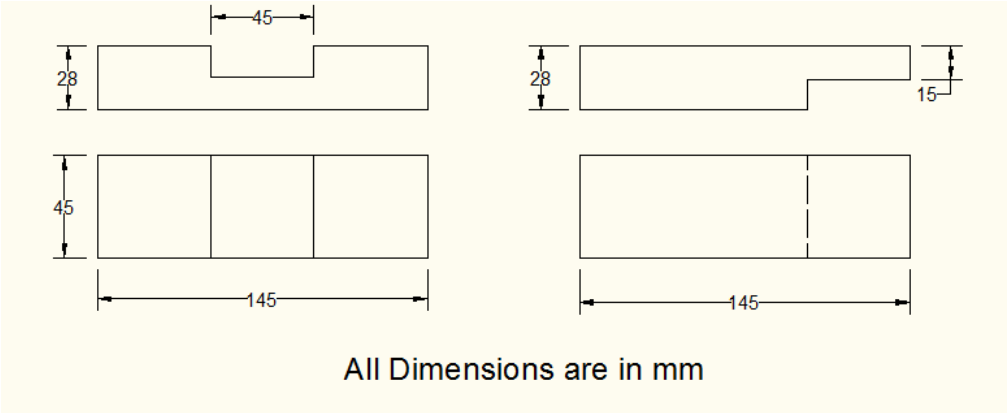
PART -2 : CARPENTRY

- General Safety precaution inside the workshop.
- Study about First Aid.
- Study of Hand tools and Measuring instruments.
- Marking practice
- Types of wooden joints
- Wood categories and grain structure
- Hand saw cutting, chisel cutting

Exercise No. 1

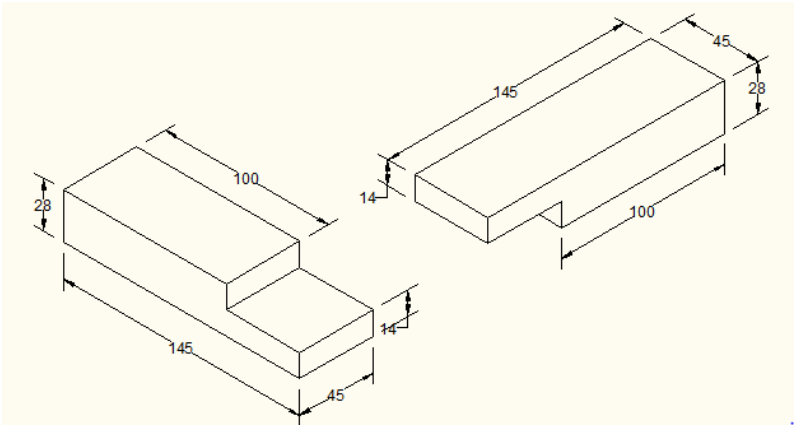
MIDDLE HALF LAP JOINT

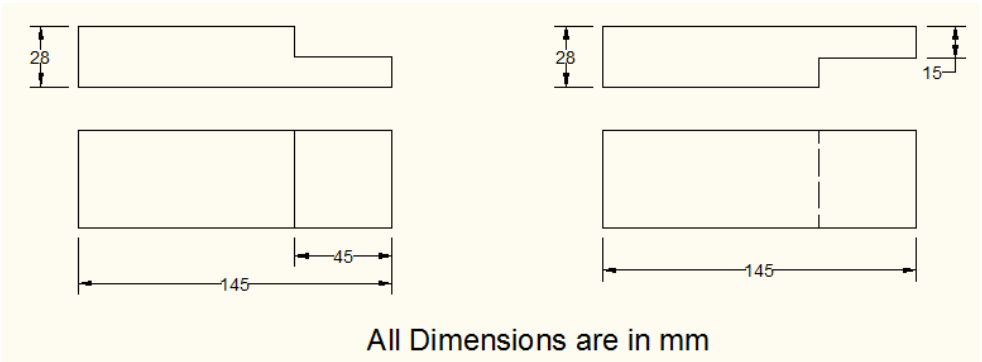




Exercise No. 2

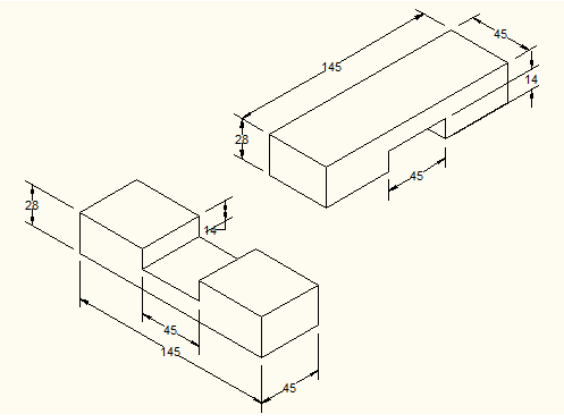
CORNER HALF LAP JOINT

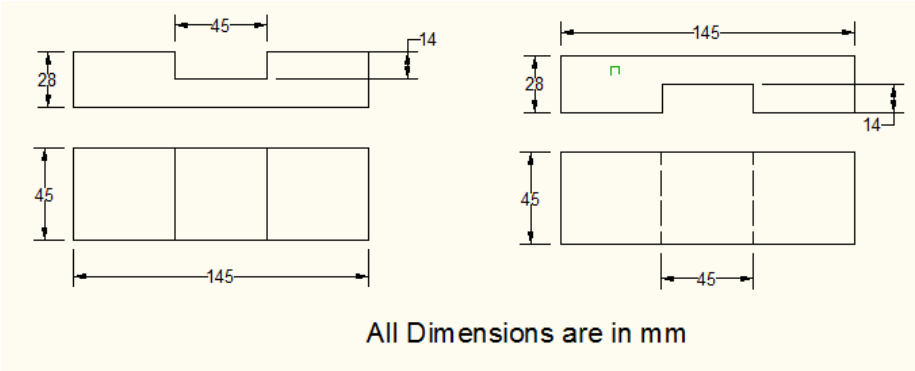




Exercise No. 3

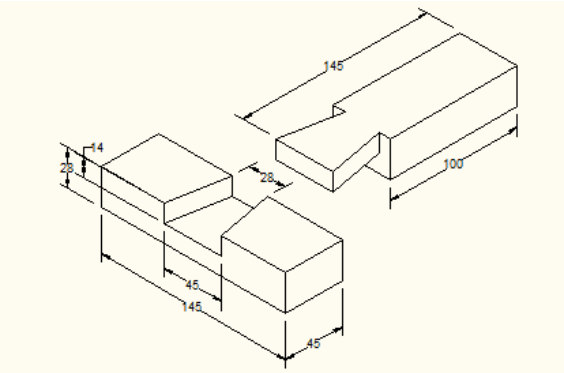
CROSS HALF LAP JOINT

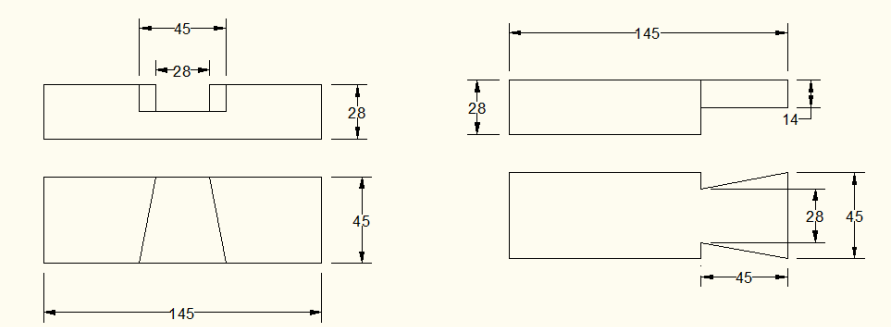




Exercise No. 4

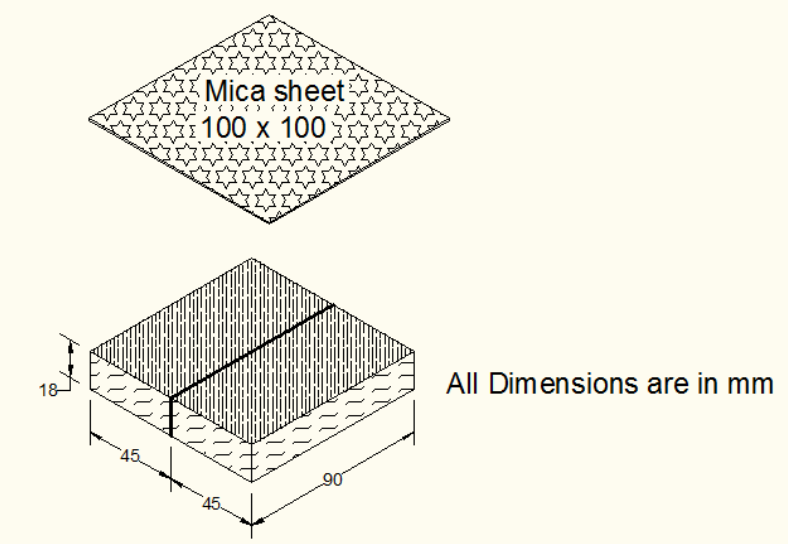
DOVETAIL HALF LAP JOINT





Exercise No. 5

TWO PIECE JOINT USING ADHESIVE



PART -3: Moulding

Demonstration of green sand moulding for any one of the single or double pattern must be given. (Not for the Autonomous End Examination)

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[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

AUTONOMOUS END EXAMINATION

WORKSHOP PRACTICAL – I

QUESTION PATTERN AND MARK ALLOCATION

Note:

- Arrangement should be made to conduct the examinations inside the workshop for both the sections.
- All the exercises should be given in the question paper and students are allowed to select the question by a lot.

Exercises	Duration	Max. Marks
(1) **Fitting** – Allocation of Marks	1 ½ Hrs	**50**
Marking & Punching		15
Hacksawing / Filing / Fitting / Drilling		25
Finishing		10
(2) **Carpentry** – Allocation of Marks	1 ½ Hrs	**45**
Marking & Job preparation		15
Saw cutting / Chisel cutting / Joining		25
Finishing		5
(3) Viva-voce		**5**
TOTAL	3 Hrs	**100**

* Practical Examination will be conducted

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All Branches of Diploma in Engineering and Technology

Subject Code : 40016

Semester : I

Subject Title : ENGINEERING PHYSICS – I PRACTICAL

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	External Examination	Total	
ENGINEERING PHYSICS – I PRACTICAL	2 Hrs	32 Hrs	25	100*	100	3 Hours

- Examination will be conducted for 100 marks and will be reduced to 75 marks

COURSE OUTCOMES:

After successful completion of the course students will be able to

1.	Determine the volume of solid cylinder, hollow cylinder, spherical ball, thin plate and area of spherical ball and thin irregular plate using Vernier calipers and screw gauge
2.	Determination, comparison of the co-efficient of viscosity of liquid and verification of parallelogram law, Lami's Theorem
3.	Determine the frequency of the tuning fork, comparison of magnetic moment of two bar magnets and find the surface tension of the given water.

GUIDELINES:

- All the eight experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Instruments/Equipment and taking readings in the practical classes, every two students should be provided with a separate experimental setup for doing experiments in the laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

The Internal mark Calculation for Practical subjects is to be done as follows:-

Particulars	Marks
Procedure/ observation and tabulation/ Other Practical related Work (Observation Note)	10 Marks
Completion of Worksheets	5 marks
Presentation skill	10 Marks
TOTAL	25 Marks

- All the Experiments indicated in the syllabus should be completed and the same be given for final board examinations.

- Students must submit observation note book which includes the following:
  - Formula and Explanation
  - Observation
  - Tabulation
  - Calculation
  - Result

  A maximum of 10 marks is allotted for this purpose.

- At the end of each practical, students are expected to complete the worksheets pertaining to the practical by browsing internet and referring books at library and the same should be submitted in the following week. A maximum of 5 marks is allotted for submitting the relevant worksheets.

- At the end of each cycle of experiments, students are expected to make oral presentation on completed experiments by using LCD projector. For this purpose, students will be divided into groups consisting 6 each. Presentation should be made by each and every student. Presentation will be reviewed by the

faculty. A maximum of 10 marks will be awarded for each student based on his / her oral presentation.

- At the end of the Semester, the average marks of all the exercises should be calculated for 25 marks.
- All the marks entries for observation, worksheet and presentation skills should be entered in the Personal Log Book of the staff, who is handling the subject.

Autonomous End Examination

- The students should be given proper practice in all the experiments. All the experiments should be completed before the examinations.
- The students should maintain observation note and Record note.
- The record note book should be submitted during the Board Practical Examinations.
- All experiments should be given and the students are allowed to select any one by lot.
- The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.
- The Examiners should ensure the proper safety measures before the commencement of Practical examinations.

AUTONOMOUS END EXAMINATION

MARK ALLOCATION

Formula with explanation	: 10 marks
Figure / Circuit diagram with parts	: 10 marks
Tabulation with proper units	: 10 marks
Observation (including taking readings)	: 40 marks
Calculation	: 15 marks
Result	: 10 marks
Viva voce	: 05 marks
Total	**: 100 Marks**

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS – I PRACTICAL
LIST OF EXPERIMENTS WITH OBJECTIVES

1). **Micrometer (Screw Gauge)**
To determine the surface area and volume of the given sphere and of a irregular thin plate.

2). **Vernier Calipers.**
To determine the volume of the material of the given hollow cylinder and solid cylinder.

3). **Parallelogram Law of Forces.**
To verify the Parallelogram Law using concurrent forces.

4). **Lami"s Theorem.**
To verify the Lami's Theorem using concurrent forces.

5). **Comparison of Viscosities.**
To compare the co-efficient of viscosities of two low viscous liquids by capillary flow method.

6). **Stoke's Method.**
To determine the co-efficient of viscosity of a highly viscous liquid.

7). **Sonometer.**
To determine the frequency of the given tuning fork.

8). **Deflection Magnetometer.**
To compare the magnetic moments of the two bar magnets using deflection magnetometer in Tan A position, by equal distance method.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS – I PRACTICAL
LIST OF EQUIPMENTS

Minimum four set of equipment / Components are required for the Batch of 30 students

1). **Micrometer (Screw Gauge)**
Screw Gauge, graph sheet, sphere and irregular thin plate.

2). **Vernier Calipers.**
Vernier calipers, solid cylinder and Hollow cylinder.

3). **Parallelogram Law of Forces.**
Vertical drawing board, two Z pulleys, three sets of slotted weight (5 x 50 gm) and twine thread.

4). **Lami's Theorem.**
Vertical drawing board, two Z pulleys, three sets of slotted weight (5 x 50 gm) and twine thread.

5). **Comparison of Viscosities.**
Burette stand, graduated burette without stopper, rubber tube, capillary tube, beaker, digital stop watch, funnel, two liquids.

6). **Stoke's Method.**
Stoke's tube with stand, highly viscous liquid (Castrol Oil), spherical metal sphere of different radii, digital stop watch and screw gauge.

7). **Sonometer.**
Sonometer, screw gauge, tuning fork rubber hammer, slotted weight hanger set (5 x 0.5 kg) and paper rider.

8). **Deflection Magnetometer.**
Deflection magnetometer, meter scale, two bar magnets.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS – I PRACTICAL
MODEL QUESTION PAPER

All experiments should be given for examinations and the students are allowed to select any one by lot (Interchange of Experiment is not allowed)

1. Determine the surface area and volume of the given sphere and of a thin plate.
2. Determine the volume of the material of the given hollow cylinder and solid cylinder.
3. Verify the parallelogram law using concurrent forces.
4. Verify the Lami's Theorem using concurrent forces.
5. Compare the co-efficient of viscosities of two low viscous liquids by capillary flow method using graduated burette.
6. Determine the co-efficient of viscosity of a high viscous liquid by Stokes' method.
7. Determine the frequency of the given tuning fork using sonometer.
8. Compare the magnetic moments of the two bar magnets using deflection magnetometer in Tan-A position, by equal distance method.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of diploma in Engineering and Technology
Subject code : 40017
Semester : I
Subject Title : Engineering Chemistry – I Practical

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / week	Hours / Semester	Internal Assessment	Board Examinations	Total	
ENGINEERING CHEMISTRY-I PRACTICAL	2 Hrs	32 Hrs	25	100*	100	3 Hrs.

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

OBJECTIVES:

At the end of the program the student will have knowledge about volumetric analysis in acidimetric, alkalimetry and permanganametric titration and their applications.

COURSE OUTCOMES:

Students will be able to

1. Perform volumetric titrations of acids and bases.
2. Develop ability to carry out Permanganometry titration under different conditions.

List of Topics:

Contents: Practical

S. No	Name of the Topics
	Acidimetry and Alkalimetry (double titration)
1	Estimation of sulphuric acid.
2.	Estimation of sodium carbonate.
3.	Comparison of strength of two acids.
4.	Comparison of strength of two bases.
	Permanganometry (double titration)
5	Estimation of Mohr's salt.
6	Estimation of ferrous ion.
7	Comparison of strength of two permanganate solutions.
8	Estimation of oxalic acid.

SAFETY MEASURES (DO'S & DON'TS)

Experiment should be carried out with the supervision of Lab instructor / staff i/c.

- Do not enter into the Laboratory without proper supervision.
- Do wear protective equipment for eye protection and make sure to wear a laboratory coat.
- Do not smell, inhale taste of chemicals.
- Do label all containers with chemicals.
- Do avoid direct contact with chemicals, far from your hands face, clothes and shoes.
- Do not use Hazardous chemical without proper directions.
- Do Use separate cabinets for acid solutions with concentration more than 6M.
- Whenever, accidentally when concentrated acids fallen on hands / cloth wash thoroughly with running water, and after taking first aid, and the student may be taken to hospital.
- Do attach chemical labels with all necessary information to all containers.
- Do read the warning labels when opening newly received reagent chemicals. This will help to be aware of any special storage precautions such as refrigeration or inert atmosphere storage.
- Do periodic check on chemical containers for rust, corrosion and leakage.
- Do Store bottles in chemical safe bags especially those hazardous and moisture absorbing chemicals.

- Do not use of mouth suction to fill a pipette. Use a pipette bulb or other filling devices.
- Do not Smoke, drink, eat and the application of cosmetics is forbidden in areas where hazardous chemicals are used or stored.
- Do use chemicals with adequate ventilation.
- Do wash thoroughly with soap and water whenever you leave the lab after handling any chemicals.
- Do Keep your hands and face clean free from any trace of chemicals.
- Do not play with chemicals.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

MODEL QUESTION PAPER

Time	**3 Hours.**	**Max. Mark**	**100 Marks**
Branch	**BASIC ENGINEERING**	**Subject Code**	**40017**
Semester	**I**	**Subject Name**	**ENGINEERING CHEMISTRY-I PRACTICAL**

Note:

1) **Answer any one of the following**
2) **Write Aim, Principle, Simple procedure, Titration 1&2, Formula, Calculation and Result**

1. Estimate the amount of sulphuric acid present in 200 ml of the given solution. You are provided with a standard solution of oxalic acid of normality 0.1009N and a link solution of sodium hydroxide.

2. Estimate the amount of sodium carbonate present in 500 ml of the given solution. You are provided with a standard solution of sodium hydroxide of normality 0.1009 N and a link solution of sulphuric acid.

3. Compare the strength of two sulphuric acid solutions given in bottle (A) and (B) and estimate the amount of sulphuric acid present in 500 ml of the stronger solution. You are provided with a standard solution of sodium hydroxide of strength 0.0995 N.

4. Compare the strength of two sodium hydroxide solutions given in bottle (A) and (B) and estimate the amount of sodium hydroxide present in 100 ml of the weaker solution. You are provided with a standard solution of oxalic acid of strength 0.0975 N.

5. Estimate the amount of ferrous ammonium sulphate (FAS) present in one litre of the given solution. You are provided with a standard solution of ferrous sulphate of strength 0.0905 N and an approximately decinormal solution of potassium permanganate.

6. Estimate the amount of ferrous sulphate present in one litre of the given solution. You are provided with a standard solution of ferrous ammonium sulphate of strength 0.1122 N and an approximately decinormal solution of potassium permanganate.

7. Compare the strength of two potassium permanganate solutions 1 & 2 and estimate the strength of potassium permanganate present in 250ml of the weaker solution. You are provided with a standard solution of ferrous sulphate of normality 0.0955N.

8. Estimate the amount of oxalic acid present in the 500ml of the given solution. You are provided with a standard solution of ferrous sulphate of strength 0.0997 N and an approximately decinormal solution of potassium permanganate.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

AUTONOMOUS END EXAMINATION

ENGINEERING CHEMISTRY-I PRACTICAL
MARK ALLOCATION

S.No	Item	Marks
1.	Aim	5
2.	Simple procedure	5
3.	Titration 1	35
3.	Titration 2	35
4.	Formula, Calculation and Result	15
5.	Viva	5
Total		**100**

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DIPLOMA IN ENGINEERING AND TECHNOLOGY
(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : **All branches of Diploma in Engineering and Technology**

Subject Code : **40018**

Semester : **I**

Subject Title : **BASICS OF COMPUTER PRACTICAL**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
BASICS OF COMPUTER PRACTICAL	3 Hrs	48 Hrs	25	100*	100	3 Hours

*Examination will be conducted for 100 marks will be reduced to 75 marks.

Topics and Allocation of Hours:

S. No	Topic	Time (Hrs)
1	Windows	6
2	Word Processing	9
3	Spreadsheet	9
4	Database	9
5	Presentation	9
6	Internet	6
	Total =	**48**

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DIPLOMA IN ENGINEERING AND TECHNOLOGY
BASICS OF COMPUTER PRACTICAL

Course Objectives:

- To learn fundamentals of the computer and Understand the function of Windows, Folder manipulation, copying files into CD/DVD and Switching between application and Familiarize and customize the desktop
- To create the Documentation using word processor.
- To develop the spreadsheet and its uses.
- To learn about the PPT presentation.
- To create and understand the Database and its tools.
- To know the Internet and its uses

Course Outcomes:

After completion of the course the students will be able to

- Create, move and rename a folder, shortcut keys, copying files in CD, switching between application in windows and using different menus and their sub-menus in the word, create tables, mail merge and newsletter.
- Apply formulae and use applications in excel such as formatting cells, inserting chart, fill colours, sorting, filtering and converting a table
- Create a Power Point, slide transition, slide animation, inserting image and creation of photo album
- Create a database, accessing the database and usage of queries
- Surf Internet and e-mail

BASICS OF COMPUTER PRACTICAL

LAB EXERCISES

WINDOWS (6 Hours)

Introduction – History of windows – Screen saver and monitor resolution – Wallpaper setting – Folder manipulation – properties of a folder – Recycle bin – Shortcuts – Sorting folder – Switching between applications – Copying files in CD/DVD settings – Recording Audio files

Exercises

1. a. Restoring files and folders from Recycle/bin
   b. Creating Shortcuts for folder/file
   c. Finding a file or folder by name
   d. Selecting and moving two or more files/folders using mouse

2. a. Copying files into CD/DVD
   b. Making the taskbar wider and hiding the taskbar
   c. Recording and saving an audio file
   d. Set/Change the date and time

3. Switching between applications

4. a. Installing screen saver and change the monitor resolution by 1280 x 960
   b. Setting Wall paper
   c. Creating, moving, deleting and renaming a folder
   d. Copy, paste, and cut a folder/file
   e. Displaying the properties for a file or folder

WORD PROCESSING (9 Hours)

Introduction – Menus – Tool bar – Create – Edit – Save – Alignment – Font Size – Formatting – Tables – Fill colors – Mail Merge – Page setup – Preview – Water marking – Header and Footer – Clip art.

Exercises

5. Create the following table and perform the operations given below
   - Arrange Days as left align, period as right Align and other columns as center align
   - Use doubled Border to the Summary Title and fill with 25% grey colour
   - Implement merging and splitting two or more cells

- Give alternative forecolour for columns
- Print the above table

Time Table							
Days	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Mon	Eng	Mat	Phy	Che	Computer Application Lab		
Tue	Che	Phy	Mat	Eng	Phy	Mat	Che
Wed	Workshop Practice			Mat	Che	Eng	Phy
Thurs	Phy Lab - 1		Mat	Phy	Che	Eng	Mat
	Che Lab - 2						
Fri	Eng	Phy	Che	Mat	Phy Lab - 2		Che

6. Create a standard covering letter and use mail merge to generate the customized letters for applying to a job in various organizations. Also, create a database for the applying organizations.

7. Create a newsletter of three pages with two columns text. The first page contains some formatting bullets and numbers. Set the document background colour and add 'confidential' as the watermark. Give the document a title which should be displayed in the header. The header/footer of the first page should be different from other two pages. Also, add author name and date/time in the header. The footer should have

SPREADSHEET (9 Hours)

Introduction – Menus – Tool bar – Create – Edit – Save – Formatting cells – chart wizard – Fill colours – Creating and using formulas – sorting – filtering.

Exercises

8. Create a table of records with columns as Name and Donation amount. Donation amount should be formatted with two decimal places. There should be at least twenty records in the table. Create a conditional format to highlight the highest donation with blue colour and lowest donation with red colour. The table should have a heading.

9. Create a result sheet containing candidate's register number, name, and marks for four subjects. Calculate the total and result. The result must be calculated as below and failed candidates should be turned to red.

Result is distinction if Total >=70% First Class,
if Total >=60% Second Class,
if Total >=50% Third Class,
if Total >=35% Pass, Fail otherwise.

Prepare line, bar, and pie chart to illustrate the subjects wise performance of the class for any one semester

10. Create a Super Market Bill Preparation using Excel.

11. Calculate the Values of minimum grade, Max Grade, Count and Rank using the below table

S.NO	NAME	Grade - I	Grade - II	Grade - III
1	TILAK			
2	HARISH			
3	BALA			
4	JOHNSON			
5	WILSON			
6	SMITH			
7	NATARAJ			
8	SUMESH			
9	FRANCIS			
10	RAKESH			

DATABASE (9 Hours)

Introduction – Menus – Tool bar – Create – Edit – Save – Data types – Insert – delete – update – view – Sorting and filtering – Queries – Report – Page setup - Print

Exercises

12. Create database to maintain at least 10 addresses of your class mates with the following constraints

- Roll no. should be the primary key
- Name should be not null

13. Prepare a payroll for employee database of an organization with the following details: Employee ID, Employee Name, Department and Designation, Date of appointment, basic pay, Dearness allowance, House Rent allowance and other deductions if any. Perform simple queries for different categories.

14. Creating and Running Reports for Students Mark List and calculate their Total, Average and Result. Perform simple queries for different categories.

PRESENTATION (9 Hours)

Introduction – Menus – Tool bar – Create – Edit – Save – Slide transition – insert image- hyperlink – slide numbers – view slideshow with sound – photo album – clipart.

Exercises

15. Create a presentation on "Communication skills" with 6 different slide transitions.

16. Make the marketing presentation of any consumer product with at least 6 slides. Use different customized animation effects on pictures and text.

17. Create a Photo album in PowerPoint.

INTERNET (6 Hours)

Introduction - Browsers – Open a website – E-mail: send, receive and delete – E-mail with attachments in Google docs – Search Engines – Searching topics

Exercises

18. Create and E-mail ID and perform the following

- Write and E-mail inviting your friends to your birthday party
- Make your own signature and add it to the E-mail message
- Add a word attachment of the venue route
- Send the E-mail to at least 5 of your friends

19. Find out the direction and distance about road travel form Delhi to Agra using the internet search. Also make a report of the map and other details like place to stay and visit at Agra.

20. Create a presentation on Google docs. Ask your friend to review it and comment on it. Use "Discussion" option for your discussions on the presentation

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

BASICS OF COMPUTER PRACTICAL

Question Pattern for Autonomous End Examination

Year/Term: I/I **CODE: N2 - 40018**

MAX. MARKS: 100

Note: Answer **any one** question from **PART-A** and **any one** question from **PART-B**

PART - A

1. Exercise in Word or Excel

   (or)

2. Exercise in PowerPoint or Access

PART - B

1. Exercise in Word or Excel

   (or)

2. Exercise in PowerPoint or Access

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

BASICS OF COMPUTER PRACTICAL

MODEL QUESTION PAPER

Year/Term: I/I **CODE: N2 - 40018**

ANSWER ALL THE QUESTIONS: **MAX. MARKS: 100**

Note: Answer **any one** question from **PART-A** and **any one** question from **PART-B**

PART –A (1×50=50)

(i) To do mail merge operation for standard covering letter for applying to a job in an organization.

(or)

(ii) To create a Communication skills using Transition effect in PowerPoint presentation

PART –B (1×45=45)

(i) Create a table with two columns namely Serial number, Name and Donation amount
- Form Donation column with two decimal places
- Highlight the highest donation with blue colour and lowest donation with red colour

(or)

(ii) To create a database that contains the address list
- The fields should be Roll No, Name, DOB, Address, City and Pincode.
- The Roll no should be the primary key
- The name should be Not Null

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

BASICS OF COMPUTER PRACTICAL

AUTONOMOUS END EXAMINATION

MARK ALLOCATION

S.No	Contents	Marks
PART - A		
1	Writing Steps	20
2	Execution	20
3	Result / Printout	10
PART - B		
4	Writing Steps	15
5	Execution	20
6	Result / Printout	10
7	Viva	5
	TOTAL	**100**

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of Diploma in Engineering and Technology
Subject Code : 40021
Semester : II
Subject Title : Communicative English – II

TEACHING AND SCHEME OF EXAMINATION

No. of Weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
COMMUNICATIVE ENGLISH - II	4	64	25	100*	100	3 Hrs.

***Examination will be conducted for 100 marks and will be reduced to 75 marks.**

Units and Allocation of Hours

S. No.	Unit	Hours
1.	Unit – I	12
2.	Unit – II	12
3.	Unit – III	12
4.	Unit – IV	9
5.	Unit - V	12
Test & Model Exam		7
Total		64

Note: All the five units will have the topics **"Functional Grammar and Usage, Vocabulary Enrichment, Situational English, Creative English & English for Scholarly Presentation/Fluency"**

English for Scholarly Presentation/Fluency	
Prose	"The Lost Child" by Mulk Raj Anand
	"My Vision for India" by Abdul Kalam
Poetry	"From Lover's Gift" by Rabindranath Tagore "The Flower" by Tennyson

Rationale:

- With the advent and supremacy of the Internet, smart phones, e-Commerce and Social Media in global communication, English has metamorphosed itself with new dimensions to get the communicator's thoughts, feelings and interactions dressed in alien colours.
- To execute the tasks in Technical Environment, whether academic, professional or social, proficiency in English plays a vital role and a requisite for communication skills has gained momentum both for e-communication, higher studies abroad and placement in MNCs.
- Amazing and inconceivable developments in technology has led various industries to coin and employ their own new words every day and hence revision of syllabus, especially to cater to the need for essential updated vocabulary has become in evitable.
- In addition to the retention of certain functional grammar parts to attest accuracy in communication, new components such as vocabulary enrichment, situational English, Creative English and English for Scholarly Presentation have been introduced to equip the learners to cope up with revamping technical scenario.

General Objective:

The main objective of this course is to make the student express himself in oral and written communication effectively. The employers expect that student should be able to spell and construct simple sentences correctly. Moreover, they need to be fluent in English, be aware of the rules of written genres such as, official letters, emails, etc. At the end of the course, the student will be able to get practical command of English which will be useful to him/her in the work place.

Specific Objective:

- To develop the knowledge and understanding of grammar and their use in writing
- To develop the ability of comprehending and responding to the situation
- To develop the creativity of students
- To make student understand basic sentence structure and content by reading text books so that he can write simple sentences of his/her own
- To make students focus on the correct usage of sentences by giving various grammar topics

Course Outcome

The students will be able to:

1. Frame sentences with correct grammar and syntax.
2. Use proper words or phrases in sentences while communicating with others.
3. Write effective sentences for professional communications such as official letters, email, etc.
4. Present information persuasively with the best sequence, words and structures.

5. Present ideas concisely, clearly and effectively in written communication.

COMMUNICATIVE ENGLISH – II

Detailed Syllabus

Unit	Name of the Topics	Hours
I	**Functional Grammar and Usage** • Application of Modal Verbs **English for Enrichment** • The Language Game: Unscramble **Situational English** • Email for Official Communication **Creative English** • The Language Game: Word Puzzle Grid **English for Scholarly Presentation/Fluency** • "The Lost Child" by Mulk Raj Anand	12
II	**Functional Grammar and Usage** • Negative Formation (No, Never, Nothing, Hardly, Seldom, No longer, None, Nowhere, Neither … nor) **English for Enrichment** • Phrases (Noun Phrase, Verb Phrase, Prepositional Phrase, etc.) **Situational English** • Social Media Language **Creative English** • Notice Writing for the Given Situations **English for Scholarly Presentation/Fluency** • "From Lover's Gift" by Rabindranath Tagore	12
III	**Functional Grammar and Usage** • Use of Subordinating Conjunctions **English for Enrichment** • Cause and Effect **Situational English** • Reacting to Situations **Creative English** • Slogan Writing **English for Scholarly Presentation/Fluency** • "My Vision for India" by Abdul Kalam	12
IV	**Functional Grammar and Usage** • Use of Conditionals • Reported Speech (Dialogue to Indirect Speech) **English for Enrichment** • Writing Suitable Responses to the Given Questions **Situational English** • Correction of Sentences (Questions must be taken only from the topics given below) (Articles, Subject Verb Agreement, Tenses, Degrees of Comparison, Singular & Plural) **Creative English** • Technical Words	9

V	**Functional Grammar and Usage** • Punctuation **English for Enrichment** • Giving Instructions **Situational English** • Proverbs for Everyday Situations **Creative English** • Infographics Comprehension **English for Scholarly Presentation/Fluency** • "The Flower" by Tennyson	12

Reference Books

Glossaries

https://www.engineering-dictionary.com/
https://techterms.com/definition/
http://dictionary.tamilcube.com/
https://www.lexilogos.com/english/tamil_dictionary.htm

Grammar

1. Just Enough English Grammar Illustrated, Gabriele Stobbe, McGraw-Hill Osborne Media, 2008
2. Visual Guide to Grammar and Punctuation, DK Publishing, 2017
3. English Grammar in Use, Raymond Murphy, Cambridge University Press, 2019
4. Intermediate English Grammar, Raymond Murphy, Cambridge University Press, Second Edition.
5. Essential English Grammar, Raymond Murphy, Cambridge University Press, New edition.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY
COMMUNICATIVE ENGLISH – II
MODEL QUESTION PAPER

Time: 3 Hrs. **Maximum Marks: 100**

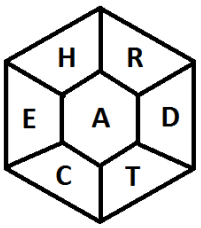
I. Answer any Ten of the following: (10x4=40)

1. **Rewrite the following sentences using suitable modal verbs without changing the meaning:**
   a. She is able to speak English.
   b. You are allowed to go home.
   c. It is not necessary for you to wait any longer.
   d. He will probably pass the test.
2. **Fill in the following sentences using suitable negatives:**
   a. _____ of Sankar's friends is invited for the party.
   b. Lions _____ fight with each other.
   c. _____ in my class is going for the tour.
   d. _____ is as refreshing as the fragrance of jasmine.
3. **Rewrite the following sentences using the subordinating conjunctions given in the brackets:**
   a. The meeting had to be postponed due to the Chairman's illness.(Rewrite with 'because')
   b. We were late. We missed the train. (Rewrite with 'Since')
   c. If we don't hurry up, we will miss our flight. (Rewrite with 'otherwise')
   d. It was cold but we went for swimming. (Rewrite with 'although')
4. **Complete the following conditional sentences with suitable verb given in the brackets:**
   a. If they _____ their house, they would be rich. (sell / sold / will sell)
   b. If Aruna _____, call me. (comes / came / will come)
   c. The zoo keeper _____her with a fine if she had fed the animals. (punished / would have punished / will punish)
   d. I would call the office if I _____ you. (was / were / am)
5. **Rewrite the following conversation into reported speech:**

   Jai: Where are you going?
   Gopi: To the airport.
   Jai: May I drop you there in my car?
   Gopi: Thanks a lot. It will be a great help to me
6. **Correct the paragraph by adding appropriate punctuation and capitalization:** my heart leaps up when I behold a rainbow in the sky wrote wordsworth the famous

poet most of us share his feelings when we are lucky enough to see a rainbow have you ever tried to reach a rainbows end

7. **Make any 4 words by combining the letters in the hexagon. The central letter should be common in each word.**



8. **Make use of the following phrases and write your own sentences:**
   a. The black cat
   b. Without fail
   c. To a great extent
   d. Has been working

9. **Combine the cause with the effect and rewrite the sentences using appropriate connectives given in brackets:**
   (As, Because, Consequently, So, Therefore, This causes)
   a. Their son was ill. They had to cancel the trip.
   b. It was raining. We had to cancel the match.
   c. She adopted the puppy. She liked it.
   d. The weather was bad. We stayed at home.

10. **Write suitable responses either in affirmative or in negative to the following questions as directed:**
    a. Did she write a nice essay? (Affirmative)
    b. Do you mind if I sit in the corner seat? (Negative)
    c. Are they playing football? (Negative)
    d. Are you going to the movie tomorrow? (Affirmative)

11. **Use imperatives and write any 4 instructions to be followed in the chemistry lab.**

II. Answer any FOUR of the following: (4x5=20)

1. **You are Mr.Arul and you recently bought a mobile phone from Smart Mobiles. Write an email to the Manager of Smart mobiles, explaining the poor quality of service offered in your city.**

2. **Convert the following acronyms / abbreviations used in social media into formal language:**
   a. NVM
   b. RSVP
   c. TYT
   d. BTW
   e. POV

3. **Write a dialogue with minimum 5 exchanges between the Class tutor and a student on submitting assignments.**

4. **Identify the grammatical / lexical errors in the following sentences and correct them:**

S. No.	Sentence	Error	Correction
a.	Amar is a artist.		
b.	He love to paint and draw.		
c.	There are five childrens in the room.		
d.	He has builded his house.		

5. **Match the meanings with their proverbs**

Meanings	Proverbs
a. If you can't see someone or something, you soon forget about them b. Achieve two goals with one action c. If you want to know about someone, look at his friends d. Some people never change e. No choice at all	1. A leopard can't change its spots 2. Kill two birds with one stone 3. Too many cooks spoil the broth 4. Out of sight, out of mind 5. A double edged sword 6. A person is known by the company he keeps 7. Hobson's choice

III. Answer any FOUR of the following: (4x5=20)

1. **Find the antonyms of the given words in the vocabulary grid**

a. Happy b. Hard c. Late d. Hot e. Expensive

W	S	A	P	A	E	H	C
E	O	U	G	L	Y	I	O
T	E	A	S	Y	E	G	L
S	A	D	O	A	U	H	D
O	R	I	G	H	T	T	E
F	L	V	E	F	D	I	N
T	Y	E	Q	U	I	C	K

2. **You are Sports – in – charge. Write a notice congratulating and praising the achievement of your college cricket team that has won the district level trophy.**

3. **Write 2 Slogans on your own on "SAVE ENVIRONMENT".**

4. **Write the appropriate technical words for the following:**

a) The area of Artificial Intelligence concerned with the practical use of robots
b) The plan / design of something that is laid out
c) The creation of something in the mind
d) An elaborate and systematic plan of action
e) A weakened state caused by long stress on a material

5. **Look at the following infographics and prepare a report of about 50 words using the information presented in it:**

IV. Write short notes on any FOUR of the following in about 50 words: (4x5=20)

1. Appreciate the former President Dr. Kalam's vision for India.
2. List out the things the child sees on his way to the fair.
3. Give a brief summary of Tagore's poem "From Lover's gift".
4. Narrate the plight of the boy when he was lost.
5. Bring out the theme of the poem "The Flower".
6. Identify an individual's role in India's development.

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of Diploma in Engineering and Technology

Subject Code : 40022

Semester : II

Subject Title : ENGINEERING MATHEMATICS – II

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGINEERING MATHEMATICS –II	7 Hrs	112 Hrs	25	100*	100	3 Hours

*Examination will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	Topic	Time (Hrs)
I	Vector Algebra - I	20
II	Vector Algebra - II	20
III	Integral Calculus- I	20
IV	Integral Calculus- II	20
V	Statistics	20
	Test , Model Exam & Tutorial	12
	Total	112

RATIONALE:

In many fields of Engineering, there are situations where the effects done to various factors can be calculated any in a smaller region. To calculate the total effect or effect over a larger region, the Integration concept is used. Integration plays vital role in many fields of Engineering.

OBJECTIVES:

The student will be able to acquire knowledge as algebra of vectors, vector calculus and its application in finding work done, moment, volume, they acquire knowledge of integration principles and different methods of integration. This subject also helps the students to become aware of Random variable, Binomial Distribution, Poisson distribution and Normal distributions which can be used in quality control.

COURSE OUTCOME:

After completion of this course it is expected that the student will be able to:

- Calculate scalar product and vector product of vectors and their applications.
- Find vector product of three and four vectors and also vector differentiation and its applications
- Find integrals of basic functions.
- Solve problems using Bernoulli's formula and evaluate definite integrals.
- Calculate mean and variance of a probability distribution, and also apply Binomial, Poisson and Normal distributions to evaluate the probability of real valued events.

ENGINEERING MATHEMATICS – II
DETAILED SYLLABUS

Unit	Name of the Topics	Hours
I	**VECTOR ALGEBRA - I** **1.1 VECTOR – INTRODUCTION** Definition of vector – types, addition, subtraction and scalar multiplication of vector, properties of addition and subtraction. Position vector. Resolution of vector in three dimensions, distance between two points, Direction cosines and direction ratios. Simple problems. **1.2 PRODUCT OF TWO VECTORS** Scalar product – Vector product – condition for parallel and perpendicular vectors, properties, angle between two vectors, unit vector perpendicular to two vectors –simple problems. **1.3 APPLICATION OF SCALAR AND VECTOR PRODUCT** Geometrical meaning of scalar product and vector product workdone, moment –simple problems.	6 7 7
II	**VECTOR ALGEBRA – II** **2.1 PRODUCT OF THREE AND FOUR VECTORS** Scalar and vector triple product and product of four vectors- simple problems. **2.2 VECTOR DIFFERENTIATION** Vector point function and vector field, scalar point function and scalar field, vector differential operator – Gradient – basic properties of the gradient- simple problems. **2.3 APPLICATION OF VECTOR DIFFERENTIATION** Divergence, basic properties, solenoidal, curl of a vector function, irrotational vector- simple problems.	7 6 7
III	**INTEGRAL CALCULUS – I** **3.1 INTEGRATION - DECOMPOSITON METHOD** Historical approach for integration - Anti derivative - Definition of the integral as an anti-derivative - Fundamental rules for integration - Integration using decomposition method - simple problems based on Engineering Applications.	6

III	**3.2 METHODS OF INTEGRATION-INTEGRATION BY SUBSTITUION** Integrals of the form $\int [f(x)]^n f'(x)dx$, where $n \neq 1$. $\int \frac{f'(x)}{f(x)}dx$ and $\int F[f(x)]f'(x)dx$- Simple problems. **3.3 STANDARD INTEGRALS** Integrals of the form $\int \frac{dx}{a^2 \pm x^2}, \int \frac{dx}{x^2 - a^2}, \int \frac{dx}{\sqrt{a^2 - x^2}},$ $\int \sqrt{a^2 - x^2}\, dx, \quad \int \sqrt{x^2 \pm a^2}\, dx, \int e^{ax}\, cosbxdx, \int e^{ax} sinbxdx$ – simple problems.	7 7
IV	**INTEGRAL CALCULUS – II** **4.1 METHODS OF INTEGRATION - INTEGRATION BY PARTS** Integrals of the form $\int x\, sinnx\, dx, \int x\, cosnx\, dx, \int xe^{nx}dx$ $\int x^n logxdx$ and $\int logxdx$ - Simple problems. **4.2 BERNOULLI'S FORMULA** Evaluation for the integrals $\int x^m sinnxdx, \quad \int x^m cosnxdx\ and \int x^m e^{nx}dx$ where $m \leq 3$ Using Bernoulli's formula - Simple problems. **4.3 DEFINITE INTEGRALS** Definition of definite integral – Properties of definite integrals -Reduction formula $\int_0^{\frac{\pi}{2}} \sin^n x\, dx \quad \int_0^{\frac{\pi}{2}} \cos^n xdx, \quad \int_0^{\frac{\pi}{2}} \sin^m x\, cos^n xdx$ - Simple problems.	6 7 7
V	**STATISTICS** **5.1 RANDOM VARIABLE AND MATHEMATICAL EXPECTATION** Definition of random variable – Types – Probability mass function – Probability density function. Simple problems. Mathematical expectation discrete random variable, mean and variance. Simple problems. **5.2 BINOMIAL DISTRIBUTION AND POISSON DISTRIBUTION** Definition of binomial distribution $P(X = x) = nC_x P^x q^{n-x}$ where $x = 0,1,2, \ldots \ldots$ Statement only. Expression for mean and variance. Simple problems. Definition of poisson distribution $P(X = x) = \frac{e^{-\lambda}\, \lambda^x}{x!}$ Where x=0,1,2,3,.....(statement only). Expression for mean and variance. Simple problems	7 7

V	**5.3 NORMAL DISTRIBUTION** Definition of normal and standard normal distribution (statement only). Constants of normal distribution (results only) – Properties of normal distribution – Simple problems using the table of standard normal distribution.	6

Reference Books:

1. Higher Secondary +1 Mathematics volume I&II. Tamilnadu Text book corporation.
2. Higher Secondary +2 Mathematics Volume I&II. Tamilnadu Text book corporation.
3. Engineering Mathematics V. Sundaram, R. Balasubramanian
4. Engineering Mathematics –I C.B.Gupta, A.K.Malik, Newageinternational Publishers, 1st edition – 2008.
5. Differential Calculus S. Balachandra Rao, CK Shantha New age Publishers
6. Probability Theory and Stochastic Process B.Prabhakara Rao, TSR Murthy, BS Publishers.
7. Vectors and Geometry GS.Pondey, RR.Sharma, New age international publishers.
8. Engineering Mathematics – I Guruprasad Samanta, New age international publishers, 2nd edition 2015.
9. Engineering Mathematics Reena Garg, Khanna publishing House, New Delhi, Revised edn. – 2018.
10. Engineering Mathematics Volume I P. Kandasamyand K. Thilagavathy, S. Chand & Company Ltd.

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING MATHEMATICS-II
MODEL QUESTION PAPER

Time: 3 Hrs. **Max. Marks: 100**

Part – A

Answer Fifteen questions. All questions carry equal marks. (15×2=30)

1. Find the direction cosines and direction ratios of $2\vec{\imath} + 3\vec{\jmath} - 4\vec{k}$
2. Find the value of 'm', if the vectors $3\vec{\imath} - \vec{\jmath} + 5\vec{k}$ and $6\vec{\imath} + m\vec{\jmath} + 4\vec{k}$ are perpendicular
3. Find the vector product of $\vec{\imath} + \vec{\jmath} + \vec{k}$ and $\vec{\imath} + 2\vec{\jmath} - 3\vec{k}$
4. If $\vec{F} = 5\vec{\imath} + 4\vec{\jmath} - 3\vec{k}$ and $\vec{d} = 4\vec{\imath} - 2\vec{\jmath} + \vec{k}$. Find the workdone of the force.
5. Find the value of $[\vec{\imath} + \vec{\jmath}, \quad \vec{\jmath} + \vec{k}, \quad \vec{k} + \vec{\imath}]$
6. Find the gradient of $x^2 + y^2 - 5xz$
7. Define solenoidal vector and irrotational vector.
8. If $\vec{F} = xy\vec{\imath} + yz\vec{\jmath} + zx\vec{k}$ find curl $\vec{F}$.
9. Evaluate: $\int (2e^x + 3)dx$
10. Evaluate: $\int \left(5\sec^2 x - \frac{7}{x}\right) dx$
11. Evaluate: $\int \frac{\sin(logx)}{x} dx$
12. Evaluate: $\int \frac{dx}{25+x^2}$
13. Evaluate : $\int logx\, dx$
14. Evaluate: $\int xsinxdx$
15. Evaluate: $\int xe^x dx$
16. Evaluate: $\int_1^2 \frac{1}{x} dx$
17. A Random variable X has the following probability distribution.

    Find the value of 'a'

X	0	1	2	3
P(X)	a	$2a$	$3a$	$4a$

18. For a Binomial Distribution with $n = 9$, $p = \frac{1}{3}$ .Find variance.
19. The mean of the Poisson distribution is 1.5, find $P(X = 2)$
20. Write the properties of Normal curve?

PART B

Answer All the questions, choosing any two subdivisions from each question. All subdivisions carry equal marks. $(\mathbf{5 \times 14 = 70})$

21.(a). Show that the vectors $2\vec{\imath} - \vec{\jmath} + \vec{k}, \vec{\imath} - 3\vec{\jmath} - 5\vec{k}$ *and* $3\vec{\imath} - 4\vec{\jmath} - 4\vec{k}$ *and* $3\vec{\imath} - 4\vec{\jmath} - 4\vec{k}$ form a right angled triangle.

(b). Find the unit vector perpendicular to $2\vec{\imath} - \vec{\jmath} + \vec{k}$, $3\,\vec{\imath} + 4\vec{\jmath} - \vec{k}$. Also find the sine of the angle between them.

(c). Find the magnitude of moment of a force $3\vec{\imath} + 4\vec{\jmath} + 5\vec{k}$ acting through a point $\vec{\imath} - 2\vec{\jmath} + 3\vec{k}$ about the point $4\vec{\imath} - 3\vec{\jmath} + \vec{k}$.

22.(a). If $\vec{a} = \vec{\imath} + \vec{\jmath}$, $\vec{b} = \vec{\jmath} + \vec{k}$, $\vec{c} = \vec{k} + \vec{\imath}$ & $\vec{d} = \vec{\imath} + \vec{\jmath} + \vec{k}$

Find $(\vec{a}X\vec{b}) . (\vec{c}X\vec{d})$

(b).If $\varphi = x^3 + y^3 + z^3 - 3xyz$ $find\ \nabla\varphi\ and\ \nabla \times\ \nabla\varphi$

(c). Show that $F = (y^2 - z^2 + 3yz - 2x)i + (3xz + 2xy)j + (3xy - 2xz + 2z)k$ is both solenoidal and irrotational.

23.(a). $(i)\ \int (x+1)(2+x)\,dx$ $(ii) \int \frac{dx}{1+cosx}$

(b). $(i) \int (2x^2 - x + 5)^4 (4x - 1)\,dx$ $(ii)\ \int \frac{\sec^2 x}{5+3tanx} dx$

(c). $(i) \int \frac{dx}{\sqrt{81-4x^2}}$ $(ii) \int e^{2x} cos3x dx$

24.(a). $(i) \int x cos5x dx$ $(ii) \int x^2 log x dx$

(b). $(i) \int x^2 sin2x dx$ $(ii) \int x^3 e^{2x} dx$

(c). $(i) \int_0^2 (5x^2 + 3x + 1) dx$ $(ii) \int_0^{\frac{\pi}{2}} \sin^6 x dx$

25.(a). A Random variable 'X' has the following probability distribution,

X	-3	6	9
P(X)	1/6	1/2	1/3

Find the mean and variance.

(b). In a Poisson distribution, if $3\mathrm{P}(\mathrm{X} = 2) = \mathrm{P}(\mathrm{X} = 4)$

Find (i) the parameter λ (ii) P(X=0)

(c). In a Normal Distribution, if X has Mean 80 and standard deviation 10, find $P(70 \leq X \leq 100). Take\ P(0 \leq z \leq 1) = 0.3413\ and\ P(0 \leq z \leq 2) = 0.4772.$

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[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of Diploma in Engineering and Technology
Subject Code : 40023
Semester : II
Subject Title : ENGINEERING PHYSICS – II

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGINEERING PHYSICS-II	4 Hrs	64 Hrs	25	100*	100	3 Hours

***** Examinations will be conducted for 100 marks and will be reduced to 75 marks

Topics and Allocation of Hours:

S. No	Topic	Time (Hrs)
1	Heat	12
2	Thermodynamics, Liquefaction of Gases & Non-Conventional Energy	12
3	Light and Remote Sensing	11
4	Electricity	11
5	Electronics	11
6	Test + Model Exam	7
	Total =	64

OBJECTIVES:

At the end of the study of II Semester the student will be able to

- Identify good conductors and insulators of heat.
- Analyse the relation between pressure, volume and temperature of gas and to interpret the results.
- Understand the process of Isothermal and Adiabatic changes of gas and basic laws of thermodynamics.
- Acquire knowledge about liquefaction process of gases.
- Realise the inevitable need for tapping Alternate energy to address the looming energy crisis.
- Identify the characteristics and properties of LASER, Optical fibre cable and their engineering applications.
- Acquire broader ideas about the process of remote sensing in tapping the earth resources for human benefits.
- Acquire knowledge about heating, chemical and magnetic effects of electric current.
- Gain broader ideas of capacitors, diodes, transistors, integrated circuits and logic gates.
- Identify, analyse and solve Engineering field related problems involving expressions derived in all the above topics.

Course Outcomes:

After successful completion of the course students will be able to

1.	Discuss about good, poor conductor, transfer of heat energy, kinetic theory of gases, relation between pressure, volume, temperature, and specific heat capacities of gases. And solve the problems involving expressions.
2.	Describe isothermal, adiabatic changes of gas, working principle of Carnot's engine, liquefaction of gases, and alternate energy sources. And solve the problems involving expressions.
3.	Explain Laser, Optical fibre, Remote sensing, Radar. And describe and derive the refractive index of a medium. And solve the problems involving expressions.
4.	Explain the heating, chemical, magnetic effects of electrical current and measuring instruments. And solve the problems involving expressions.
5.	Explain capacitor, diode, transistor, Integrated circuits and logic gates. And solve the problems involving expressions.

ENGINEERING PHYSICS – II
DETAILED SYLLABUS

UNIT – I

HEAT (12 Hours)

1.1. TRANSFER OF HEAT (4 Hours)

Concept of Heat and Temperature – Centigrade, Fahrenheit and Kelvin scales of temperature measurement – Heat conversions (C, F, K). Conduction, convection and radiation – Definitions and explanations – Good and Poor conductors – Examples. Coefficient of thermal conductivity – Definition and SI unit – Properties of thermal radiation.

1.2. KINETIC THEORY OF GASES (4 Hours)

Postulates – Mean square velocity and Root Mean Square (RMS) velocity of molecules – Definitions and expressions – Expression for the pressure of a gas on the basis of postulates of kinetic theory of gases –Relation between pressure and kinetic energy of the gas – Relation between Kinetic energy and absolute temperature of the gas – Simple problems based on the expression for the pressure of a gas.

1.3. SPECIFIC HEAT CAPACITY (4 Hours)

Specific heat capacity of a substance (solids and liquids) – Definition – Specific heat capacity of a gas at constant volume – Specific heat capacity of a gas at constant pressure – Ratio of specific heat capacities – Explanation for Cp greater than Cv – Derivation of Mayer's relation – calculation of Universal gas constant R from the gas equation PV = RT. Simple problems based on Mayer's relation.

UNIT – II

THERMODYNAMICS, LIQUEFACTION OF GASES AND NON-CONVENTIONAL ENERGY (12 Hours)

2.1. THERMODYNAMICS (5 Hours)

First law of thermodynamics – Statement – Isothermal and Adiabatic changes – Explanation – Equations for isothermal and adiabatic changes (No derivation) Simple problems based on equations $P_1V_1 = P_2V_2$ and $P_1V_1^{\gamma} = P_2V_2^{\gamma}$. Second law of thermodynamics – Clausius statement and Kelvin's statement – Working of Carnot's reversible engine with indicator diagram and its efficiency – Applications of heat and thermodynamics.

2.2. LIQUEFACTION OF GASES (4 Hours)

Critical temperature, critical pressure and critical volume – Definitions – Principle used in cascade process – Cascade process of liquefaction of oxygen – Disadvantages of cascade process – Joule Thomson effect – Temperature of inversion – Liquefaction of air by Linde's process.

2.3. NON – CONVENTIONAL ENERGY (3 Hours)

Introduction – Non-renewable and Renewable (Alternate) energy sources – Examples – Solar energy, wind energy, Biomass Energy – Advantages and disadvantages of renewable energy.

UNIT – III

LIGHT AND REMOTE SENSING (11 Hours)

3.1. OPTICS (4 Hours)

Refraction – Laws of refraction – Refractive index of a medium – Derivation of refractive index of glass prism using minimum deviation – Definition – Spectrometer – Experimental determination of refractive index using spectrometer – Phenomenon of total internal reflection – Fibre optics – Introduction – Optical fibre cable as a wave guide – Advantages of OFC – Simple problem using the refractive index – Applications of total internal reflection.

3.2. LASER (3 Hours)

LASER – Characteristics of LASER – principle of LASER – Spontaneous emission – Stimulated emission – population inversion – Ruby laser - construction and working – Uses of LASER.

3.3. REMOTE SENSING (4 Hours)

Remote sensing – Introduction – Active and passive remote sensing – Explanation and examples – Components of remote sensing – Data acquisition, data analysis and reference data – RADAR – principle and working with block diagram

UNIT – IV

ELECTRICITY (11 Hours)

4.1. ELECTRICAL CIRCUITS (3 Hours)

Ohm's law – Laws of resistances – Resistivity, Conductivity, Super conductivity and Meissner effect – Definitions – Kirchoff's current and voltage laws. Condition for

balancing the Wheatstone's bridge – Simple problems based on expression for resistivity.

4.2. HEATING AND CHEMICAL EFFECTS OF CURRENT (3 Hours)

Joule's law of heating – Experimental determination of specific heat capacity of a liquid using Joule's calorimeter – Applications of heating effect of electric current. – Faraday's laws of electrolysis – Electro chemical equivalent (e.c.e) of an element – Definition – Experimental determination of e.c.e. of copper – Simple problems based on expression for e.c.e.

4.3. MEASURING INSTRUMENTS (5 Hours)

Expression for the force acting on a current carrying straight conductor placed in a uniform magnetic field – Fleming's Left Hand rule – Expression for the torque experienced by a rectangular current carrying coil placed inside a uniform magnetic field – Working of a moving coil galvanometer and its merits – Conversion of galvanometer into an Ammeter and Voltmeter. Simple problems based on conversion of galvanometer into ammeter and voltmeter.

UNIT – V

BASICS OF ELECTRONICS (11 Hours)

5.1. CAPACITOR (2 Hours)

Capacitance of a capacitor – Definition – 'farad '– Definition – Expressions for effective capacitance when capacitors are connected in series and in parallel.
Simple problems based on effective capacitance for series and parallel connections of capacitors – Applications of capacitors.

5.2. SEMICONDUCTORS (3 Hours)

Semiconductors – Energy bands in solids – Energy band diagram of good conductors, insulators and semi-conductors – Concept of Fermi level – Intrinsic semiconductors – Concept of holes – Doping – Extrinsic semiconductors – P type and N type semiconductors.

5.3. DIODES AND TRANSISTORS (3 Hours)

PN junction diode – Forward bias and reverse bias – Rectification action of diode – Working of full wave bridge rectifier using PN junction diodes. PNP and NPN transistors – Three different configurations – working of NPN and PNP transistor in common base configuration.

5.4. DIGITAL ELECTRONICS (3 Hours)

Digital electronics – Introduction – Logic levels – Basic logic gates: OR, AND and NOT gates – Universal logic gates: NAND and NOR gates – Symbolic representation,

Boolean expression and Truth table for all above logic gates – Integrated circuits – Levels of integration – SSI, MSI, LSI and VLSI – Advantages of ICs - Applications of transistors, gates and ICs.

Text Book :

1) Physics – Higher secondary – First & Second year– Volume I & II – TamilNadu Text Book Corporation – 2004 & 2005.
2) Intermediate physics – Volume I & II – Anwar Kamal – Foundation books Private Ltd. – 2008

Reference Book :

1) Fundamentals of physics – Brijlal and Subramaniam.
2) Fundamentals of Electricity – D.N. Vasudeva – S. Chand & co
3) Non- Conventional energy sources – G.D. Rai.- Khanna publishers.
4) Text book of Remote sensing and Geographical information systems – M. Anji Reddy BS publications.

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEEERING PHYSICS– II
MODEL QUESTION PAPER - I

Time : 3 Hrs **Max. Marks : 100**

PART – A

Answer any FIFTEEN of the following questions. **15 x 2 = 30**

1. State any three postulates of kinetic theory of gases.
2. Define co-efficient of thermal conductivity.
3. Define specific heat capacity of a gas at constant pressure.
4. What is the relation between pressure and kinetic energy.
5. State first law of thermodynamics.
6. Define isothermal change.
7. Define critical temperature.
8. What is meant by temperature of inversion?
9. What is meant by refraction of light?
10. What is active remote sensing?
11. Explain stimulated emission.
12. Give any three advantages of renewable energy.
13. Explain super conductivity and Meissner effect.
14. State Ohm's law
15. State Faradays Law of electrolysis.
16. State Fleming's left hand rule.
17. What is intrinsic semiconductor?
18. Explain Reverse bias.
19. What is an amplifier?
20. Write any two advantages of ICs.

PART – C

Answer the following questions, choosing any two subdivisions from each questions. All subdivisions carry equal marks. 5 x 14 = 70

21.(a). Write the properties of thermal radiation.
(b). Derive Mayer's relation ($C_p - C_v = R$)
(c). If the density of carbon dioxide at STP is 1.977 kgm^{-3}, find the RMS velocity of carbon dioxide.

22.(a). Explain the liquefaction of oxygen by cascade process.
(b). Write a short note on wind energy.
(c). A gas at 1 atm pressure is compressed to one-third of its initial volume. Calculate the final pressure if the compression is (i) isothermal and (ii) adiabatic. Take $\gamma = 1.4$

23.(a). Explain how OFC acts as a wave guide?
(b). Calculate the refractive index of the material of an equilateral prism. The angle of minimum deviation is 38°
(c). Describe the components of remote sensing.

24.(a). Describe an experiment to determine the specific heat capacity of a liquid using Joule's calorimeter.
(b). Describe how a galvanometer can be converted into (i) an ammeter and (ii) a voltmeter.
(c). The resistance of a wire of 25 m long and 1 mm diameter is 0.65Ω. Calculate its resistivity.

25.(a). Describe the energy band diagrams of conductors, insulators and semiconductors.
(b). Explain the working of full wave rectifier using PN junction diodes.
(c). Show that when two equal capacitors are joined in parallel the system has 4 times the capacity of that obtained when there are joined in series.

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P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEEERING PHYSICS– II
MODEL QUESTION PAPER - II

Time : 3 Hrs **Max. Marks : 100**

PART – A

Answer any FIFTEEN of the following questions. **15 x 2 = 30**

1. Define Fahrenheit scale of temperature.
2. Define Root mean square velocity.
3. State any two properties of thermal radiation.
4. Define specific heat capacity of gas at constant volume.
5. State Clausius statement of second law of thermodynamics.
6. Define adiabatic change.
7. Define critical pressure.
8. State Joule's Thompson effect.
9. Define refractive index of a medium.
10. Give the codition for total internal reflection.
11. Give any two properties of LASER.
12. What is passive remote sensing?
13. State the law of resistances.
14. What is meant by syper conductor?
15. State Joules law of heating.
16. Define electro chemical equivalent.
17. What is doping?
18. What is meant by forward bias?
19. What is rectifier?
20. Give the logic symbol and truth table for NOR gate.

PART – C

Answer the following questions, choosing any two subdivisions from each questions. All subdivisions carry equal marks. 5 x 14 = 70

21.(a). Explain the three types of heat transfer.

(b). Derive an expression for the pressure of the gas on the basis of kinetic theory of gases.

(c). The ratio between two specific heat of a gas is 1.31. The specific heat capacity at constant pressure is 35100 J K^{-1} kg^{-1}mol. Calculate the value of universal gas constant.

22.(a). Describe Liquefaction of air by Linde's process.

(b). Write a short notes on Wind Energy and bio mass energy.

(c). A gas at 10 atm pressure is compressed to half of its initial volume. Calculate the final pressure if the compression is (i) isothermal and (ii) adiabatic. Take $\gamma = 1.4$

23.(a). If the angle of prism 59^0 and its angle of minimum deviation is 40^0. Calculate the refractive index of the prism.

(b). Describe the construction and working of Ruby laser.

(c). Explain the working of RADAR with block diagram.

24.(a). Derive the condition for balancing the Wheatstone's bridge by using Kirchoff's laws.

(b). Describe the construction and working of a moving coil galvanometer.

(c). The resistance of a galvanometer is 100 ohm and it withstands a maximum current of 100mA. How will you convert it into an ammeter to read to 10A?

25.(a). Derive the expression for the effective capacitances when they are connected in (i) series and (ii) parallel.

(b). Explain NAND and NOR gates with the help of truth table.

(c). Three capacitors of values 3μF, 4μF and μF, are connected (i) in series and (ii) in parallel. Calculate the effective capacitances in each case.

* * *

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of diploma in Engineering and Technology
Subject code : 40024
Semester : II
Subject Title : Engineering Chemistry – II

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
ENGINEERING CHEMISTRY – II	4 Hrs	64 Hrs	25	100*	100	3 Hrs.

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours:

UNIT	Topic	Time (Hrs)
I	Electrochemistry	12
II	Chemistry of Corrosion and Prevention	12
III	Energy Chemistry	11
IV	Applied Chemistry	11
V	Environmental Chemistry	11
Test & Model Exam		7
Total =		64

OBJECTIVE:

The objective of this Course is to make the student to:

1. Explain the details of electrochemistry, electrochemical cell and energy sources.
2. Understand corrosion and its preventive methods.
3. Acquire knowledge about fuels, advantages and combustion of fuels and analysis.
4. Know about hardness of water and methods to remove the hardness of water.
5. Acquire knowledge about Environmental Chemistry.

COURSE OUTCOME:

Students will be able to

1. Explain the mechanism of conductions, construction of storage cells and its applications.
2. Describe the concepts of corrosion, methods of prevention of corrosion, the components of paint and their function.
3. Explain the preparation, composition and calorific values of fuels and flue gas analysis.
4. Elaborate the technology of water.
5. Describe the sources, harmful effects and control measures of air and water pollutants and goals of green chemistry.

ENGINEERING CHEMISTRY-II
DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**1.1 Electrochemistry-I:** Conductors- semiconductors- insulators examples - Distinction between metallic and electrolytic conduction - Electronic concept of oxidation and reduction – Electrochemical equivalence- definition - Faradays' laws of electrolysis – simple problems – electrolytes -classification-strong, weak and non-electrolyte –examples – electrolysis – definition – Mechanism – Industrial applications of Electrolysis – electroplating – chromeplating.	5
	1.2 Electrochemical cell: Electrochemical cell – Definition Galvanic cell – Formation of Daniel cell – Electrochemical series – Definition – significance.	3
	1.3 Energy Sources: Primary Battery – Secondary Battery – Definition and example – cell – Construction, working principle and Uses of Lead acid – Storage battery – Lithium ion – battery - Solar Cell – Definition – working principle.	4
II	**2.1 Corrosion:** Definition – types of corrosion – theories of corrosion – galvanic cell formation theory – differential aeration theory – factors influencing rate of corrosion.	4
	2.2 Methods of Prevention of corrosion: Galvanization – tinning – anodisation – cathodic protection – sacrificial anode method and impressed voltage method.	4
	2.3 Organic Coatings: Paint – definition – Components of paints – Varnish – definition – Preparation of oil varnish – differences between paint and varnish – Special Paints – Luminescent paint, fire retardant paint, Aluminum paint and distemper.	4
III	**3.1 Fuels:** Fuel – Definition – Calorific value – calorie – Liquid fuels – liquid hydrogen –power alcohol – uses – Refining of Petroleum – Fractional distillation – Cracking (Concept only) – Gaseous fuels – Preparation, composition and specific uses of Producer gas and	4

	Water gas – Composition and uses of CNG and LPG – advantages of gaseous fuels.	
	3.2 Combustion: Definition – Combustion calculation by mass (for solid and liquid fuels) – Stoichiometric calculations – Volume of air required – Definition of Flue gas – Flue gas Analysis – Orsat Apparatus – Simple numerical problems.	5
	3.3 Rocket Propellants: Definition – characteristics – Classification of propellants – brief idea of solid and liquid propellants.	2
IV	**4.1 Technology of Water–I:** Sources of water – depletion of underground water – Reasons – Rain water harvesting (Basic ideas) – advantages – Hard water and soft water – Hardness of water – Carbonate and Non–carbonate hardness – Methods of expressing hardness – mg/lit and ppm – Simple problems – Disadvantages of hard water – Estimation of total hardness by EDTA method – Problems involving Total, Carbonate and Non–carbonate hardness in ppm – Disadvantages of using hard water in boilers – Scale formation, Corrosion of boiler metal, Caustic Embrittlement – Priming and Foaming.	6
	4.2 Technology of Water–II: Softening of hard water – Ion-Exchange method and Reverse Osmosis method – Municipal supply – purification of drinking water – Quality of potable water (WHO standard) – parameters of potable water – pH – TDS – residual Chlorine permissible limits – determination of ecoli (preliminary idea).	5
V	**5.1 Air Pollution:** Pollution and Air pollution – Definition – Air pollutants (SO_2, H_2S, HF, CO and Dust) – Sources and Harmful effects – smog and types of smog – Formation of Acid Rain – Harmful effects – Green House Effect – Causes – Global warming – Harmful effects – Ozone Layer – Importance – Causes for Depletion of Ozone Layer (No equations) – Harmful effects of Ozone Layer Depletion – Control of Air Pollution.	5
	5.2 Water Pollution: Causes of Water Pollution – Sewage, Effluents, Algae and Microorganisms – Harmful effects – Definition – Sewage – Sewerage – Disposal – Industrial Effluents – Harmful effects of	3

	Effluents Treatment of Effluents – Eutrophication – definition – harmful effects.	
	5.3 Solid Waste Management: Solid Waste – Definition – Problems – Types of Solid Waste – Methods of Disposal – Land fill and Incineration – Recycling – Definition – Examples – Advantages of Recycling (Basic ideas) Green Chemistry Definition – Goals of Green Chemistry (Basic ideas).	3

Reference Book:

1. Introduction to Engineering Chemistry, Shradha Sinha , S S Dara & Sudha Jain, S Chand Publishers, 2004.
2. S.Chand's Engineering Chemistry, S S Dara, Sudha Jain & Shradha Sinha, 2005.
3. A Textbook of Engineering Chemistry, Dr. Uday Kumar, 2013.
4. Chemistry – Higher Secondary – 1 st and 2nd year, Vol. I & II, Tamil Nadu Text Book Corporation, 2018.
5. Engineering Chemistry Fundamentals and Applications, Shikha Agarwal, Cambridge University Press, 2019.
6. Handbook of rain water harvesting, Chennai Metrowater, 2018
7. Engineering Chemistry, Jain&Jain Dhanpat Raj Publishing Comapany,2016
8. Pradeeps new course chemistry, Vol I, Class 11,Dr.S.C. Khetarpal, Dr.S.N.Dhawan, Pradeep Publication,2018
9. Electrochemistry and Corrosion Science,,Nestor Perez,

Website references:

https://link.springer.com/book/10.1007%2F978-3-319-24847-9#toc

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY-II

MODEL QUESTION PAPER – I

Time: 3hrs **Max. Marks: 100**

PART –A

I. Answer any FIFTEEN of the following questions: (15 X 2 = 30)

1. Define electronic concept of oxidation and reduction.
2. What are weak and strong electrolytes?
3. Define Faraday's laws of electrolysis.
4. Distinguish between primary and secondary battery.
5. Define corrosion.
6. What is galvanization?
7. Distinguish between paint and varnish.
8. Write a short note on luminescent paint.
9. What is cracking?
10. What are rocket propellants?
11. Write the composition and uses of LPG.
12. Define calorific value of a fuel.
13. Distinguish between hard water and soft water.
14. What is caustic embrittlement?
15. List the reasons for the depletion of underground water.
16. Define ppm.
17. How is acid rain formed?
18. What is greenhouse effect?
19. What is eutrophication?
20. Write the goals of green chemistry.

PART –B

II. Answer all the questions choosing any two sub divisions in each of the following Questions:
All questions carry equal marks [5X14=70]

17.

a) Distinguish between metallic and electrolytic conductor.

b) Explain the mechanism of chrome plating.

c) Explain the construction and working of lead acid battery.

18.

a) Explain the differential aeration theory of corrosion.
b) Explain sacrificial method of preventing corrosion.
c) List the components of paint with their functions.

19.

a) Describe the process of fraction distillation of petroleum.
b) Write the characteristics of rocket propellants
c) Write the advantages of gaseous fuels.

20.

a) How is hardness of water estimated by EDTA method?
b) How is water purified for drinking purpose?
c) List the disadvantages of using hard water in boilers.

21.

a) Name any three common air pollutants and list their harmful effects.
b) Name any three common water pollutants and list their harmful effects.
c) Write the advantages of recycling of solid waste materials

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY-II

MODEL QUESTION PAPER – II

Time: 3hrs **Max. Marks: 100**

PART –A

I. Answer any FIFTEEN of the following questions: **(15 X 2 = 30)**

1. What are semiconductors? Give examples.
2. What is electrochemical series?
3. What are solar cells?
4. Distinguish between primary and secondary battery.
5. Define corrosion.
6. What is anodisation?
7. Distinguish between paint and varnish.
8. How is oil varnish prepared?
9. What is cracking?
10. How are propellants classified?
11. Write the composition and uses of water gas.
12. What is flue gas?
13. Write the reasons for depletion of underground water.
14. What is carbonate hardness due to?
15. What is ppm?
16. What is rain water harvesting?.
17. How is acid rain formed?
18. What is global warming?
19. What are effluents?
20. List the types of solid waste materials.

PART –B

II. Answer all the questions choosing any two sub divisions in each of the following Questions:

All questions carry equal marks **(5X14=70)**

17.

a) Explain the construction and working of Daniel cell.

b) Explain the mechanism of chrome plating.

c) Explain the construction and working of lithium ion battery.

18.

a) Explain the Galvanic cell formation theory of corrosion.
b) Explain impressed voltage method of preventing corrosion.
c) Write a short note on special paints.

19.

a) Describe the process of fraction distillation of petroleum.
b) Write the characteristics of rocket propellants
c) Describe Orsat apparatus of flue gas analysis.

20.

a) How is water softened by ion-exchange process?
b) Explain reverse osmosis process of purification of water.
c) List the disadvantages of using hard water in boilers.

21.

a) Name any three common air pollutants and list their harmful effects.
b) Name any three common water pollutants and list their harmful effects.
c) Explain land fill method and incineration method of disposal of solid waste.

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name	: **All branches of Diploma in Engineering and Technology**
Subject Code	: **40025**
Semester	: **II**
Subject Title	: **ENGINEERING GRAPHICS**

Objectives:

- To learn to use the drawing instruments
- To understand the basic concepts of Engineering Drawing
- To learn conics, special curves, projection of solids using manual drafting methods
- To learn the drawing entities and the ways of edit them using Auto CAD software
- To understand orthographic projections and the procedure to create them using Auto CAD software
- To create isometric drawings and the procedure to create them using Auto CAD software

Course Outcomes:

After the completion of the course the students will be able to

1. Utilize drawing instruments and explain basic concepts of Engineering Drawing
2. Draw conics, special curves, projection of solids using manual drafting methods
3. Work and create drawing entities and edit them using Auto CAD software
4. Create orthographic projection using Auto CAD software
5. Create isometric drawing using Auto CAD software

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGINEERING GRAPHICS	3 Hrs	48 Hrs	25	100*	100	3 Hours

*Examination will be conducted for 100 marks will be reduced to 75 marks.

Topics and Allocation of Hours:

S. No	Topic	Time (Hrs)
1	Manual Drafting Basics	5
2	Introduction to Conics and Special Curves and Projection of Solids	10
3	Introduction to CAD Software	10
4	orthographic projections	10
5	Isometric Drawing, Printing and Plotting	10
6	Test	3
	Total =	48

Note:

The students should be given training in manual drafting for the first two units and for the remaining three units, students should be given training using CAD software. All the exercises should be completed. The students should maintain records in a workbook for the concerned trades and the same must be submitted during the Board Practical Examinations.

ENGINEERING GRAPHICS
DETAILED SYLLABUS

UNIT - I

MANUAL DRAFTING BASICS (5 Hours)

1.1.1 Importance of engineering drawing - drawing instruments: drawing board, mini drafter, compass, divider, protractor, drawing sheets etc., layout of drawing sheets.

1.1.2 Importance of legible lettering and numbering - single stroke letters - upper case and lower case letters- general procedures for lettering and numbering - height of letters - guidelines.

1.1.3 Dimensioning - Need for dimensioning - terms and notations as per BIS - Dimension line, Extension line and Leader line - Methods of dimensioning – Importance of dimensioning rules - Exercises.

1.1.4 Scales - Study of scales - full size scale, reduced scale and enlarged scale.

UNIT - II

INTRODUCTION TO CONICS AND SPECIAL CURVES AND PROJECTION OF SOLIDS (10 Hours)

2.1. CONICS (2 Hours)

Different types – Definition of locus, focus and directrix - Constructions of ellipse, parabola, and hyperbola using rectangular method.

2.2 CONSTRUCTIONS OF SPECIAL CURVES (2 Hours)

2.2.1 Geometric curves: Definition, application of cycloid - epicycloid – hypocycloid.

2.2.2 Involute of a circle - Archimedean spiral – helix.

2.3 PROJECTION OF SOLIDS (6 Hours)

2.3.1 Projection of points – projection of straight lines - projections of straight lines - exercises

2.3.2. Projection of solids – terminology – classification of solids –prismatic and cylindrical solids.

2.3.3. Projection of solids in simple positions – projections of solids with respect to either HP or VP – exercises.

UNIT - III

INTRODUCTION TO CAD SOFTWARE (10 Hours)

3.1. INTRODUCTION (2 Hours)

History of CAD – Applications – Advantages over manual drafting – Hardware requirements – Software requirements – Windows desktop – CAD screen interface

– menus – Tool bars – How to start CAD – How to execute command – types of co-ordinate systems – Absolute – Relative – Polar

3.2. DRAWING AIDS AND EDITING COMMANDS (4 Hours)

Creating objects (2D) – Using draw commands – Line, Arc, Circle, Ellipse, Donut, Polygon, Point, Pline, Sketch, Trace – Creating 2D Solid. Creating text – Dtext, Mtext, Text styles – Mline, spline – Drawing with precision – Osnap options – drafting settings –limits – Units – drawing aids – Fill, Snap, Grid, Ortho lines – Function keys - Editing and modify commands – Object selection methods – Erasing object – Oops - Cancelling and undoing a command – Copy – Move – Array – Offset – Scale – Rotate – Mirror – Break – Trim – Extend – Explode. Divide – Measure – stretch – Lengthen – Changing properties – Color – line types –LT scale – Matching properties – Editing with grips – Pedit – Ddedit – Mledit.

3.3 BASIC DIMENSIONING, HATCHING, BLOCKS AND VIEWS (4 Hours)

Basic dimensioning – Editing dimensions – Dimension styles – Dimension system variables. Machine drawing with CAD. Creation of blocks – Wblock – inserting a block – Block attributes – Hatching –Pattern types – Boundary hatch – working with layers - Controlling the drawing display – Blipmode – View group commands – Zoom, redraw, regen, regenauto, pan, viewres – Real time zoom. Inquiry groups – calculating area – Distance – Time – Status of drawing – Using calculator.

UNIT - IV

ORTHOGRAPHIC PROJECTIONS (10 Hours)

4.1.1 Introduction – projection terms - Orthographic projection - Co-ordinate planes of projection - Systems of orthographic projection - First angle orthographic projection- Third angle orthographic projection - Comparison of first and third angle projections.

4.1.2 Projection of three views (Elevation, Plan, Side view) of simple objects using first angle projection only - exercises.

UNIT - V

ISOMETRIC DRAWING, PRINTING AND PLOTTING (10 Hours)

5.1 Isometric Drawing (4 Hours)

5.1.1 Isometric projection – drawing isocircles – Dimensioning isometric objects.

5.2 Development of Surfaces (4 Hours)

5.2.1 Exercises in triangular, square, pentagon and hexagon prisms and pyramids, cylinder and cone.

5.2.2 Development of T-pipe, elbow, ducts, tray, lamp shade and funnel.

5.3 Plotting (2 Hours)

File commands – File Import and export – Layout preparation – page setup and printer configuration - plotting drawing.

Text Books:

1. Gill P.S., “Engineering drawing”, S.K.Kataria & Sons.
2. Bhat N.D., “Engineering drawing”, Charotar Publishing House.

Reference Books:

1. Gopalakrishnan.K.R., "Engineering Drawing", (Vol.I and Vol.II), Dhanalakshmi publishers, Edition 2, 1970
2. Venugopal.K, Sreekanjana G, “Engineering Graphics” New Age International Publishers.
3. K V Nataraajan “A Text Book of Engineering Drawing”
4. Thomas E.French, Charles J.Vierck, Robert J.Foster, “Engineering drawing and graphic technology”, McGraw Hill International Editions.
5. Barkinson & Sinha, "First Year Engineering Drawing", Pitman Publishers.
6. Shah/Rana, “Engineering Drawing”, Pearson Longman.
7. Inside AutoCAD - D. Raker and H. Rice - BPB Publications, NewDelhi
8. Engineering Drawing and Graphics + AutoCAD – K.Venugopal, - New Age International Publications
9. AutoCAD 2010 with Applications - Sham Tickoo - Tata Mcgraw Hill.
10. Computer Graphics, Prentice – Donald Hearn, M. Pauline Baker - Hall of India Pvt. Limited, NewDelhi.

AUTONOMOUS END EXAMINATION

QUESTION PATTERN AND MARK ALLOCATION

(1) Draw the following diagram on given grid sheets	:	10 Marks
(2) Identify and draw missing lines on the orthographic projections	:	10 Marks
(3) Draw the orthographic projections from the following isometric drawing [(i) Front View - 20 Marks and (ii) Top View - 15 Marks]	:	35 Marks
(4) Draw the isometric drawing from the following orthographic projections	:	25 Marks
(5) Dimensioning & Layout	:	10 Marks
(6) Printout	:	05 Marks
(7) Viva Voce	:	05 Marks
Total Marks	:	**100 Marks**

* Practical Examination will be conducted for 100 marks and reduced to 75 marks

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY
(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All Branches of Diploma in Engineering and Technology
Subject Code : 40026
Semester : II
Subject Title : ENGINEERING PHYSICS – II PRACTICAL

TEACHING AND SCHEME OF EXAMINATION:
No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGINEERING PHYSICS – II PRACTICAL	2 Hrs	32Hrs	25	100*	100	3 Hours

*Examination will be conducted for 100 marks and will be reduced to 75 marks

COURSE OUTCOME:
After successful completion of the course students will be able to

1.	Able to determine the refractive index of liquid, glass prism and specific heat capacity of liquid.
2.	Able to verify the laws of resistances and determine electro chemical equivalent of copper.
3.	Able to determine the V-I characteristic curve of PN junction diode, solar cell and verify the output of logic gates.

GUIDELINES:

- All the eight experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Instruments/Equipment and taking readings in the practical classes, every two students should be provided with a separate experimental setup for doing experiments in the laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

The Internal Mark Calculation for Practical subjects is to be done as follows:

Particulars	Marks
Procedure/ observation and tabulation/ Other Practical related Work (Observation Note)	10 Marks
Completion of Worksheets	5 marks
Presentation skill	10 Marks
TOTAL	**25 Marks**

- All the Experiments indicated in the syllabus should be completed and the same be given for final board examinations

- Students must submit observation note book which includes the following:
  - Formula and explanation
  - Observation
  - Tabulation
  - Calculation
  - Result

  A maximum of 10 marks is allotted for this purpose.

- At the end of each practical, students are expected to complete the worksheets pertaining to the practical by browsing internet and referring books at library and the same should be submitted in the following week. A maximum of 5 marks is allotted for submitting the relevant worksheets.

- At the end of each cycle of experiments, students are expected to make oral presentation on completed experiments by using LCD projector. For this purpose, students will be divided into groups consisting 6 each. Presentation should be made by each and every student. Presentation will be reviewed by the faculty. A maximum of 10 marks will be awarded for each student based on his / her oral presentation.

- At the end of the Semester, the average marks of all the exercises should be calculated for 25 marks

- All the marks entries for Observation, worksheet and presentation skills should be entered in the Personal Log Book of the staff, who is handling the subject

Board Practical Examinations

- The students should be given proper practice in all the experiments. All the experiments should be completed before the examinations.

- The students should maintain observation note and Record note.
- The record note book should be submitted during the Board Practical Examinations.
- All experiments should be given and the students are allowed to select any one by lot.
- The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.
- The Examiners should ensure the proper safety measures before the commencement of Practical examinations.

AUTONOMOUS END EXAMINATION

MARK ALLOCATION

Formula with explanation	: 10 marks
Figure / Circuit diagram with parts	: 10 marks
Tabulation with proper units	: 10 marks
Observation (including taking readings)	: 40 marks
Calculation	: 15 marks
Result	: 10 marks
Viva voce	: 05 marks
Total	**: 100 Marks**

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

[Government Aided Autonomous Institution]

DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS – II PRACTICAL
LIST OF EXPERIMENTS WITH OBJECTIVES

1). **Refractive Index.**

To determine the refractive index of a transparent liquid (water) using travelling microscope.

2). **Solar Cell.**

To draw the V – I characteristics of the solar cell.

3). **Spectrometer.**

To measure the angle of the prism (A) and the angle of minimum deviation (D) using spectrometer.
(find either A or D for End Exam)

4). **Laws of Resistances.**

i) To find unknown resistance of the two given coil.
ii) To verify the laws of resistances by connecting the two given resistances in (i) series and (ii) parallel, using Ohm's law.

5). **Joule's Calorimeter.**

To determine the specific heat capacity of a given liquid.

6). **Copper Voltameter.**

To determine the electro chemical equivalent (e.c.e.) of copper.

7). **P-N Junction Diode.**

To draw the voltage – current characteristics in forward bias and to find the "dynamic forward resistance" & "knee voltage" from the graph.

8). **Logic Gates.**

To find the output conditions for different combinations of the input for NOT gate and 2 inputs AND, OR, NAND & NOR logic gates, using IC chips.
(IC 7404 –NOT Gate, IC 7408 – AND Gate, IC 7432 – OR gate, IC 7400 – NAND Gate, IC 7402 – NOR Gate).

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS – II PRACTICAL
LIST OF EQUIPMENTS

Note: Minimum four set of equipment / Components are required for the Batch of 30 students

1). **Refractive Index.**
Travelling microscope, Beaker with transparent liquid and saw dust.

2). **Solar Cell.**
Solar cell kit, connecting terminals.

3). **Spectrometer.**
Spectrometer, sodium vapour lamp, Reading lens, Glass prism, sprit level, hand lamp

4). **Laws of Resistances.**
Battery Eliminator, key, rheostat, ammeter, voltmeter, connecting wires and two unknown resistance

5). **Joule's Calorimeter.**
Joule's calorimeter, Thermometer, Digital balance, stop clock, Battery Eliminator, key, rheostat, ammeter, voltmeter, connecting wires.

6). **Copper Voltameter.**
Copper voltameter, Digital balance, stop clock, Battery Eliminator, key, rheostat, ammeter, emery sheet, connecting wires

7). **P-N Junction Diode.**
PN junction diode kit, connecting terminal

8). **Logic Gates.**
Logic gate testing apparatus with IC moulding Kit,
IC 7404 –NOT Gate, IC 7408 – AND Gate, IC 7432 – OR gate, IC 7400 – NAND Gate, IC 7402 – NOR Gate

P.A.C. RAMASAMY RAJA POLYTECHNIC COLLEGE, RAJAPALAYAM

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS – II PRACTICAL
MODEL QUESTION PAPER

Note: All experiments should be given for examinations and the students are allowed to select any one by lot. (Interchange of Experiment is not allowed)

1. Determine the refractive index of the given transparent liquid using traveling microscope.

2. Draw the V – I characteristics of the solar cell.

3. Measure the angle of the prism (A) **or** the angle of minimum deviation (D) using spectrometer

4. To find unknown resistance of the two given coil. Also verify the laws of resistances by connecting the two given resistances in (i) series and (ii) parallel, using Ohm's law.

5. Determine the specific heat capacity of a given liquid, using Joule's calorimeter.

6. Determine the electro chemical equivalent (e.c.e.) of copper using Copper Voltameter.

7. Draw the voltage – current characteristics of a P-N junction diode in forward bias and then find the 'dynamic forward resistance' & 'knee voltage' from the graph.

8. Find the output conditions for different combinations of the input for NOT gate and 2 inputs AND, OR, NAND & NOR logic gates using IC chips. (NOT-IC7404, AND-IC7408, OR-IC7432, NAND-IC7400, NOR-IC7402)

P.A.C. Ramasamy Raja Polytechnic College, Rajapalayam

(Government Aided Autonomous Institution)

DIPLOMA IN ENGINEERING AND TECHNOLOGY

N2- SCHEME

(Implemented from the Academic Year 2021-2022 onwards)

Course Name : All branches of diploma in Engineering and Technology
Subject code : 40027
Semester : II
Subject Title : Engineering Chemistry – II Practical

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
ENGINEERING CHEMISTRY – II Practical	2 Hrs	32 Hrs	25	100*	100	3 Hrs.

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

OBJECTIVES:

The objective of this Course is to make the student to:

1. Get knowledge in estimation of total hardness, temporary and permanent hardness in the hard water sample.
2. Acquire knowledge about the determination of alkalinity and dissolved chlorine in a given sample of hard water.
3. Get knowledge about analysis of acid and basic radical.

COURSE OUTCOMES:

Students will be able to

1. Estimate and compare the water quality parameters by titration methods.
2. Identify acid and basic radical in the given sample.
3. Crystallise and identify the constituent ions in copper sulphate.

Topics and Allocation of Hours:

Contents: Practical

S. No	Name of the Topics
1	Estimation of residual chlorine in a given sample of water.
2	Estimation of total hardness of hard water by EDTA method.
3	Comparison of total hardness of three different samples of hard water from rural areas.
4	Determination of alkalinity of given sample of hard water.
5	Identification of carbonate, nitrate, sulphate ions and their industrial importance.
6	Crystallization of copper sulphate from copper carbonate and confirmation of copper and sulphate ions.
7	Preparation of urea formaldehyde resin and its industrial importance.
8	Effluents analysis- sources-identification and harmful effects a) Lead and copper b) Zinc and cadmium.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY
MODEL QUESTION PAPER

Time	3 Hours.	**Max. Mark**	100 Marks
Branch	BASIC ENGINEERING	**Subject Code**	40027
Semester	II	**Subject Name**	ENGINEERING CHEMISTRY –II PRACTICAL

Note:

1) **Answer any one of the following**
2) **Write Aim, Principle, Simple procedure, Titration 1&2, Formula, Calculation and Result**

1. Estimate the amount of residual chlorine present in the given sample of water. You are provided with standard solution of potassium permanganate and a link solution of thiosulphate.
2. Estimate the total hardness in the given sample of hard water using a standard hard water of molarity 0.01M and an approximately 0.01M solution of EDTA.
3. Compare the total hardness present in the given samples of hard water by EDTA titration. You are provided with a standard solution of 0.01M EDTA.
4. Determine the type and amount of alkalinity present in the given sample of hard water. You are provided with a standard sodium hydroxide solution of strength 0.02N and a dilute hydrochloric acid solution.
5. Write any four tests to identify the presence of nitrate, sulphate ion and chloride ion and mention their industrial importance.
6. Prepare and crystallize copper sulphate from cupric carbonate sample using dilute sulphuric acid and confirm it by performing four tests for copper ion and sulphate ion.
7. Prepare the crystals of urea formaldehyde resin using urea and formaldehyde and mention its uses.
8. Write any three tests to identify the presence of the copper industrial effluents. List their sources and any five harmful effects.

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY - II

AUTONOMOUS END EXAMINATION

MARK ALLOCATION

Titrations

S.No	Item	Marks
1.	Aim	5
2.	Simple procedure	5
3.	Titration 1	35
3.	Titration 2	35
4.	Formula, Calculation and Result	15
5.	Viva	5
	Total	100

Crystallization of copper sulphate and Effluent Analysis

S.No	Item	Marks
1	Preparation - procedure	20
2	Confirmatory test for Cu^{2+} ion	25
3	Confirmatory test for SO_4^{2-} ion	25
4	Effluent Analysis	25
5	Viva	5
	Total	100

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

(Students admitted from Academic Year 2021 – 2022 onwards)

N2 – Scheme

Course Name : All branches of Diploma in Engineering and Technology

Subject Code : 40028

Semester : II

Subject Title : BASICS OF INDUSTRIES & WORKSHOP PRACTICAL – II

Objectives:

- To understand the concepts of industrial safety and quality
- To familiarise with Industry 4.0
- To make use of the tools and equipment's related to sheet metal, plumbing and wiring
- To work with sheet metal and to fabricate parts and / or assemblies using sketches
- To study the components used in plumbing work and to learn the procedure to join them to make leak proof plumbing connections
- To understand the house hold electrical components, the ways to connect them and safety aspects related to Earthing and UPS / Battery.

Course Outcomes:

After the completion of the course the students will be able to

1. Explain the basic concepts of safety, quality and Industry 4.0
2. Fabricate sheet metal parts and assembling using sketches with precision and accuracy
3. Prepare and install leak proof plumbing connections
4. Prepare electrical circuits and domestic projects and perform the house hold wiring

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
BASICS OF INDUSTRIES & WORKSHOP PRACTICAL – II	5 (Theory: 2hrs Practical: 3 hrs)	80 (Theory: 32hrs Practical: 48 hrs)	25	100*	100	3 Hours

*Examination will be conducted for 100 marks will be reduced to 75 marks.

Note:

The students should be given training in both sections. All the exercises should be completed. The students should maintain records in a workbook for the concerned trades and the same must be submitted during the Board Practical Examinations.

BASICS OF INDUSTRIES & WORKSHOP PRACTICAL – II
DETAILED SYLLABUS

PART -1: THEORY PORTION
Unit I
BASICS OF INDUSTRIES (6 hours)
What is Industry? - Classification– Factors influences the location of the industries. Types of industries: Small Scale Industries: Definitions – procedure to start. Medium scale industries: Definition. Large scale industries: Definition. Manufacturing Industry - purpose of manufacture – global manufacture. Engineering Industry: Introduction – Products of various engineering sectors.
Unit II
INDUSTRIAL SAFETY AND MAINTENACE (6 hours)
Introduction – Safety equipment – Health and safety procedure – Personnel Protective Equipment – Safe working practices - Safety Signs. Plant Maintenance: Introduction – objectives – importance. Types of Maintenance: Break down maintenance – Preventive maintenance – Predictive Maintenance. TPM: introduction – objectives - Steps of TPM process.
Unit III
QUALITY AND STANDARDS (6 hours)
Definition of Quality – Total Quality Management - introduction – basic concepts – Quality Council – objectives. 5S Principle – Sort, Set in Order, Shine, Standardise and Sustain. – Necessity of 5S – Six Sigma – Essential elements – Methodologies – Six Sigma belt. ISO standards – Intellectual Property Rights - Engineering Ethics. Brief description only.
Unit IV
BASICS OF ENGINEERING (8 hours)
Tolerance - limits – Deviation – Allowance – Definitions only. Types of tolerances: Unilateral, Bilateral – Fits – Types of fits. List of important materials used for building construction – Requirements of water for construction. Mortar: Types and its properties. Concrete: constituents – requirements. Types of roofing – Types of foundation – requirements of good foundation – Standard sizes of doors and windows. Weathering course: purpose – materials required. Earth quake: types of earth quake and its remedial measures. Rain water harvesting – types - importance. Electrical flux – electrical flux density – electrical field intensity – current – EMF –

potential difference – resistivity – ohms law – work – power – energy – Kirchhoff's law – definitions only.
Unit V
INDUSTRY 4.0 (6 hours)
Industrial revolution – Definition - Industry 4.0 - Definition – Key trends. Components: Big data – Cloud computing – Internet of Things – Simulation – Autonomous Robots – Augmented reality – Cyber security – System integration – Additive manufacturing. Evolution of Industry 4.0 – Global readiness – Global trend – Initiative by industries and Government – Importance of Industry 4.0.

Reference Books:

1. Basic Manufacturing, Roger Timings, Third Edition – Newnes, An imprint of Elsevier.
2. Industrial Organisation and Engineering Economics, T.R. Banga, S.C.Sharma, Khanna Publishers
3. Industrial Engineering and Management, O.P.Khana, Dhanbat Rai Publications.
4. Machine Drawing, K.L.Narayana, P.Kannaiah, K.Venkatareddy, New Age International Publishers.
5. Elements of Civil Engineering, M.S.Palanisamy, Tata Mc Grawhill Publication.
6. A Text Book of Electrical Technology, B.L.Theraja, A.K.Theraja, S.Chand & Company Ltd.
7. IJTSRD Conference, March 2019, The Fourth Industrial Revolution (I4.0) in India Challenges & Opportunities, Viraj Vijay Jadhav, Ravindra Mahadeokar.
8. Industry4.0, All India Management Association report.

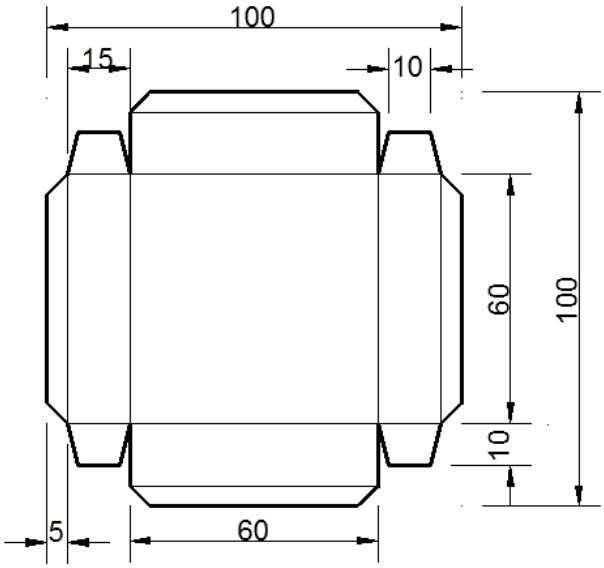
PART -2: PRACTICAL PORTION (Sheet metal, Plumbing & Wiring)

2A. SHEET METAL

- Study about the Safety in sheet metal shop.
- Study of sheet metal Tools and their uses.
- Methods of marking, cutting, hemming, seaming, punching and riveting.
- Development of simple surface
- Fabrication of sheet metal components

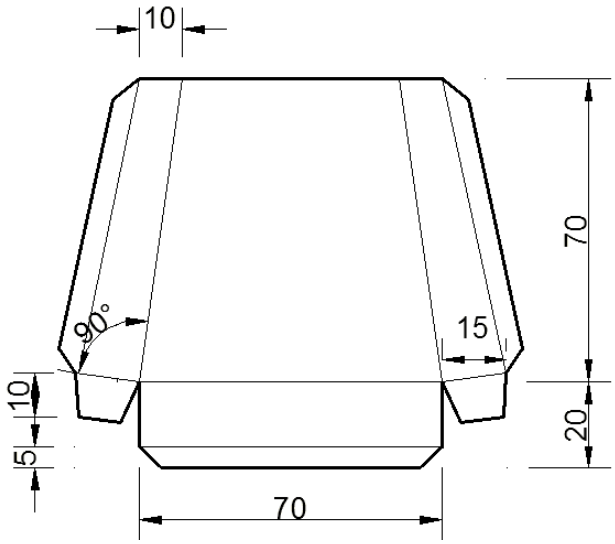
Exercise No. 1

SQUARE TRAY



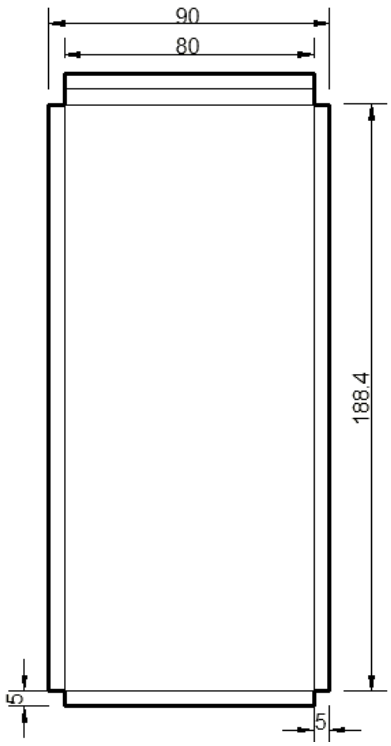
Exercise No. 2

DUST PAN



Exercise No. 3

CYLINDER

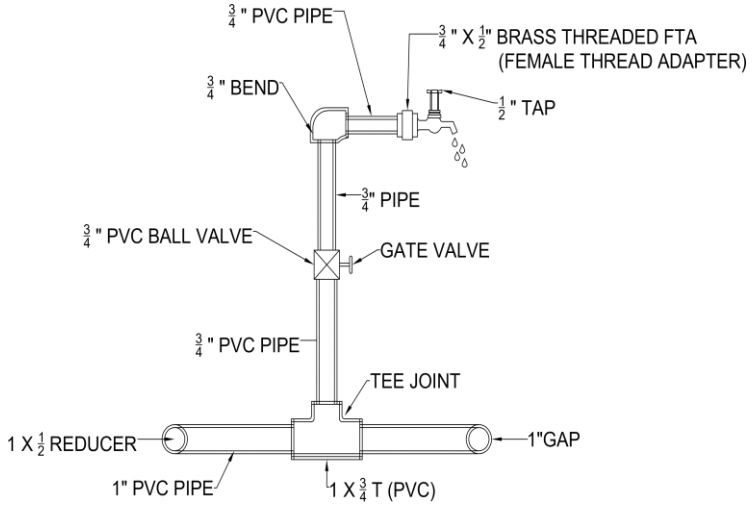


2B. PLUMBING

- Introduction important equipment, tools and accessories for installation and service in piping systems
- Types of pipe fittings using GI material
- Types of pipe fittings using PVC material

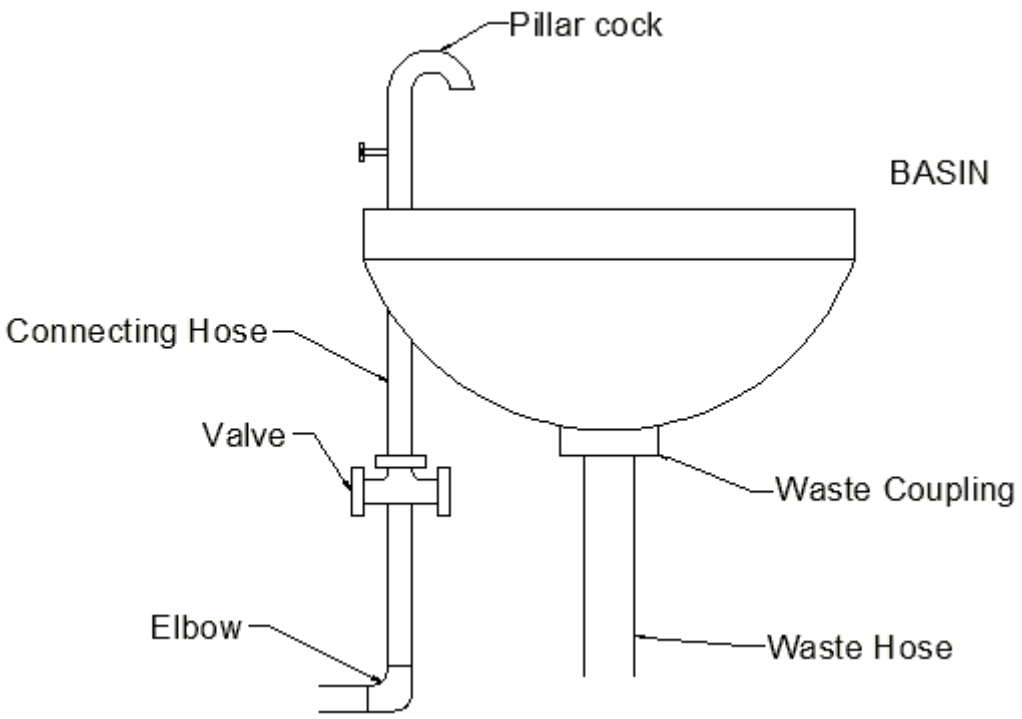
Exercise No.1

Single Tap Connection using PVC Pipe from Overhead tank



Exercise No.2

Wash Basin Connection with PVC Pipe



2C. WIRING

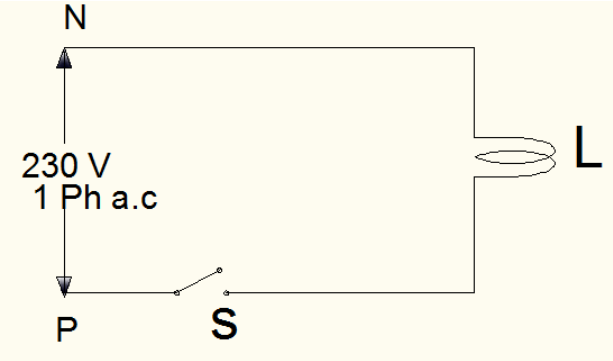
- Study about the safety in wiring
- Study of Ohm's Law - current – voltage - resistor – capacitor – inductor
- Study of Wiring materials – Conducting materials - Insulating materials
- Study of tools
- Study about the earthing
- Identify different electrical fitting and accessories
- Identify the types of wires with colour code
- Identify the symbols in circuit diagram
- Practice simple wiring

Required wiring components should be given to the students along with the board. Students should draw the circuit diagram and fix the components according to their circuit. The power connection must be given on the board and the circuit must be tested with power after taking the due precaution. The concern faculty/examiner must ensure that the proper precaution has been taken before providing the power to the circuit. All the components should be disassembled from the board after evaluation by the examiner.

Exercise No. 1

ONE LAMP / FAN / SOCKET CONTROLLED BY ONE WAY SWITCH

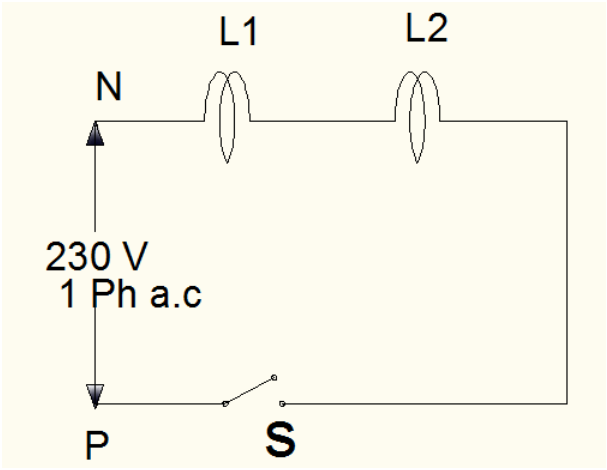
Circuit Diagram:



Exercise No. 2

TWO LAMPS CONTROLLED BY ONE WAY SWITCH IN SERIES

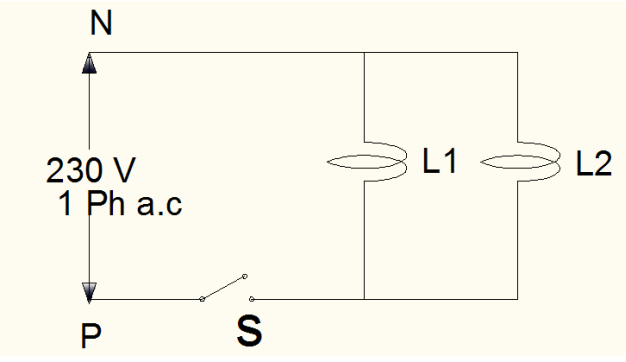
Circuit Diagram:



Exercise No. 3

TWO LAMPS CONTROLLED BY ONE WAY SWITCH IN PARALLEL

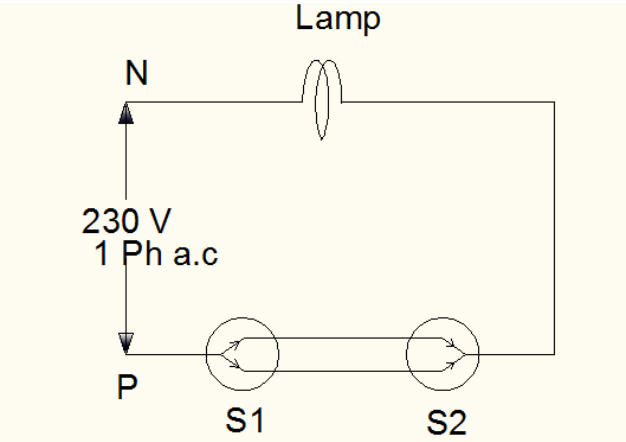
Circuit Diagram:



Exercise No. 4

STAIRCASE WIRING USING TWO WAY SWITCHES

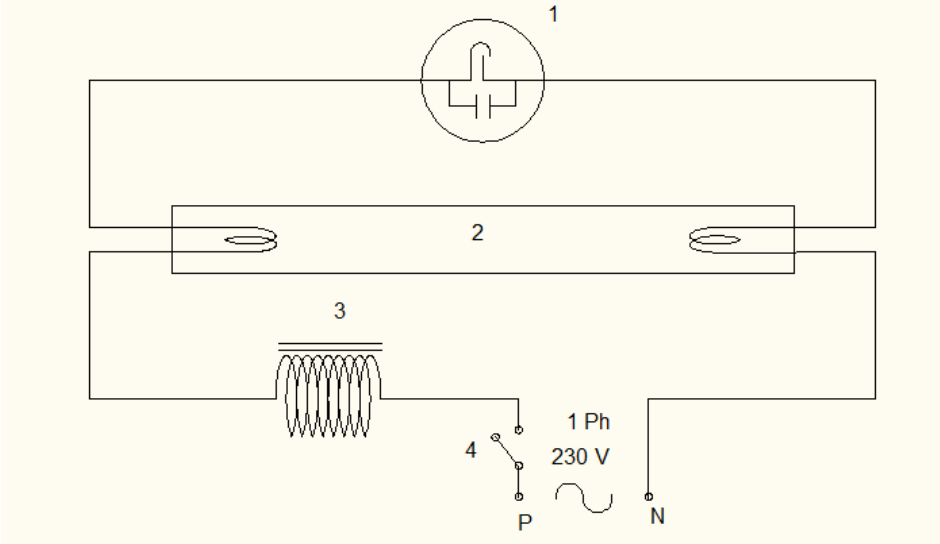
Circuit Diagram:



Exercise No. 5

TUBE LIGHT CONNECTION

Circuit Diagram:



1. STARTER (40 W/ 250 V)
2. FLUORESCENT TUBE LAMP (40 W/ 250 V)
3. CHOKER (40 W/ 250 V)
4. SPT SWITCH (250 V / 5A)

Note: Students should draw the circuit diagram / block diagram and collect the components according to their requirement. The connections should be done by the student in a board and it should be verified. Suitable safety precautions should be made accordingly.

Exercise No. 6. Concept of wiring using UPS / Battery and related safety measures (Not for the Autonomous End Examination)
Exercise No. 7. Concept of Earthing, Types of wires, Selection of wires (Not for the Autonomous End Examination)
2D. BLACK SMITHY Demonstration of black smithy operation such as L bend / U bend must be given. (Not for the Autonomous End Examination)

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DIPLOMA IN ENGINEERING AND TECHNOLOGY

BASICS OF INDUSTRIES AND WORKSHOP PRACTICAL - II

AUTONOMOUS END EXAMINATION

QUESTION PATTERN AND MARK ALLOCATION

Note:

- Arrangement should be made to conduct the examinations inside the workshop for both the sections.
- All the exercises should be given in the question paper and students are allowed to select the question by a lot.

Exercises	Duration	Max. Marks
(1) **Theory Question and Answer (9 questions X 5 Marks = 45 Marks)**	1 ½ Hrs	**45**
(2A) Sheet Metal – Allocation of Marks	1 ½ Hrs	**50**
Marking		15
Cutting / Hemming / Seaming / Punching / Riveting		25
Finishing		10
(OR)		
(2B) Plumbing – Allocation of Marks	1 ½ Hrs	**50**
Marking & Cutting		15
Fitting and Connection		25
Finishing		10
(OR)		
(2C) Wiring – Allocation of Marks	1 ½ Hrs	**50**
Circuit diagram / Block diagram		15
Connection and Checking		25
Result		10
(3) Viva-voce		**5**
TOTAL		**100**

* Practical Examination will be conducted for 100 marks and reduced to 75 marks