DIRECTORATE OF TECHNICAL EDUCATION

GOVERNMENT OF TAMILNADU

STATE BOARD OF TECHNICAL EDUCATION & TRAINING

DIPLOMA IN ENGINEERING & TECHNOLOGY

N - SCHEME

FIRST YEAR SYLLABUS

IMPLEMENTED FROM 2020 - 2021

CURRICULUM DEVELOPMENT CENTRE

DIRECTORATE OF TECHNICAL EDUCATION

GUINDY, CHENNAI - 600 025.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020-2021 onwards)

CURRICULUM OUTLINE

FIRST SEMESTER (FULL TIME)

Col. No.	Subject Code	Subject	Hours Per Week				
			Theory	Drawing	Tutorial	Practical	Total
1	40011	Communication English I	5				5
2	40012	Engineering Mathematics I	5				5
3	40013	Engineering Physics I	5				5
4	40014	Engineering Chemistry I	5				5
5	40015	Engineering Graphics I		6			6
6	40006	Engineering Physics Practical (Semester examination in the second semester)				2	2
7	40007	Engineering Chemistry Practical (Semester examination in the second semester)				2	2
8	40001* 40002^	Communication Skill Practical * Computer Application Practical ^				2	2
			20	6		6	32
Extra / Co-Curricular activities		Physical Education					2
		Library					1
Total							35

* For Circuit Branches only

^ For Non-Circuit Branches only

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DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020-2021 onwards)

CURRICULUM OUTLINE

SECOND SEMESTER (FULL TIME)

Col. No.	Subject Code	Subject	Hours Per Week				
			Theory	Drawing	Tutorial	Practical	Total
1	40021	Communication English II	4				4
2	40022	Engineering Mathematics II	4				4
3	40023	Engineering Physics II	4				4
4	40024	Engineering Chemistry II	4				4
5	40025	Engineering Graphics II		5			5
6	40006	Engineering Physics Practical				2	2
7	40007	Engineering Chemistry Practical				2	2
8	40028	Basics of Industries and Workshop Practical	2			3	5
9	40001* 40002^	Communication Skill Practical * Computer Application Practical ^				2	2
			18	5		9	32
Extra / Co-curricular activities		Physical Education					2
		Library					1
Total							35

* For Non-Circuit Branches only

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implements from the Academic year 2020-2021 onwards)

CURRICULUM OUTLINE

FIRST SEMESTER (PART TIME)

Col .No.	Subject Code	Subject	Hours Per Week				
			Theory	Drawing	Tutorial	Practical	Total
1.	40011	Communication English I	3				3
2.	40012	Engineering Mathematics I	4				4
3.	40013	Engineering Physics I	4				4
4.	40014	Engineering Chemistry I	3				3
5.	40006	Engineering Physics Practical (Semester examination in the second semester)				2	2
6.	40007	Engineering Chemistry Practical (Semester examination in the second semester)				2	2
		Total	14			4	18

40015 Engineering Graphics I

40001* Communication Skill Practical } will be in the second year

40002^ Computer Application Practical

* For Circuit Branches only.

^ For Non-Circuit Branches only.

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SECOND SEMESTER (PART TIME)

Col. No.	Subject Code	Subject	Hours Per Week				
			Theory	Drawing	Tutorial	Practical	Total
1.	40021	Communication English II	3				3
2.	40022	Engineering Mathematics II	3				3
3.	40023	Engineering Physics II	3				3
4.	40024	Engineering Chemistry II	3				3
5.	40006	Engineering Physics Practical (Semester examination in the second semester)				2	2
6.	40007	Engineering Chemistry Practical (Semester examination in the second semester)				2	2
7.	40028	Basics of Industries and Workshop practical				2	2
		Total	12			6	18

40025 Engineering Graphics II
40001* Communication Skill Practical
40002^ Computer Application Practical
} will be in the second year

* For Non-Circuit Branches only.

^ ForCircuit Branches only.

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N SCHEME

(Implemented from the Academic Year 2020 - 2021 onwards)

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Subject: Engineering Mathematics I & II

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Subject: Engineering Physics I &II and Engineering Physics Practical

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Subject: Engineering Chemistry I &II and Engineering Chemistry Practical

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Central Polytechnic College, Chennai – 113.

Subject: Engineering Graphics I & II

Convener

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Tmt. J.Prema
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GRG Polytechnic College, Coimbatore

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STATE BOARD OF TECHNICAL EDUCATION& TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

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Co-ordinator

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Subject: Basics of Industries and Workshop Practical & Computer Applications Practical

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ANNEXURE- I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except HMCT and film &TV.

Subject Code : 40011

Semester : I

Subject Title : COMMUNICATION ENGLISH – 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	
COMMUNICATION ENGLISH – I	5	80	25	100*	100	3 Hrs.

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

Topics and Allocation of Hours

UNIT	Topic	Time
1	Functional Grammar and Usage	17
2	Vocabulary Enrichment	15
3	Situational English	15
4	Creative English	15
5	English for Scholarly Presentation/ Fluency	11
Test & Model Exam		7
Total		**80 Hrs.**

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.

OBJECTIVES:

At the completion of the study of I and II semesters, the students will be able to

- Apply functional grammar to produce pristine presentations in English.
- Carry out effective interaction with the aid of formation of interrogatives.
- Enrich his/her vocabulary to cater to the needs of changing linguistic requirements.
- Understand and respond to the e-content available elsewhere in academic, professional and social environments.
- Understand and review e-books, movies and TV programmes and post his/her reviews online.
- Execute dialogues with his/her friends, teachers and colleagues in day-to-day situations.
- Describe and interpret visuals, images, machine drawings, events in books and on the Net.
- Understand, acquire and employ new structures in scholarly presentations with an exposure to works of Great personalities.
- Communicate effectively with idioms and phrases appropriate to real-life situations.

40011 COMMUNICATION ENGLISH –I

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**Functional Grammar and Usage** Parts of Speech Functional Units 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) Framing Yes / No Questions Framing Wh-Questions Application of Active Voice and Passive Voice Use of Prepositions	17
II	**Vocabulary Enrichment** Word Conversion (selective 25 words) Collocation - Noun with Verb, Adjective with Noun (Selective 25collocations) Homophones (selective 25 homophones) One-word Substitution (Textual) Idiomatic expressions for Daily Life (frequently used 25 expressions) Frequently Used Phrasal verbs (selective 25 phrasal verbs)	15
III	**Situational English** Dialogue for Day to Day Situations Short Messages for e-Communication Letter Writing for Academic Purpose (Leave Application, Requisition for Bonafide Certificate, Applying for TC) Writing the Essentials Comprehension	15
IV	**Creative English** Review Writing (Book / Movie / TV Program) Visual Description	15

	Advertisement Writing Word Cloud Transforming Verbal Passage into Graphics	
V	**English for Scholarly Presentation/ Fluency** "A Snake in the Grass" by R.K. Narayan “Of Parents and Children” by Francis Bacon "On His Blindness" by John Milton "When I Have Fears" by John Keats	11

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.

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. Chicken Soup for the Soul, Jack Canfield, Mark Victor Hansen, 2001

MODEL QUESTION PAPER

COMMUNICATION ENGLISH – I

Time – 3 Hours [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:

1. Humans have been storing information for more than 5000 years – True or False
2. Who coined the term “Information Technology”?
3. The term “Information Technology” was first used in_____.
4. What do you mean by Information Technology?
5. 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 Appliances Show Room 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 a pie-chart.

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. (4 x 5 = 20)

1. Bring out the observations of Bacon on the duties of Parents towards children.
2. How does Milton arrive at the conclusion-“They also served who only stand and wait.”?
3. Explain the irony at the end of the Snake in the Grass.
4. Explain by listing out the fears that Keats refers to in his poem?

5 . Elucidate the narrative skill of R. K. Narayan with reference to the short story you studied.

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ANNEXURE- I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programs except DMOP, HMCT and Film &TV.

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			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
ENGINEERING MATHEMATICS I	5	80	25	100*	100	3 Hrs.

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

TOPICS AND ALLOCATION OF HOURS:

Sl. No.	Topics	Time (Hrs)
1	Algebra	15
2	Complex Number	15
3	Trigonometry	14
4	Differential Calculus – I	15
5	Differential Calculus – II	14
Test & Model Exam		7
TOTAL		**80**

40012 ENGINEERING MATHEMATICS – I

DETAILED SYLLABUS

Contents: Theory

UNIT	NAME OF THE TOPICS	HOURS
I	**ALGEBRA**	
	1.1 MATRICES AND DETERMINANTS:	**3**
	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.	**7**
	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.	**5**
II	**COMPLEX NUMBERS**	
	2.1 ALGEBRA OF COMPLEX NUMBERS	**6**
	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 $n \leq 7$ - Simple problems. APPLICATIONS OF COMPLEX NUMBERS An application of Complex numbers: AC Circuits - Definitions – Impedance and Admittance - Simple Problems	**5** **4**
III	**TRIGONOMETRY** **3.1 TRIGONOMETRIC FUNCTIONS & ALLIED ANGLES** Trigonometric functions – Properties of Trigonometric functions - Relation between Degree & Radian Measure – Simple problems. Applications of Radian Measure – Length of an arc of a sector – Linear and angular velocity - Trigonometric Ratios of Allied angles – Simple problems. **3.2 TRIGONOMETRIC IDENTITIES** Trigonometric Ratios of sum & difference of two angles – Multiple and Sub multiple angles – Functions of 3A angles – Sum and Product Identities - Simple problems. **3.3 PROPERTIES OF TRIANGLE & INVERSE TRIGONOMETRIC FUNCTIONS** Properties of Triangle – Law of Sines and Law of Cosines - Inverse Trigonometric Functions – Principal value – Properties of Inverse Trigonometric functions – simple problems.	**5** **5** **4**
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.	**5**

	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.	**5** **5**
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.	**5** **5** **4**

Reference Book

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.

Board Examination-Question Paper Pattern

For all theory subjects except Communication English I & II and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.

Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. Max.Marks:100

PART – A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked Either or type. One question from every unit. Answer either A or B. Each question carries 15 marks. A and B have subdivisions. (7 + 8)

The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.

PART A Definitions and Statements. Question Number 1 to 5	5 X 1 = 5 Marks
PART B Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
PART C Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
TOTAL	100 Marks *

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

MODEL QUESTION PAPER

40012 ENGINEERING MATHEMATICS - I

Time: 3.00 hrs. Max.Mark:100

Note:

1. Answer all questions in PART A. Each question carries one mark.
2. Answer any ten questions in PART B. Each question carries two marks.
3. Answer all question by selecting either A or B. Each question carries fifteen marks.
4. Clarkes Table and programmable calculators are not permitted.

PART – A (5×1=5)

1. If $A=\begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$, $B=\begin{bmatrix} 5 & 0 \\ 3 & 6 \end{bmatrix}$ find A+B.
2. Find the values of $i^2+i^3+i^4$
3. Convert $\frac{2\pi}{5}$ into Degree measure.
4. Evaluate: $\lim_{x\to 0}\frac{\sin 7x}{9x}$
5. If $u=e^{x^2+y^2}$ then show that $\frac{\partial u}{\partial x}=2xu$

PART – B (10×2=20)

6. Reduce the matrix $\begin{bmatrix} 3 & -1 & 2 \\ -6 & 2 & 4 \\ -3 & 1 & 2 \end{bmatrix}$ to a echelon form.
7. Find the adjoint of $A=\begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 3 \\ -1 & 1 & 2 \end{bmatrix}$
8. Find the general term in the expansion of $(x+2y)^3$.
9. Find the real and imaginary parts of $\frac{7+2i}{2-3i}$
10. If $x=\cos\theta+i\sin\theta$, find $x^m+\frac{1}{x^m}$
11. 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.
12. If a ball is travelling in a circle of diameter 10m with velocity 20m/s, Find the angular velocity of the ball.
13. Prove that $\frac{sin2A}{1+cos2A}=\tan A$
14. Suppose that a boat travels 10km from the port towards east and then turns 60° to its left.If the boat travels further 8 km, how far from the port is the boat?
15. Evaluate: $\lim_{x\to 3}\frac{x^4-8}{x^4-9}$

16. Differentiate: $\frac{1}{x^2}+\frac{1}{3x}+\frac{1}{\sin x}+\frac{1}{2}$

17. Differentiate: $x^2 \sin y = c$

18. Find $\frac{d^2y}{dx^2}$, if $y = \tan x$

19. If $y = ae^x + be^{-x}$ Prove that $y_2 = y$.

20. Show that $u = x^3 - x^2y + xy^3$ is a homogenous function.

PART – C (5×15=75)

21. A) i. Find the inverse of $\begin{bmatrix}1 & 2 & -1\\ 3 & 8 & 2\\ 4 & 9 & 1\end{bmatrix}$ (7)

ii) Solve the equations $x + 2y - z = -1,\ 3x + 8y + 2z = 28,\ \&\ 4x + 9y - z = 14$ by Cramer's rule. (8)

(OR)

B) i. Find the eigen values and eigen vectors of the matrix $\begin{bmatrix}1 & 1 & -2\\ -1 & 2 & 1\\ 0 & 1 & -1\end{bmatrix}$ (7)

ii. Find the coefficient of x^{30} in the expansion of $\left(x^4+\frac{1}{x^6}\right)^{15}$ (8)

22. A) i. Express the Complex number $\frac{1+3\sqrt{3}i}{\sqrt{3}+2i}$ in polar form (7)

ii. Prove that $\left(\frac{\cos\theta+\sin\theta}{\sin\theta-i\cos\theta}\right)^4 = 1$ (8)

(OR)

B) i. Solve $x^7 + x^4 + x^3 + 1 = 0$ (7)

ii. Two impedances $z_1 = 10 + 6j$ and $z_2 = 8 - 12j$ are connected in parallel across 200volts, 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. (8)

23. A) i. Find the values of all trigonometric functions of θ if $\cos\theta = -\frac{1}{2}$ & θ lies in III quadrant. (7)

ii. The point A(9,12) rotates around the origin O in a plane through 60° in the anticlockwise direction to a new position B. Find the co ordinates of the point B. (8)

(OR)

B) i. Prove that $(cos\alpha - cos\beta)^2 + (\sin\alpha - sin\beta)^2 = 4sin^2\left(\frac{\alpha-\beta}{2}\right)$ (7)

ii. Prove that $\sin^{-1}\left(\frac{3}{5}\right) + \sin^{-1}\left(\frac{8}{17}\right) = \sin^{-1}\left(\frac{77}{85}\right)$ (8)

24.A) i. 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 indensity of light and f(x) is in mm. Find the diameter of the pupils with(a) Minimum light b) Maximum light. (7)

ii. Differentiate: (i) $(1 + \sin x)(x - \cos x)$ (ii) $\frac{1+\cos}{1-\cos}$ (8)

(OR)

B) i. a)Find $\frac{dy}{dx}$ if $y = \tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)$ (7)

b) Find $\frac{dy}{dx}$ if $x = acos^3t, y = asin^3t$

ii. a) Find $\frac{dy}{dx}$ if $y = \sqrt{x}e^x \sin^{-1} x$ (8)

b) Find the derivative of x^x with respect to $3x^2 + 2x + 5$

25. A) i. If $y = x^2 \cos x$, then prove that $x^2\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + (x^2+6)y = 0$. (7)

ii. Find the radius of curvature for $y^2 = 4x$ at (1, 1) (8)

(OR)

B) i. If $u = x^3 + y^3 + 3xy^2$ then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 3u$ (7)

ii. Show that the functions $u = x^2 + y^2 + z^2,\ v = x + y + z,\ w = xy + yz + zx$ and are dependent. (8)

ANNEXURE- I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and film &TV.

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			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
ENGINEERING PHYSICS I	5	80	25	100*	100	3 Hrs.

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

Topics and Allocation of Hours:

Sl.No	Topic	Duration (Hrs)
1	S I UNITS AND STATICS	15
2	PROPERTIES OF MATTER	15
3	DYNAMICS- I	15
4	DYNAMICS–II	14
5	SOUND AND MAGNETISM	14
	TEST & MODEL	7
	Total	**80**

40013 ENGINEERING PHYSICS – I

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**S I UNITS AND STATICS**	
	1.1 UNITS AND MEASUREMENTS: -	5
	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
	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 - Solved problems.	
II	**PROPERTIES OF MATTER**	
	2.1 ELASTICITY: -	5
	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
	Viscosity – Definition - Coefficient of viscosity - Definition, SI unit and dimensional formula - Stream line flow, turbulent flow – Explanation - Critical velocity – Reynolds number – Definition - Experimental comparison of coefficient 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
	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. Simple problems based on expression for surface tension – Applications of surface tension – Solved problems.	
III	**DYNAMICS–I**	
	3.1. STRAIGHT LINE MOTION: -	2
	Introduction-Newton's Laws of motion-Fundamental Equations of motion for objects- horizontal motion-falling freely-thrown vertically upwards.	
	3.2 PROJECTILE MOTION: -	5
	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 - Simple problems based on expressions for maximum height, time of flight and horizontal range – Examples of projectile motion.	
	3.3 CIRCULAR MOTION: -	8
	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. $\{\tan\theta = v^2/(r\,g)\}$ - Simple harmonic motion, amplitude, frequency and period - Definition. Simple problems based on the expressions for centripetal force and angle of banking - Applications of centripetal force and centrifugal force – Solved problems.	
IV	**DYNAMICS–II** **4.1 ROTATIONAL MOTION OF RIGID BODIES: -** 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.	7
	4.2 GRAVITATION: - Newton's laws of gravitation – Acceleration due to gravity on the surface of earth – Expression for variation of acceleration due to gravity with altitude	3
	4.3 SATELLITES: - Satellites – Natural and artificial – Escape velocity and orbital velocity – Definitions – Expression for escape velocity and Orbital velocity – Polar and Geostationary satellites – Uses of artificial satellites. Simple problems based on the expressions for escape velocity and Orbital velocity.	4
V	**SOUND AND MAGNETISM** **5.1 SOUND**: - Wave motion – Introduction and definition – Audible range – Infrasonic – Ultrasonics - 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	9

	standing waves. Vibrations - Free & forced vibrations and resonance – definitions and examples - Laws of transverse vibration 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 – Noise pollution. Simple problems based on expression for frequency of vibration. Doppler effect – Definition and Applications – Ultrasonic and its uses – SONAR – Solved Problems. **5.2 MAGNETISM: -** Pole strength – Definitions – Magnetic moment, intensity of magnetisation, magnetising 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 problems based on intensity of magnetization – Types of magnetic materials and their applications – Solved problems.	5

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.

Board Examination-Question Paper Pattern

For all theory subjects except Communication English I & II and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.
Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. Max.Marks:100

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked Either / Or type. One question from every unit. Answer either A or B. Each question carries 15 marks.

A and B have subdivisions. (7 + 8)

The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.

PART A Definitions and Statements. Question Number 1 to 5	5 X 1= 5 Marks
PART B Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
PART C Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
TOTAL	100 Marks *

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

ENGINEERING PHYSICS - I

Model Question Paper

TIME: 3hrs MARKS: 100

PART A (5 X 1 = 5)

Note: Answer ALL questions. All questions carry equal marks.

1. Mention any two fundamental physical quantities.
2. Why rain drops fall slowly?
3. What is the condition for maximum range of a projectile?
4. Define moment of inertia of a rigid body.
5. Define magnetic moment.

PART B (10 X 2 = 20)

Note: Answer any TEN questions. All questions carry equal marks.

6. What are the uses of dimensional formula?
7. What is meant by coplanar force?
8. State Lami's theorem.
9. What are three moduli of elasticity?
10. Explain turbulent flow.
11. Define angle of contact.
12. State Newton's laws of motion.
13. Define normal acceleration.
14. Define angle of banking.
15. State law of conservation of angular momentum.
16. State Newton's law of gravitation.
17. Write any two uses of artificial satellites.
18. Define resonance.
19. Define Doppler effect.
20. Explain hysteresis.

PART B (5 X 15 = 75)

Note: Answer ALL questions by choosing either A (**OR**) B

21.A. i) State the conventions to be followed in the SI units. (8)

ii) Explain how to resolve a vector quantity in to two rectangular components. (7)

OR

B. i) Describe an experiment to verify the parallelogram law of forces. (8)

ii) If the resultant of two equal forces is $\sqrt{3}$times each force. Find the angle between the forces. (7)

22.A. i) Explain uniform and non-uniform bending of beams. (8)

ii) Describe an experiment to determine the Young's modulus of the material of the beam by uniform bending method. (7)

OR

B. i) Describe an experiment to compare the coefficient of viscosities of two liquids. (8)

ii) Calculate the surface tension of water if it rises to a height of 4.2 cm in a capillary tube dipped vertically in it. Radius of the capillary tube is 3.5×10^{-4} m and density of water is 1000 kgm^{-3} (7)

23.A. i) Derive an expression for the maximum height and time of flight reached by the projectile. (8)

ii) Derive expression for normal acceleration and centripetal force acting on a body executing uniform circular motion. (7)

OR

B. i) Derive an expression for the angle of banking. (8)

ii) A ball weighing 0.5 kg tied to one end of a string of length 2 m is rotated at a constant speed of 10 ms^{-1} in a horizontal plane. Calculate the centripetal force on the ball. (7)

24.A. i) Derive an expression for angular momentum of rotation of a rigid body rotating about an axis. (8)

ii) Derive an expression for variation of acceleration due to gravity with altitude. (7)

OR

B. i) Write short notes on polar and geostationary satellites. (8)

ii) If the radius of the earth is 6400 km, and acceleration due to gravity is 9.8 ms^{-2}. Calculate the escape velocity on the surface of the earth. (7)

25.A. i) Distinguish between longitudinal and transverse wave. (8)

ii) Write a note on acoustics of buildings. (7)

OR

B. i) Explain the method of drawing hysteresis loop of a given specimen. (8)

ii) The vibrating length of 0.24 m of a sonometer wire is unison with a tuning fork when stretched by a weight of 4.5 kg. The linear density of the wire is 0.65×10^{-3} kgm^{-1}. Calculate the frequency of the fork. (7)

ANNEXURE- I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 -2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and film &TV.

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			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
ENGINEERING CHEMISTRY I	5	80	25	100*	100	3 Hrs.

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

Topics and Allocation of Hours:

UNIT	Topic	Duration (Hrs)
I	**Basic concepts in chemistry** – Atomic Structure and Chemical bonding, Periodic Table, Acids and Bases	15
II	**Surface Chemistry -** Colloids, Nanotechnology, Catalysis	15
III	**Minerals and Metallurgy**– Metallurgy of Iron, Metallurgy of Tungsten and Titanium, Powder Metallurgy	15
IV	**Industrial Chemistry** – Nuclear Chemistry, Cement, Ceramics, Refractories and Glass	15
V	**Chemistry of Engineering Materials** – Polymer, Abrasives, Composite Materials	13
Test & Model Exam		7
	Total	**80**

RATIONALE:

The subject Engineering Chemistry I lay foundation of all the elements, structure and periodic classification. The latest trends on nano technology, its application on various fields of engineering is also dealt with. It provides basic concepts about minerals and its resources, the metal extraction, heat treatment and powder metallurgy. It also imparts knowledge about few Engineering Materials like cement, ceramics, refractory and glass. It also deal with polymers, abrasives and composite materials.

OBJECTIVES:

The objective of this Course is to make the student:

1. Know about atomic structure, chemical bonding, periodic classification and acids and bases.
2. Learn about surface chemistry, colloidal particles and nano-particles and their application.
3. Know about the mineral resources of Tamilnadu and the fundamentals of metal extraction, iron and steel manufacture, heat treatment and powder metallurgy.
4. Study about the importance of Engineering Chemistry in industry.
5. Know about Engineering materials like cement, ceramics, refractory, glass, rubber, plastic and composites.

40014 ENGINEERING CHEMISTRY I

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hrs.
I	**BASIC CONCEPTS IN CHEMISTRY**	
	1.1 Atomic Structure and Chemical Bonding	**6**
	Fundamental particles – proton – electron – neutron – atomic number – mass number – extra nuclear part – filling up of electrons – aufbau 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.	
	1.2 Periodic Table	**4**
	Modern periodic law – periodic classification of elements – features of modern periodic table – properties of s–p–d–f block elements.	

	1.3 Acids and Bases Properties of acids and bases – Lewis concept of acids and bases – advantages – pH and pOH – Definition – Numerical problems – Indicator – Definition – Buffer solution – Definition – Types of buffer solution with examples – Application of pH in industries	**5**
II	**SURFACE CHEMISTRY** **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. **2.2 Nanotechnology** Nano particles – definition – properties – application of Nanotechnology – Engineering – medicine – biomaterial. **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.	**6** **4** **5**
III	**MINERALS AND METALLURGY** **3.1 Minerals and Metallurgy** Mineral – Minerals of Tamilnadu – Sources and Uses (Basic concepts only) – Extraction of iron – Blast furnace – cast iron – steel manufacture – Bessemer converter – heat treatment of steel – hardening – annealing – tempering. **3.2 Metallurgy of tungsten and Titanium** Extraction and uses of Tungsten and Titanium **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.	**7** **4** **4**

IV	**INDUSTRIAL CHEMISTRY** **4.1 Nuclear Chemistry** Nuclear reaction – Differences between nuclear reaction and ordinary chemical reaction – Radioactive decay – alpha emission – beta emission – gamma emission – half-life period – simple problems– Nuclear fission – nuclear fusion – chain reaction - components nuclear reactor, reactor core, nuclear reactor coolant, Control rods, neutron moderator – steam turbine – Application of radioactive isotopes. **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. **4.3 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.	**6** **5** **4**
V	**CHEMISTRY OF ENGINEERING MATERIALS** **5.1 Polymer** Definition – Natural polymer – Rubber – Defects of natural rubber – Compounding of rubber – Ingredients and their functions – Vulcanization –Plastics – types – Thermoplastics and Thermosetplastics – Differences –Mechanical properties of plastics – Polymers in Surgery – Biomaterials – Definition – Biomedical uses of Polyurethane, PVC, Polypropylene and Polyethylene. **5.2 Abrasives** Definition – classification – hardness in Moh's scale – Natural abrasives – Diamond, Corundum, Emery and Garnet. Synthetic abrasives – Carborundum – Boroncarbide manufacture – properties and uses. **5.3 Composite Materials** Definition – examples – Classification of composites – Advantages over metals and polymers – General application	**6** **4** **3**

References

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
7. Indian Minerals Yearbook 2011, Government of India Ministry of Mines, Indian Bureau of Mines Indira Bhavan, Civil Lines, Nagpur – 440 004

Website references:

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

Board Examination-Question Paper Pattern

For all theory subjects except Communication English I & II and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.
Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. Max.Marks:100

PART - A Five questions will be asked covering all units. All questions are to be answered. Each question carries 1 mark.

PART- B Fifteen questions will be asked covering all the units. Three questions from each unit. Answer any ten questions. Each question carries 2 marks.

PART-C Five questions will be asked Either / Or type. One question from every unit. Answer either A or B. Each question carries 15 marks.A and B have subdivisions. (7 + 8)

The questions are to be numbered from 1 to 25. All the units are to be covered with equal weightage.

PART A Definitions and Statements. Question Number 1 to 5	5 X 1= 5 Marks
PART B Short answer type questions Question Number 6 to 20	10 X 2 = 20 Marks
PART C Descriptive answer type questions (Either A or B) Question number 21 to 25	5 X15 = 75 Marks
TOTAL	100 Marks *

Note: Board Examinations will be conducted for 100 Marks and converted to 75 Marks.

ENGINEERING CHEMISTRY I
MODEL QUESTION PAPER

Part A

NB: 1. Answer all questions. 5x 1 = 5 Marks

2. All questions carry equal marks

1. How many electrons are there in the ultimate orbital of sodium atom?
2. What is the relationship between pH and pOH?
3. Name an ore of tungsten?
4. What is added to delay the setting of cement?
5. What is the hardness of diamond on Moh's scale?

Part B

NB: 1. Answer any 10 questions 10 x 2 = 20 Marks

2. All questions carry equal marks

6. State octet rule.
7. Write down the modern periodic law.
8. Define Lewis concept of acids and bases.
9. Mention the types of colloids.
10. What are catalytic promoters?
11. Define biomaterial.
12. Mention the composition of stainless steel.
13. Mention the uses of titanium.
14. Define powder metallurgy.
15. What is meant by radioactive decay?
16. Write down the importance of glazing in ceramics.
17. Define refractory.
18. What is meant by annealing of glass. Mention the importance of it.
19. Give any 2 defects of natural rubber?
20. How is Carborundum prepared?

Part C

NB: 1. Answer all questions5 x 15= 75 Marks

2. Answer any one of the subdivisions, either (A) or (B) from each question

21.A (i) Explain in detail about aufbau principle for filling of electrons in an atom with suitable example. (7)

(ii) Define valency of an element. Explain electrovalent bond with suitable example With a neat diagram (8)

(**or**)

B (i) Distinguish between s and d-block elements in the periodic table (7)

(ii) Define pH of a solution. Calculate the pH of 0.025 N sodium hydroxide solution (8)

22.A (i) Distinguish between lyophilic and lyophobic colloids. (7)

(ii) Define colloid. Describe any four industrial applications of colloids. (8)

(or)

B (i) List the industrial applications of catalyst. (7)

(ii) What is called nanotechnology? Illustrate the various applications of nanotechnology in various fields of Engineering. (8)

23.A (i) Describe the manufacture of steel by Bessemer process. (7)

(ii) What is meant by heat treatment of steel? Write notes on various heat treatment of steel. (8)

(or)

B (i) Explain the extraction of tungsten from its ore. (7)

(ii) Describe the process and applications of powder metallurgy. (8)

24.A. (i) Distinguish between ordinary chemical reaction and nuclear reaction. (7)

(ii) Define half-life period. The decay constant of Co-60 is 0.132/yr. Calculate its half-life period. If the quantity of Co-60 is 2.5g, what will be the quantity that remain after 10.5 years. (8)

(or)

B (i) Describe the manufacture of Portland cement (7)

(ii) Define refractory. What are the requirements of a refractory? (8)

25.A (i) Explain vulcanization of rubber and give the properties of vulcanized rubber (7)

(ii) Write a note on advantage of composite materials over metals and polymers (8)

(or)

B (i) What are bio-materials? List biomedical uses of use following:

(a) Polyurethane (b) PVC (c) Polypropylene (d) Polyethylene (7)

(ii) Write a note on the following abrasives.

(a) Diamond (b) Corundum (c) Emery (d) Garnet (8)

ANNEXURE - I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N - SCHEME
(Implemented from the Academic year 2020 – 2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and Film &TV.

Subject Code : 40015

Semester : I

Subject Title : ENGINEERING GRAPHICS - 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	
ENGINEERING GRAPHICS - I	6	6	25	100*	100	3 Hrs.

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

Topics and Allocation of Hours

Sl. No.	Topic	Duration
1	Drawing Office Practice and Dimensioning	19
2	Geometric Constructions and Construction of Conics	19
3	Projection of Points & Straight Lines and Construction of Special Curves	19
4	Orthographic Projections	32
	Test & Model Exam.	07
Total		**96Hrs**

RATIONALE:

Engineering Graphics is a basic subject for all branches of diploma in engineering and technology. Since engineering drawing is considered as the language of engineers, the proper understanding and practice is required with proper use of instruments.

This subject is aimed at providing basic understanding of the fundamentals of Engineering Graphics; mainly visualization, graphics theory, standards of drawings, the tools of drawing and the use of drawings in engineering applications.

The topics covered are based on the syllabus for diploma studies in engineering. The subject is planned to include sufficient practices which would help the student in visualization of two-dimensional objects and developing the drawing.

The chapters are arranged in sequence and starts from the basic concepts of lettering, dimensioning, geometrical constructions, conic sections, projection of points and straight lines, construction of engineering curves, proceeds to the orthographic projection techniques. By learning this subject, it is expected that the students would be matured to visualize the engineering components by reading an engineering drawing.

OBJECTIVES:

At the end of the subject, the students will be able to,

- Understand the importance of drawing
- Identify and use the drawing instruments
- Practice the rules and methods of dimensioning
- Acquire knowledge about geometric constructions
- Construct conic curves
- Understand the concepts of projection of points and straight lines
- Acquire knowledge about the construction of special curves
- Draw orthographic views from the given pictorial drawing

Note: While practicing, usage of drawing instruments like drawing board, mini drafter, compass, divider, drawing clips / cello tape, H, 2H and HB grade drawing pencils, eraser etc., are mandatory for class work and examinations. Size of drawing sheet recommended: A2 size (420 x 594 mm). Use both sides of drawing sheets for practice.

40015 ENGINEERING GRAPHICS - I

DETAILED SYLLABUS

Contents: Theory

<table>
<tr><th>Unit</th><th>Name of the Topic</th><th>Hours</th></tr>
<tr><td>I</td><td>
DRAWING OFFICE PRACTICE AND DIMENSIONING
1.1 Drawing Office Practice
Importance of engineering drawing as a graphic communication– drawing practice as per BIS code–drawing instruments: drawing board, mini-drafter, compass, divider, protractor, drawing sheets, drawing pencils, set squares etc., – title block– layout and folding of drawing sheets.
Lettering and numbering as per BIS –importance of legible lettering and numbering–single stroke letters–upper case and lower case letters–slanting / inclined letters–general procedures for lettering and numbering–height of letters–guidelines–practices.
Scales–full size scale, reducing scale and enlarging scales (Description only).
<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises</td></tr>
<tr><td>1</td><td>Upper case, lower case, slanting letters and numerals – each 5 sentences with different heights</td></tr>
</table>
1.2 Dimensioning
Dimensioning – need for dimensioning–dimensioning terms and notations as per BIS – dimension line, extension line and leader line – dimensioning systems – methods of placement of dimensions – uni-directional and aligned systems – important dimensioning rules – dimensioning of common features – diameters, radii, holes, chamfers – addition of letters and symbols – parallel, chain and progressive dimensioning – practice of dimensioning the given drawing as per BIS code (one view of the object).
<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises</td></tr>
<tr><td>1</td><td>8 - 2D drawings</td></tr>
</table>
</td><td>06

13</td></tr>
</table>

<table>
<tr>
<td>II</td>
<td>
GEOMETRIC CONSTRUCTIONS AND CONSTRUCTION OF CONICS
2.1 Geometric Constructions
Bisect a straight line – bisect an arc – bisect an angle – divide a straight line into any number of equal parts – divide the circle into number of equal divisions – construct an arc touching two lines at any angle – construct an arc touching two arcs.
<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all methods</td></tr>
<tr><td>1</td><td>10</td></tr>
</table>
2.2 Construction of Conics
Conic sections – definition of locus, focus, directrix, axis, vertex and eccentricity – practical applications of ellipse, parabola and hyperbola.
Ellipse: Construction of ellipse by concentric circle method, rectangular method when major and minor axis are given and eccentricity method when focus and directrix are given–exercises in practical applications.
Parabola: Construction of parabola by rectangular method, parallelogram method when major and minor axis are given and eccentricity method when focus and directrix are given – exercises in practical applications.
Hyperbola: Construction of hyperbola by eccentricity method when focus and directrix are given – exercises in practical applications.
<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all methods</td></tr>
<tr><td>2</td><td>7</td></tr>
</table>
</td>
<td>06

13</td>
</tr>
<tr>
<td>III</td>
<td>
PROJECTION OF POINTS & STRAIGHT LINES AND CONSTRUCTION OF SPECIAL CURVES
3.1 Projection of Points and Straight Lines
Projection of points – position of a point on four quadrants and on the reference planes – system of notation–Place a point on four quadrants with different distances – exercises.
Projection of straight lines–line in the first quadrant and on the reference planes – parallel to one plane and perpendicular to other
</td>
<td>11</td>
</tr>
</table>

<table>
<tr><td></td><td>plane – inclined to one plane and parallel to the other plane – parallel to both the planes – simple exercises.
<table><tr><td colspan="2">Minimum criteria for class assessment</td></tr><tr><td>No. of Drawing sheets</td><td>No. of Exercises</td></tr><tr><td>2</td><td>12</td></tr></table>
3.2 Construction of Special Curves
Definition and construction of cycloid – epicycloid – hypocycloid – involute of a circle – Archimedean spiral for one revolution – helix – practical applications – exercises.
<table><tr><td colspan="2">Minimum criteria for class assessment</td></tr><tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all methods</td></tr><tr><td>2</td><td>6</td></tr></table></td><td>08</td></tr>
<tr><td>IV</td><td>ORTHOGRAPHIC PROJECTIONS
4.1 First angle: Simple components Introduction – projection terms –orthographic projection – planes of projection – principal orthographic views – designation of views – four quadrants – first angle projection – third angle projection – symbols and arrangement of views for first angle and third angle projections –comparison – Simple exercises in first angle projection with minimum two views of simple components (Without curves and circles).
<table><tr><td colspan="2">Minimum criteria for class assessment</td></tr><tr><td>No. of Drawing sheets</td><td>No. of Exercises</td></tr><tr><td>1</td><td>6</td></tr></table>
4.2 First Angle Projections only: Engineering components
Draw the projections of the simple engineering components using first angle projection – exercises in drawing orthographic views – three views–front view, top view and right / left side views. (For Board Examinations any two views can be asked.)
<table><tr><td colspan="2">Minimum criteria for class assessment</td></tr><tr><td>No. of Drawing sheets</td><td>No. of Exercises</td></tr><tr><td>3</td><td>12</td></tr></table></td><td>11

21</td></tr>
</table>

Reference Books:

1. Bhatt N.D, “Engineering Drawing”, Charotar Publishing House Pvt. Ltd.
2. Gill P.S, “Engineering drawing”, S.K.Kataria&Sons.
3. Gopalakrishna.K.R., "Engineering Drawing", (Vol 1 & 2 combined), Subhas Publications.
4. Venugopal. K, Prabhu Raja V, “Engineering Graphics”, New Age International Publishers.

5. Natarajan K V “A Text Book of Engineering Drawing and Graphics” N Dhanalakshmi Publishers.
6. Shah M B, Rana B C, “Engineering Drawing”, Pearson.
7. Basant Agrawal, Agrawal C M “Engineering Drawing”, McGraw hill HED.
8. Parkinson A C, "First Year Engineering Drawing", Sir Isaac Pitman & Sons Ltd.
9. Thomas E. French, Charles J. Vierck, “The Fundamentals of Engineering Drawing”, McGraw Hill Book Co. Inc.

Internal Assessment Marks:

Class assessment drawings	10
Average of Two Assessment Tests	05
Model Examination	05
Attendance	05
Total	**25**

BOARD EXAMINATION

QUESTION PAPER PATTERN

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

Note: 1. Answer all the questions only in the drawing sheet.

2. Assume missing dimensions suitably, if required.

3. Proper drawing instruments and board should be used

PART – A (4x5 = 20)

Note: Five questions will be asked (Sl. No: 1 to 5). Answer any four questions.

Each question carries five marks.

Minimum one question should be asked from each unit first chapter.

(Chapters: 1.1, 2.1, 3.1, 4.1)

PART – B (4x20 = 80)

Note: Six questions will be asked (Sl. No: 6 to11). Answer any four questions.

Each question carries twenty marks.

Minimum one question should be asked from each unit second chapter. (Chapters: 1.2, 2.2, 3.2, 4.2)

MODEL QUESTION PAPER

ENGINEERING GRAPHICS - I

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

Note:
1. Answer all the questions only in the drawing sheet supplied.
2. Assume missing dimensions suitably, if required.
3. Use proper drawing instruments and drawing board.
4. First angle projection is to be followed.
5. All dimensions are in `mm'.

PART – A (4x5 = 20)

Answer any four questions. Each question carries five marks.

1. Write the following statements in a single stroke in upper case letters of 10 mm height.

   DRAWING IS THE LANGUAGE OF ENGINEERS

   ALL DIMENSIONS ARE IN MM

   ALL LETTERS SHOULD BE UNIFORM IN SHAPE, SIZE AND SPACING

   DIMENSION LINES SHOULD NOT CROSS EACH OTHER

   BUREAU OF INDIAN STANDARDS (BIS) IS OUR NATIONAL STANDARD.

2. Construct an arc of 50 mm radius touching two arcs of 25 mm and 50 mm radius externally, at a centre offset distance of 120 mm.
3. A point 'C' is 50 mm below the HP and 30 mm behind the VP. Draw the front view and top view.
4. A straight line AB 50 mm long is parallel to the VP and inclined at an angle of 30^{o} to the HP. The end A is 20 mm above the HP and 15 mm in front of the VP. Draw the projections of the line.
5. The pictorial view of a component is given in Fig: 1. Draw its front view and right side view.

PART – B (4x20 = 80)

Answer any four questions. Each question carries twenty marks.

6. Redraw the object shown in Fig: 2 and make the correct dimensioning as per BIS standards.
7. The major and minor axes of an ellipse are 120 mm x 80 mm respectively. Draw the ellipse using rectangular method.
8. Construct a parabola, when the distance of the focus from the directrix is 40 mm.

9. A circle of diameter 40 mm rolls on the outside of another circle of diameter 160 mm without slipping. Draw the path traced by a point on the smaller circle.
10. The pictorial view of the machine component is given in Fig: 3. Draw the front view and right hand side view.
11. The pictorial view of the machine component is given in Fig: 4. Draw the front view and top view.

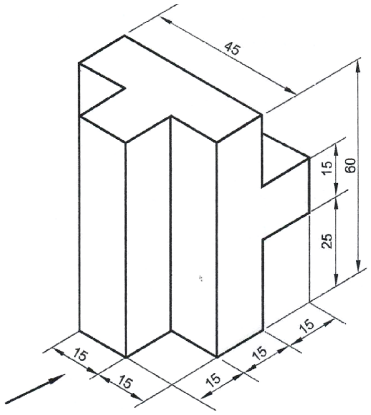

Fig: 1

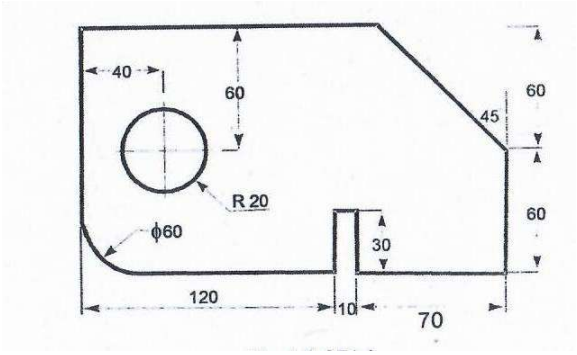

Fig: 2

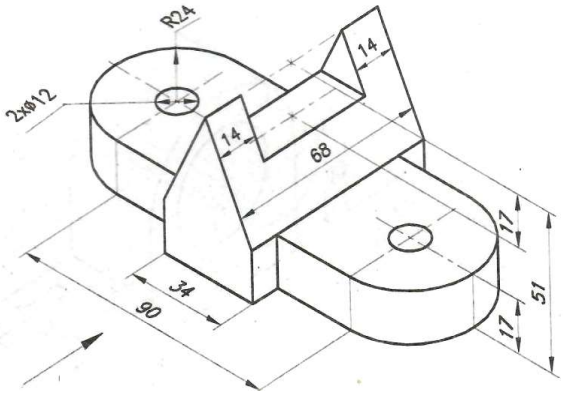

Fig: 3

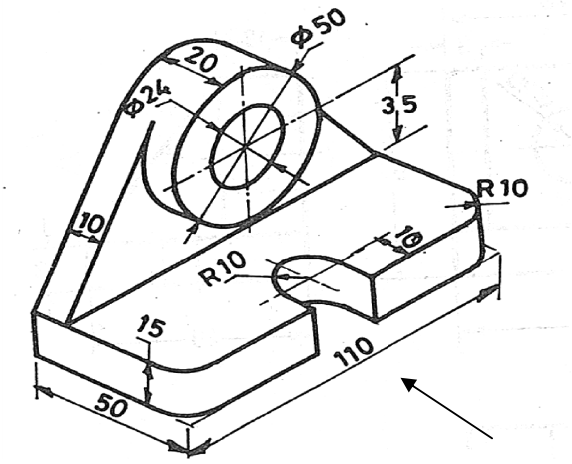

Fig: 4

ANNEXURE- I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020-2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except HMCT and film &TV.

Subject Code : 40001

Semester : I Circuit Branches
II Non-Circuit Branches

Subject Title : COMMUNICATION SKILL PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
COMMUNICATION SKILL PRACTICAL	2	32	25	100*	100	3 Hrs.

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

Topics and Allocation of Hours

Sl.No.	Topic	Duration (Hrs)
1	Listening Skill	10
2	Reading Skill	6
3	Speaking Skill	10
4	Writing Skill	6
Total		**32**

RATIONALE:

- **“**The quality of your life is in the quality of your communication” opined Antony Robins. Language is the means of self-expression and one of the prime most tools for communication. Communicative fluency augments one’s personal, academic, social and professional life.
- The present syllabus, focusing on four Communication Skills, viz. Listening, Reading, Speaking and Writing, enables the students at Diploma level gain confidence and fluency in communication which in turn would enhance them face their career commitments with globalized standards.

OBJECTIVES:

At the completion of the study, the students will be able to

- Improve their auditory skills to attentively listen, effectively comprehend and to identify important information and keywords.
- Fine tune their reading skills and make them articulate lucidly with proper stress and intonation
- Perfect their reading comprehending skills using the techniques like Skimming to get the general idea and scanning to grasp specific information.
- Pronounce words with renewed confidence.
- Express their needs, obligations, suggestions, gratitude and apology with poise and conviction.
- Introduce themselves and others in a self-assuring manner.
- Partake in face to face conversation with skilled agility.
- Emphatically write and complete the missing parts.
- Acquire a sound knowledge on the usage of non-verbal communication.

40001 COMMUNICATION SKILL PRACTICAL

DETAILED SYLLABUS

Contents: Practical

Unit	Name of the Topic	Hours
I	**Listening Skill** Listening to Speeches by Great Speakers/ TV News (Assessment Through note taking) Listening to Short Stories (Assessment by Vocabulary Check) Listening to Indian / British / American English (Assessment by Cloze)	10
II	**Reading Skill** Stress & Intonation Tongue Twisters / Tongue Modulators Frequently Mispronounced Words Reading Newspaper – (Skimming & Scanning)	06
III	**Speaking Skill** Polite Expressions (Greeting, Requesting, Thanking, Apologizing, Opinions, Suggestions) Introducing Yourself/ Friends/ Family Recite - quotes of Leaders / Scholars / Scientists Face to Face Conversation	10
IV	**Writing Skill** Thought Fillers Completing an Incomplete Story How to prepare PPT Non-Verbal Communication	06

BOARD PRACTICAL EXAMINATIONS

Note:

1. The students should be given proper practice in all the exercises. All the exercises should be completed before the examinations.
2. The students should maintain a record notebook. The record note book should be submitted during the Board Practical Examinations.
3. The external examiner should verify the availability of the facility for the batch strength before the commencement of Practical Examination.
4. PART D should be conducted first for all the students. Part A, Part B and Part C can be conducted by both examiners by dividing the students into two groups.

Part A - Listening (No. of Exercises: 3, Duration:45 min.)

Question No.1: The examiner shall play either the audio of the speech of a great speaker or that of TV news running from 3 to 5 min. The audio can be played twice. The candidates may be given 10 minutes to take notes as directed in the question paper.

Question No.2: A short story selected by the external examiner shall be played only once without transcript. The objective of this exercise is to test the Listening ability of the candidate and therefore questions should be framed accordingly in the pattern of question and answer. The time to complete this exercise is 5 minutes.

Question No.3: Any one of the audios (British English, American English or Indian English) may be selected by the external examiner and the same shall be played only once. Maximum of 5 questions for filling in the blanks may be given and the candidates may be provided maximum of 10 minutes to answer the questions.

This part shall be completed within 45 minutes including the time used for playing listening audios.

Part – B – Reading (No. of Exercises 3, Duration: 45 min.)

Each batch may be divided into two. Both examiners may engage all the students.

Question No. 1:Readout the tongue twister.

Question No. 2: A passage from newspaper can be given for reading.

Question No.3: Pronounce the words correctly. Part B shall be completed within 45 minutes.

Part – C – Speaking (No. of Exercises: 4, Duration: 45 min)

Divide the students to make it convenient for conversations in English by a pair. Both examiners can handle.

Question No.1: Polite expressions for the context provided.

Question No. 2: Self-introduction for the interview.

Question No.3: Any five quotes can be recited from the given list of quotes of Leaders, Scholars and Scientists.

Question No. 4: The candidates have to speak as directed by the concerned examiner. All the questions are mandatory. Part C shall be completed within 45 minutes.

Part D – Writing (No. of Exercises: 3, Duration: 45 min.)

All students should appear for this part.

Question No.1: Five questions with blanks shall be asked based on a list of 25 frequently used thought fillers already trained during lab classes.

Question No. 2: shall consist of an unknown incomplete story providing scope for further development and application of imagination. (minimum 3 lines for completion with suitable title and moral)

Question No. 3: Questions can be taken from a list of fifteen important questions covering the core areas of non-verbal communication. (Five out of eight questions to be answered)

Students shall be provided maximum of 30 minutes to complete Part-D.

DETAILED ALLOCATION OF MARKS

Sl. No	Detailed Allocation of Marks	Maximum Marks
A	Listening	30
B	Reading	20
C	Speaking	30
D	Writing	20
	Total	100

Guidelines for Conduct of Practical Classes and Writing Record Note:

There are 13 experiments in total equally distributed to each skill as follows:

Sl. No	Name of the exercise	Minimum Exercises to be Practiced / written in Record Note
Listening Skill		
1	Listening to Speeches by Great Speakers/ TV News	**Each One exercise**
2	Listening to Short Stories	**Minimum of two exercises**
3	Listening to Indian / British / American English	**Minimum of two exercises**
Reading Skill		
4	Reading Tongue Twisters	**A list of 25 tongue twisters**
5	Reading English Newspapers	**Minimum 2 passages from any English Newspaper**
6	Frequently mispronounced words	**List of 25 words**
Speaking Skill		
7	Making Polite Expressions	**Polite expressions - Greeting, Requesting, Thanking, Apologizing, Opinions, Suggestions**
8	Introducing oneself / friends/family	**Minimum two exercises for introducing oneself and introducing others**
9	Reciting quotes	**Quotes of Leaders/Scholars/Scientists (List of 25 quotes)**
10	Face to face conversation	**Minimum two exercises**
Writing Skill		
11	Use of Thought Fillers	**A list of 25 frequently used thought fillers**
12	Completing an Incomplete Story	**Minimum of two exercises.** **(conclusion – minimum 3 lines, title & moral)**
13	Non-Verbal Communication	**A list of 10 questions and answers relating to non- verbal communication.**

Notes:

1. Each experiment shall be awarded 20 marks and the total marks secured in all experiments shall be averaged to 20marks.
2. Attendance mark shall be calculated for 5 marks as per the given norms.
3. Total internal mark is 25 (Record 20 marks + Attendance 5 marks)
4. Observation note is not applicable for this practical.
5. Listening Skill Exercises:

For each exercise under Listening Skill, minimum exercise should be provided for practice and should be recorded in the record note.(as per the tabular column)

Open sources available online on the sites such as

www.youtube.com,

www.letstalk.co.in,

http://www.bbc.co.uk/learningenglish/english/features/6-minute-english, and

https://esl-lab.com/,

can be utilized for sessions on improving listening skill.

Note:

Since there is no observation note for English Communication Practical, the worksheets practiced by the students should be preserved along with the Record Note.

BOARD EXAMINATIONS

Model Question Paper

40001 – Communication Skill Practical

Time: 3Hrs Maximum marks:100

PART A: LISTENING (30 Marks)

I Answer the following:

1. Listen to the speech of a Great Speaker / TV News played to you and take notes. (10)
2. Listen to the Short Story / conversation read out / played to you and answer the questions. (10)
3. Listen to the following American English / British English / Indian English Audio and fill in the blanks.(10)

PART B: READING (20 Marks)

II Answer of the following:

1. Read out the following tongue twisters as fast as possible:(10)

a. Find a kind mind to wind and bind you with the kind mind like a wind.

b. How many cookies could a good cook cook if a good cook could cook cookies?

c. We should fight for our rights as fight is might.

d. Can you can a can as a canner can can a can?

e. Lesser leather never weathered wetter weather better.

2. Read the given newspaper passage with proper intonation. (5)
3. Pronounce the following commonly mispronounced words rightly. (5)

a)pizza b)dengue c) bury d)asthma e)Wednesday

PART C: SPEAKING (30Marks)

III. Answer the following:

1. Make polite expressions for the contexts provided: (5)

a. Request your teacher for a book.

b. How will you politely apologize for coming late to the meeting?

2. Introduce yourself /friend/family member as a candidate appearing for the interview.(10)
3. Recite any five quotes of Leaders/scholars/Scientists. (5)
4. Attempt a face to face conversation with your friend about the addiction to mobile phone by youngsters.(5exchanges) (10)

PART D: WRITING (20 Marks)

IV. Answer the following:

1. Fill in the blanks with suitable thought fillers given in the brackets. (5)

(look, I mean, you know, well, anyway)

a. I can't tell her name,_____, she may grow angry.

b. ___What do you want me to do for that?

c. Nobody told me about this marriage,_____no one even in my own department.

d. ___as I said, I'm going to talk to the manager to cancel this meeting.

e. ___it is not the way to talk to your senior.

2. Complete the following story by adding three more lines and give a suitable title to it.(5)

Once upon a time there was a poor farmer in a village. He had two sons and a daughter. Both sons were lazy whereas the daughter was so intelligent. One day the father was sick at bed. The daughter who went to market in the morning did not return till late night….

3. Answer any FIVE of the following in about50 words: (5x2=10)

Questions from Non Verbal Communication

LABORATORY REQUIREMENT:

1. An echo-free room.
2. A Projector.
3. A minimum of two computers with internet access.
4. DVD player with home theatre.
5. P.A system with two nos. of wired/wireless mike.
6. Any Two Standard English Newspapers.
7. A White Board with Markers.
8. Comics / Story books – 2 Nos

Blank Page

ANNEXURE- I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU
DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS
N-SCHEME
(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and film &TV.

Subject Code : 40002

Semester : I Non-Circuit Branches
II Circuit Branches

Subject Title : COMPUTER APPLICATION PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

Number of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
COMPUTER APPLICATION PRACTICAL	2	32	25	100*	100	3 Hrs.

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

TOPICS AND ALLOCATION OF HOURS

UNIT	Contents	Time (Hrs.)
1	BASICS OF COMPUTER	5 Hrs.
2	WORD PROCESSING	9 Hrs.
3	SPREAD SHEET	9 Hrs.
4	PRESENTATION	9 Hrs.
Total		32 Hrs.

40002 COMPUTER APPLICATIONS PRACTICAL

OBJECTIVES

To learn fundamentals of the computer

To understand documentation using word processor.

To understand the spread sheet and its uses.

To understand the presentation.

Contents: Practical

Units	Topic	Hrs.
I	**Basics of Computer:** Computer Basics – Hardware & Software - General understanding of various computer hardware components – CPU – Memory – Display – Keyboard- Mouse - HDD & Other Peripheral Devices – Types of Software – Application Software & System Software.	5
II	**Word Processing:** Creating new document – Opening an existing document – Edit & Save a document – Typing a text – Deleting a text – Inserting a text – Finding a text – Replacing a text – Copying & Moving a text – Selecting Font & Font Size – Justifying Texts – Bold – Italic – Underline – Strike – Double Strike – Coloring Text – Spell Check – Ruler – Formatting Page – Line Spacing – Margins – Page Size – Page Border – Page Color – Page Columns – Watermark – Page Break – Section Break – Portrait – Landscape – Inserting Symbols, Equations & Shapes – Text Box – Word Art – Hyperlink – Inserting Pictures – Picture Arrangement - Align Objects – Bullets & Numbering – Working with Tables – Header & Footer – Table of Contents – Inserting Page Number – Changing Character width & Line Spacing – Printing the document – Print Preview – Shortcuts for various activities in Word – Exercises.	9
III	**Spread sheet:** Creating a new worksheet - Opening an existing worksheet - Editing and Saving a worksheet - Creating, Renaming and Deleting worksheets in a workbook - Types of data like Numeric, text etc. - Entering in a cell- Manipulation of a cell, row and column (deleting, inserting, finding, replacing, copying and moving) -	9

	Justifying in a cell, Merging cells and columns - Addition, Subtraction and using formula - Selecting Font and Font Sizes - Using and manipulating tables, inserting / deleting of rows and columns - Sorting Columns- Using Header and footer, Inserting Page number - Border and Shading of cells, rows and columns - Formatting page, margins, page size, portrait and landscape - Selecting area for printing, Printing of a worksheet and workbooks, Using print preview - Copy / moving text between two different worksheets and workbooks - Using Chart Wizard, Creation of different types of charts – Protect sheet using password - Shortcuts for various activities in spreadsheet – Exercises.	
IV	**Presentations:** Creating New Presentations - Opening Presentations - Saving Presentation - Inserting new Slides - Slide Layout - Slide Design - Presentation View - Adding Text - Font formatting - Paragraph formatting – Inserting Clipart & Pictures - Inserting and Manipulating Smart Art - Running a slide show - - Insert Slide Number - Slide Header & Footer - Applying Slide Animation – Custom Animation - Inserting Shapes - Insert Video & Sound - Insert Action - Hyperlinks - Charts - Tables – Page Setup - Print Preview - Printing - Shortcuts of various activities in presentations – Exercises.	**9**

EXERCISES

EXERCISE 1 (WORD PROCESSING)

Prepare a report from the given printed document of minimum 250 words. (Use text formatting tools, header & footer, page number, line spacing, font & images)

- **Page Setup:**

Set Margin: Left-1.5, Right-1.5, Top-1.5 & Bottom-1.5 / Orientation: Portrait / Paper Size: A4 / No. of Columns: 2

- **Page Background Settings:**

Watermark / Page Color / Page Borders

- **Text & Paragraph Settings:**

Title: Font size: 16 – Centered – Bold – Suitable font

Heading: Font size: 14 – Left Aligned – Underlined – Set the Suitable Font Face

Body Text: Font size: 12 – Justified – 1.5 Line Spacing – Set the Suitable Font Face

- **Header & Footer:**

Header – Seminar Name, Name of the student, Reg. No. & Branch

Footer – Page No., Date and Time

- **Insert:**

Picture / Clipart / Shapes / Table.

- **Minimum No. of Words:** 250 words

EXERCISE 2 (WORD PROCESSING)

Create a resume for placement from the given printed template with your personal details. Publish a copy of the resume as PDF.

- **Page Setup:**

Margin: Left-0.5, Right-0.5, Top-0.5 & Bottom-0.5 / Orientation: Portrait / Paper Size: A4 / No. of Columns: As per the given resume format.

- **Page Borders:**

Insert Page Border if required.

- **Font & Paragraph:**

Heading : Font size: 12 - Bold – Underlined – Set the Suitable Font Face

Body Text : Font size: 12 – Justified – 1 Line Spacing – Set the Suitable Font Face

Insert Bullets & Numberings were ever required.

- **Insert:**

Photo for your Resume / Tables for Academic Records.

- **Save as PDF:**

Publish a copy of the resume as PDF using any PDF Converting Tools.

EXERCISE 3 (WORD PROCESSING)

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 and generate labels for the applying organizations.

- **Page Setup:**

Margin: Left-1.5, Right-1.5, Top-1.5 & Bottom-1.5 / Orientation: Portrait / Paper Size: A4

- **Page Background:**

Add Page Border for the Letter

- **Font & Paragraph:**

Title: Font size: 16 – Centered – Bold – Suitable font

Heading: Font size: 14 – Left Aligned – Underlined – Set the Suitable Font Face

Body Text: Font size: 12 – Justified – 1.5 Line Spacing – Set the Suitable Font Face

- **Mailings:**

Select Recipients and add a New List of HR Database.

Start Mail Merge through Step by Step Mail merge wizard.

EXERCISE 4 (SPREAD SHEET)

Create a worksheet for the given relational data (minimum ten records) and show the data in the Line Chart, Bar Chart and Pie Chart.

- **10 Records**

Add text to the spreadsheet to the various fields require to analyze the data in Chart

- **Font & Alignment**

Font Face – Font Size – Font Color

- **Formulae**

Use Formulae for the selected data for Calculation

- **Insert**

Charts – Line Chart, Bar Chart & Pie Chart

EXERCISE 5 (SPREAD SHEET)

Create a worksheet for the given data with various functions like Sum, Average, Count, Min, Max & Logical functions [IF, AND].

- **Data**

Create a Worksheet and Insert the various records to the cells.

- **Formatting**

Set the Font using Font Name, Font Size and with various Alignment tools.

- **Formulas and Functions**

Use some functions like Sum, Average, Count, Min, Max and Logical Functions. [IF, AND]

EXERCISE 6 (SPREAD SHEET)

Create a worksheet for the given data and analysis the data with various filters and conditional formatting.

- **Data**
- **Formatting**

Text: Font Face – Font Size – Font Color – Alignment

- **Functions**
- **Conditional Formatting**
- **Filters**

EXERCISE 7 (PRESENTATION)

Create a presentation of minimum 10 slides from engineering related topic.

- **Design & Layout**

Add a suitable Theme and Layout according to the content of all 10 slides.

- **Header & Footer**

Header: Insert the Title & Author

Footer : Insert the Date & Slide Number

- **Font & Paragraph**

Font Face – Font Size – Font Color - Alignment – Bullets & Numberings

- **Insert**

Images & Tables

EXERCISE 8 (PRESENTATION)

Create a presentation of 10 slides about your college with Slide & Custom Animation, Shapes, Header & Footer, Slide number, Video, Audio, Picture, Tables and Hyperlink between slides.

- **Design & Layout**

Add a suitable Theme and Layout according to the content of all 10 slides.

- **Header & Footer**

Header: Insert the Title & Author

Footer : Insert the Date & Slide Number

- **Font & Paragraph**

Font Face – Font Size – Font Color - Alignment – Bullets & Numberings

- **Insert**

Video / Audio / Tables / Shapes

- **Hyperlink**

Use hyperlink to link between slides.

- **Animation**

Custom Animation for individual Objects / Slide Transition to all slides

Custom Animation for individual Objects / Slide Transition to all slides

40002 Computer Application Practical

BOARD PRACTICAL EXAMINATIONS

Note:

1. The student should be given proper training in all the exercises. All the exercises should be completed before the examinations.
2. The student should maintain observation note book / manual and record notebook. The record note book should be submitted during the Board Practical Examinations. Common printout for the record note book should not be allowed. Individual student output for every exercise should be kept in the record note book.
3. All exercises should be given in the question paper and student is allowed to select any one by lot. All exercises with the hard copy of the template related to the exercise should be provided by the external examiner for the examination. Template can be varied for every batch.
4. The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.

DETAILED MARK ALLOCATION

	Description	Marks Awarded
A	Aim & Procedure	20
B	Execution *	50
C	Output Printout / Handout ^	20
D	Vivavoce	10
Total Marks		**100**

* Should be evaluated during the execution by the examiners only.

^ Students all actual output should be printed and submitted with the exam paper for evaluation.

Hardware and Software Requirements

Minimum Hardware Requirements:

Desktop Computers – 30Nos

Processor: 1 GHz, RAM: 1 GB, Hard Drive: 500 GB, Monitor: 15”, Keyboard & Mouse, other accessories

Overhead Projector: 1 No.

Laser Printer: 1 No.

Minimum Software Requirements:

Operating System: Any GUI Operating System

Office Package (Open Office Packages)

ANNEXURE- I
STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU
DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME
(Implemented from the Academic year 2020-2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and film & TV.

Subject Code : 40006

Semester : I and II

Subject Title : ENGINEERING PHYSICS PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

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

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

RATIONALE:

In Diploma level engineering education skill development plays a vital role. The skill development can be achieved by on hand experience in handling various instruments, apparatus and equipment. This is accomplished by doing engineering related experiments in practical classes in various laboratories.

GUIDELINES:

- All the first eight experiments should be completed in the First Semester and the remaining Eight experiments should be completed in the Second Semester. All the experiments should be given for the practical examination at the end of the Year.
- 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 two students while admitting a batch of 30 students during Board Examinations.

I SEMESTER

ENGINEERING PHYSICS - I PRACTICAL

LIST OF EXPERIMENTS WITH OBJECTIVES:

1. MICROMETER (SCREW GAUGE).

   To measure the thickness of the given irregular glass plate using micrometer. To determine the area of the glass plate using a graph sheet and to calculate the volume of the glass plate.

2. VERNIER CALIPERS.

   To measure the length and diameter of the given solid cylinder using Vernier calipers and to calculate the volume of the solid cylinder.

3. PARALLELOGRAM LAW.

   To verify the parallelogram law using concurrent force.

4. LAMI'S THEOREM

   To verify 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. STOKES' METHOD.

   To determine the coefficient 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.

II SEMESTER
ENGINEERING PHYSICS-II PRACTICAL

LIST OF EXPERIMENTS WITH OBJECTIVES:

9. REFRACTIVE INDEX

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

10. SPECTROMETER.

To measure the angle of the prism using Spectrometer.

11. SOLAR CELL.

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

12. LAWS OF RESISTANCES.

To verify the laws of resistances by connecting the two given standard resistances in series and parallel, using Ohm's law.

13.JOULE'S CALORIMETER.

To determine the specific heat capacity of water.

14. COPPER VOLTAMETER.

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

15. 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.

16. 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).

BOARD PRACTICAL EXAMINATIONS

Note:

- 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 book / manual and record notebook. In the observation, the student should draw diagram, mention the readings / observations, calculations and result manually. The same have to be evaluated for the observation mark.
- The record note book should be submitted during the Board Practical Examinations. The record work for the experiments should be completed and evaluated in the respective semesters.
- 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.

DETAILED MARK ALLOCATION

Description		Detailed Allocation
A	Formula & Diagram	20
B	Tabulation with proper units	10
C	Observation (including taking readings)	40
D	Calculation	15
E	Result	10
F	Vivavoce	5
Total Marks		**100**

LIST OF EQUIPMENTS

Minimum Two set of equipment / components are required for the Batch of 30 Students.

1. MICROMETER (SCREW GAUGE).
   Screw gauge, graph sheet and irregular glass plate.
2. VERNIER CALIPERS.
   Vernier Calipers and Solid Cylinder
3. PARALLELOGRAM LAW.
   Vertical drawing board, two Z pulleys, three sets of slotted weights (5 x 50g) and twine thread.
4. LAMI'S THEOREM
   Vertical drawing board, two Z pulleys, three sets of slotted weights (5 x 50g) and twine thread.
5. COMPARISON OF VISCOSITIES
   Burette stand, graduated burette without stopper, rubber tube, capillary Tube, beaker, digital stop watch, two liquids and funnel.
6. STOKES' METHOD.
   Stokes' Apparatus, highly viscous liquid (Castrol oil), glass beads of different radii, digital stop watch and screw gauge.
7. SONOMETER.
   Sonometer, screw gauge, tuning fork, rubber hammer, slotted weight hanger set (5 x 0.5kg) and paper rider.
8. DEFLECTION MAGNETOMETER
   Deflection Magnetometer, meter scale and two bar magnets
9. REFRACTIVE INDEX
   Travelling Microscope, Beaker with transparent liquid and Saw dust.
10. SPECTROMETER.
    Spectrometer, Sodium vapour lamp, Reading lens and Glass prism
11. SOLAR CELL.
    Solar cell Kit for drawing the V - I characteristics
12. LAWS OF RESISTANCES.
    Battery Eliminator, key, rheostat, ammeter, voltmeter, Connecting wires and two known standard resistances.
13. JOULE'S CALORIMETER.
    Joule's Calorimeter, Battery eliminator, Rheostat, Key, Ammeter, voltmeter, stop clock, thermometer, digital Balance and connecting wires.
14. COPPER VOLTAMETER.
    Copper Voltameter, Battery eliminator, Rheostat, Key, Ammeter, stop clock, digital

balance, emery sheet and Connecting wires.

15. P-N JUNCTION DIODE.
    P-N Junction Diode forward characteristics kit.
16. LOGIC GATES.
    Logic gates testing apparatus kit with bread board for Mounting ICs and Integrated circuit chips (IC 7404 –NOT Gate, IC 7408 – AND Gate, IC 7432 – OR gate, IC 7400 –NAND Gate, IC 7402 – NOR Gate)

40006 ENGINEERING PHYSICS PRACTICAL

MODEL QUESTION PAPER

All experiments should be given for examination and the students are allowed to select any one by lot.

1. Measure the thickness of the given irregular glass plate using micrometer. Determine the area of the glass plate using a graph sheet and calculate the volume of the glass plate.
2. Measure the length and diameter of the given solid cylinder using Vernier calipers and then calculates the volume of the solid cylinder.
3. Verify the parallelogram law of forces using concurrent forces.
4. Verify the Lami's theorem using concurrent forces.
5. Compare the coefficient of viscosity of two Liquids by capillary flow method, using graduated burette.
6. Determine the coefficient of viscosity of a highly 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.
9. Determine the refractive index of the given transparent liquid using travelling Microscope.
10. Measure the angle of the prism using Spectrometer.
11. Draw the V – I characteristics of the solar cell.
12. Verify the laws of resistances by connecting the two given standard resistances in (i) series and (ii) in parallel, using Ohm's law.
13. Determine the specific heat capacity of water, using Joule's calorimeter.
14. Determine the electro chemical equivalent (e.c.e.) of copper using Copper Voltameter.
15. 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.
16. Find the output conditions for different combinations of the input for NOT gate and two inputs AND, OR, NAND & NOR logic gates using IC chips.

ANNEXURE- I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU
DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS
N-SCHEME
(Implemented from the Academic year 2020-2021 onwards)

Course Name : All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and film &TV.

Subject Code : 40007

Semester : I and II

Subject Title : ENGINEERING CHEMISTRY 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	
I SEMESTER ENGINEERING CHEMISTRY I PRACTICAL	2	32	25	100*	100	3 Hrs.
II SEMESTER ENGINEERING CHEMISTRY II PRACTICAL	2	32				

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

OBJECTIVES:

1. At the end of the program the student will have knowledge about volumetric analysis in acidimetric, alkalimetric and permanganometric titration and their applications.
2. To get knowledge of estimation of total hardness, temporary and permanent hardness in the hard water sample.
3. To get knowledge about measurement of TDS, pH and to calculate Hydrogen ion concentration in a solution.
4. To get knowledge of estimation of dissolved chlorine in a water sample.

I SEMESTER

ENGINEERING CHEMISTRY – I PRACTICAL

Intellectual Skills

1. Carrying out Volumetric titrations and calculation of masses
2. Knowing units for Concentrations of solutions

Motor Skills

1. Measure quantities accurately
2. Observe chemical reactions
3. Handle the apparatus carefully

EXPERIMENTS

i) Acidimetry and Alkalimetry

1. Estimate the amount of sulphuric acid present in ……. ml of a given solution using Standard solution of HCl of strength…….N and an approximately decinormal solution of NaOH.
2. Estimate the amount of NaOH present in …….ml the given solution using a standard solution of KOH of strength …….N and approximately decinormal solution of H_2SO_4
3. Compare of strength of two given hydrochloric acids and estimate the stronger/weaker solution present in …….ml using a standard solution of sodium hydroxide of strength ……N

ii) Permanganometry

4. Estimation of the amount of Mohr salt present in…….ml of the given solution using a standard solution of ferrous sulphate of strength ……N and an approximately decinormal solution of $KMnO_4$.
5. Estimation of the amount of Fe 2+ present in…….ml of the given solution using a standard solution of ferrous ammonium sulphate of strength ……N and an approximately decinormal solution of $KMnO_4$.
6. Compare of strength of two given KMnO4 solution and estimate the stronger/weaker solution present in …….ml using a standard solution of ferrous ammonium sulphate of strength ……N

iii) Water Analysis

7. Water analysis for residual chlorine
8. Estimation of total hardness of a sample using EDTA
9. Water quality testing, pH (3 sample)
10. Water quality testing TDS (3 sample)

Determination of pH and TDS using a pH meter and TDS meter respectively and calculation of hydrogen ion Concentrations (For three given samples, one of the samples brought from home by each student) **(This question must be given to any two students per batch in the Board Examination).**

II SEMESTER

ENGINEERING CHEMISTRY–II PRACTICAL

Intellectual Skills

1. Studying the effect of heating on substances and reagents
2. Study of the reactions of the following radicals leading to qualitative analysis of the given Inorganic simple salt soluble in water or dilute acids
3. Studying the harmful effects of effluents

Acid Radicals: Carbonate, Chloride, Nitrate and Sulphate

Basic Radicals: Lead, Copper, Aluminium, ferrous iron, Zinc, Barium, Calcium, Magnesium and Ammonium

Motor Skills

1. Handling the apparatus carefully
2. Awareness on Industrial safety

EXPERIMENTS

I. Analysis of Inorganic simple salt (QUALITATIVE ANALYSIS)

Analysis of nine inorganic simple salts containing any one acid radical and basic radical without omitting any of the above – mentioned radicals.

II. Analysis of Effluent containing Lead, Copper and Zinc metal ions (EFFLUENT ANALYSIS)

Analysis of three effluents, each containing the above – mentioned metal ions.

Report on the metallic pollutant with procedure (Basic Radical Analysis Procedure) and their harmful effects.

BOARD PRACTICAL EXAMINATIONS

Note:

- 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 book / manual and record notebook. In the observation, the student should draw diagram, mention the readings / observations, calculations and result manually. The same have to be evaluated for the observation mark.
- The record note book should be submitted during the Board Practical Examinations. The record work for the experiments in the concerned semester should be completed and evaluated in the respective semesters. Both Volumetric and Salt analysis shall be recorded in the in the same record note book. During the completion of First semester, Volumetric analysis needs to be completed and record needs to be submitted. The second semester, Salt analysis also be recorded in the same record note book.
- All experiments should be given as per the model question paper 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 as per the guidelines before the commencement of practical examinations.

DETAILED MARK ALLOCATION

Description		**Detailed Allocation**
A	PART A Engineering Chemistry I Practical	53
B	PART B Engineering Chemistry II Practical	42
C	VIVAVOCE	05
Total Marks		**100**

Guide lines for Evaluation

PART A: ENGINEERING CHEMISTRY I PRACTICAL

Volumetric Analysis - Distribution of Marks

FOR	MARKS
Short procedure	5
Titration I	18
Titration II	18
Calculations (3 X 4)	12
Total	**53**
Volumetric Analysis	
Titration value accuracy for Titration I and II	
Accuracy	**Marks**
±0.2ml	18
above ±0.2 ml to ±0.4 ml	15
above ±0.4 ml to ±0.6 ml	12
above ±0.6 ml	5

Determination of pH: Distribution of marks

FOR	Marks
Answer for short questions on pH and TDS	5
Determination of pH of three samples (3 x 7)	21
Calculation of H^+ (3X2)	6
Determination of TDS - three samples (3X7)	21
Total	**53**
Accuracy per pH value	
Accuracy	**Marks**
±0.2	7
above ±0.2 to ±0.4	5
above ±0.4	2
TDS Value accuracy	
Accuracy	**Marks**
±2%	7
above ±2% to ±4%	5
above ±6%	2

Note: All the students should be given same question and each batch of student is given different inorganic simple salt and effluent. (Nine salt and three effluents)

PART B: ENGINEERING CHEMISTRY II PRACTICAL

Qualitative Analysis

FOR	Marks
Identification Procedure of Acid Radical with Systematic procedure	21
Identification Procedure of Basic Radical with Systematic procedure	21
TOTAL	**42**
Without systematic procedure	
Identification of Acid Radical with confirmatory test only	13
Identification of Basic Radical with confirmatory test only	13
Mere Spotting of Acid Radical and Basic Radical (3+3)	6

EFFLUENT ANALYSIS (two samples to be given)

FOR	Marks
Identification of metallic pollutant procedure with systematic procedure Effluent sample	16
Harmful effects of metallic pollutant	5
Identification of metallic pollutant procedure with systematic procedure Effluent sample II	16
Harmful effects of metallic pollutant	5
TOTAL	**42**
Without systematic procedure	
Group Identification Tests of metallic pollutant	13
Confirmatory Test of metallic pollutant	13
Mere Spotting of the pollutant (3+3)	6

MODEL QUESTION PAPER

MODEL1

PART A:

Estimate the mass of Iron present in whole of the given ferrous sulphate solution using a standard solution of ferrous ammonium sulphate of strength 0.1N and an approximately decinormal solution of potassium permanganate. (53marks)

PART B:

Analyse the given Inorganic simple salt and report the acid radical and basic radical present in it. (42 marks)

MODEL2

PART A:

Calculate the total hardness of the given sample of water using a standard hard water solution of molarity 0.01M and an approximately decimolar solution of EDTA. (53marks)

PART B:

Analyse the given samples (two samples) of effluent and report the metallic pollutant present in it with procedure and its harmful effects. (42 marks)

MODEL3

PART A:

Determine the pH of three given samples using pH meter and calculate the hydrogen ion concentration of the samples determine the TDS of the same sample. (Any two students per batch). (53marks)

PART B:

Analyse the given Inorganic simple salt and report the acid radical and basic radical present in it. (42marks)

MODEL4

PART A:

Estimate the amount of sulphuricacid present in the whole of the given sulphuric acid using a standard solution of hydrochloric acid of strength 0.1N and an approximately decinormal solution of sodium hydroxide. (53 marks)

PART B:

Analyse the given Inorganic simple salt and report the acid radical and basic radical present in it. (42marks)

Note:

Determination of pH using a pH meter and calculation of hydrogen ion concentrations in the solutions and TDS using TDS meter (For three given samples) (This question may be given to any two students per batch).

A single experiment with different skill value may be given for a batch. The eighth experiment (Determination of pH) may be given to any two students per batch.

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 chemicals afe 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.

List of Apparatus to be provided for each student in Chemistry Laboratory during the Engineering Chemistry –I&II Practical Classes / Board Examination in addition to the required reagents:

LIST OF EQUIPMENTS

List of Equipment Required for a Batch of 30 Students

Non-Consumable Items

Sl. No.	Name of the item	Quantity
1	LPG Connection	
2	Exhaust Fan (High Capacity)	Sufficient Nos.
3	Fire Extinguisher	1
4	First Aid Box (Full Set)	2
5	Safety Chart	1
6	Chemical Balance	1
7	Fractional Weight Box	1
8	pH Meter	2
9	TDS meter	2
10	Working Table with all accessories	8

GLASSWARE AND OTHER ITEMS

Sl. No.	Name of the item	Quantity
1	Burette(50ml)	35
2	Burette Stand	35
3	Pipette(20ml) (With safety bulb)	35
4	Pipette(10ml)	35
5	Conical Flask(250ml)	35
6	Funnel (3”)	50
7	Porcelain Tile	35
8	Measuring Cylinder (10 ml)	5
9	Measuring Cylinder (1000 ml)	2
10	Reagent Bottle (White) (250ml)	60
11	Reagent Bottle (White) (125ml)	100
12	Reagent Bottle (Amber)(250ml)	80
13	Test Tube(15mmx1.5mm)	1000
14	Test Tube(15mmx2.5mm)	500
15	Test Tube Stand	35
16	Test Tube Holder	35
17	Test Tube cleaning brush	35

18	Glass Trough	5
19	Beaker(100ml)	35
20	Glass Rod(15cm)	100
21	Watch Glass (3”)	35
22	Wash Bottle (Polythene)	35
23	Nickel Spatula	35
24	Bunsen Burner for Gas connection	35
25	Plastic Bucket(15L)	10
26	Filter Papers (Round)	Sufficient
27	Pipette bulb / filling devices	35