

# DIPLOMA BASIC ENGINEERING DEPARTMENT

# Academic Regulation: 2016-2019

# E- SCHEME

# I YEAR

# Academic Year (w.ef): 2016 - 2017

# SESHASAYEE INSTITUTE OF TECHNOLOGY

(Autonomous) ISO 9001:2008 certified Institute Tiruchirappalli – 620010.

#### PREFACE

The wave of liberalization and globalization has created an environment for free flow of information and technology through fast and efficient means the world over. This has lead to shrinking of world, bringing people from different cultures and environment together, giving rise to a global village. A shift has been taking place in India from closed economy to knowledge based and opens economy. In order to cope-up with the challenges of handling new technologies, materials and methods, we have to develop human resources having appropriate knowledge, professional skills and attitude. Technical education system is one of the significant components for human resource development. Polytechnics play an important role in meeting the requirements of trained technical manpower for industries and field organizations. The initiatives being taken by to revise the curriculum as per the needs of the industry are laudable.

In order to meet the requirements of future technical manpower, constant efforts have to be made to identify new employment opportunities, carryout activity analysis and design need based curricula of diploma programmes. This curriculum document has been designed by identifying job potential and competency profile of diploma holders leading to identification of curriculum areas for the course. It is needless to emphasize that the real success of the diploma programme depends upon its effective implementation. This will require harnessing and effective utilization of resources. In addition to acquisition of appropriate physical resources, the availability of competent and qualified faculty is essential. It is time for the managers of technical education system to reorganize the system to accept the challenges of both quantitative and qualitative expansion of technical education.

There are various online training facilities created by the Government of India through MHRD for the benefit of both the Teaching and Student community. Facilities like Spoken-Tutorial, NPTEL, e-Yantra must be exploited to its fullest extent to reap the benefits of interactive electronic media for teaching-learning process. It is hoped that polytechnics will carry out job market research on a continuous basis to identify the new skill requirements and develop innovative methods of course offering and thereby infuse dynamism in the system.

#### PRINCIPAL& CHAIRMAN

#### ACKNOWLEDGEMENTS

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Coordinator

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# **1. DEPARTMENT VISION AND MISSION**

# The Vision and Mission of the Department

# VISION

Attaining global recognition in technical education and training to meet the growing needs of the industry and society.

# **MISSION**

- To educate the students to become successful professionals.
- To provide quality education through well-designed curriculum with the challenging needs of the industry to carry out the state-of-the-art research and emerging technologies.
- To provide platforms to work effectively and innovatively in multi-disciplinary domain.

# <u>R E G U L A T I O N S</u> DIPLOMA COURSES IN ENGINEERING (TERM PATTERN-Implemented from 2016- 2017) E – SCHEME

#### (Common to all Programmes)

#### 1. Description of the Programme:

#### a. Full Time (3 years)

The Programme for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 terms\* and the First Year is common to all Engineering Programmes. The Curriculum for all the 6 Terms of Diploma Programmes have been revised and revised curriculum is applicable for the candidates admitted from 2016 - 2017 academic year onwards.

#### b. Sandwich (3<sup>1</sup>/<sub>2</sub> years)

The Programme for the Diploma in Paper Technology (Sandwich) shall extend over a period of three and half academic years, consisting of 7 terms\* and the First Year is common to all Engineering Programmes. The courses of diploma Programmes being regrouped for academic convenience.

During 4<sup>th</sup> and 7<sup>th</sup> terms, the students undergo industrial training for six months. Examination will be conducted after completion of every 6 months of industrial training

#### 2. Condition for Admission:

The candidates shall be required to have passed in the S.S.L.C Examination of the Board of Secondary Education, Tamilnadu.

(Or)

the Anglo Indian High School Examination with eligibility for Higher Secondary Course in Tamilnadu

(Or)

the Matriculation Examination of Tamil Nadu.

(Or)

Any other Examinations recognized as equivalent to the above by the Board of Secondary Education, Tamilnadu.

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

#### 3. Admission to Second year (Lateral Entry):

A pass in HSC (Academic)# or (Vocational) courses mentioned in the Higher Secondary Schools in Tamilnadu affiliated to the Tamilnadu Higher Secondary Board with eligibility for University Courses of study or equivalent examination, & should have studied the following Courses

Sl. No	Programmes	# H.Sc Academic	H.Sc Vocational	
		<b>Courses Studied</b>	<b>Courses Studied</b>	
			Related courses	Vocational courses
1	All the Regular and	Maths, Physics &	Maths, Physics	Related Vocational
	Sandwich Diploma	Chemistry	& Chemistry	Courses - Theory &
	Programmes		(any one)	Practical

. # Subject to the approval of the AICTE

• For the Diploma Programmes related with Engineering/Technology, the related / equivalent courses prescribed along with Practicals may also be taken for arriving the eligibility.

• Programmes will be allotted according to merit through counseling by the Principal as per communal reservation.

• Candidates who have studied Commerce Courses are not eligible for Engineering Diploma Programmes.

#### 4. Age Limit:

No Age limit.

#### 5. Medium of Instruction:

English

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

No candidate shall be eligible for the Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3/3 <sup>1</sup>/<sub>2</sub> academic years (Full Time/Sandwich), affiliated to the State Board of Technical Education and Training, Tamilnadu, when joined in First Year and 2/2 <sup>1</sup>/<sub>2</sub> years (Full Time/Sandwich), if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Programmes are given below:

Diploma Programmes	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years
Sandwich	3 <sup>1</sup> / <sub>2</sub> Years	6 <sup>1</sup> / <sub>2</sub> Years
Sandwich (Lateral Entry)	2 <sup>1</sup> / <sub>2</sub> Years	5 <sup>1</sup> / <sub>2</sub> Years

#### 7. Programmes of Study and Curriculum outline

The Programmes of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical courses.

#### 8. Examinations:

Autonomous Examinations in all Programmes of all the terms under the scheme of examinations will be conducted at the end of each term for 75 marks.

The internal assessment marks for all the courses will be awarded on the basis of continuous assessment earned during the term concerned. For each course, 25 marks are allotted for internal assessment and 75 marks are allotted for Autonomous end Examination.

#### 9. Continuous Internal Assessment:

#### A. For Theory Courses:

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

#### i) Course Attendance- 5 Marks

Award of marks for attendance to each Theory/Practical course will be as per the range given below

% of Attendance	Marks
80% - 83%	1 Mark
84% - 87%	2 Marks
88% - 91%	3 Marks
92% - 95%	4 Marks
96% - 100%	5 Marks

# ii) Tests # - 10 Marks

2 Tests each of 2 hours duration for a total of 50 marks are to be conducted and the marks so obtained will be reduced to 5 marks. A Model exam covering all the five units is to be conducted and the marks will be reduced to 5 marks

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	In 2 Units	End of 5 <sup>th</sup>	50	2 hours
		week		
Test II	In 2 Units	End of 10 <sup>th</sup>	50	2 hours
		week		
Test III	Model Examination - Compulsory	End of the term	100	3 hours
	Covering all the 5 Units.			
	(Autonomous Examinations-question			
	paper pattern).			

Question Paper Pattern for the Periodical Test :( Test - I & Test- II)

PART-A: 4 Questions	X 2 marks	-	8 marks
DART B. 1 Questions	X 3 marks		12 marks

PART-B: 4 Questions X 3 marks - 12 marks

PART-C: 3 Questions X 10 marks - 30 marks

Total

50 marks

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#### iii) Assignment / Online test - 10 Marks

# - From the Academic year 2016-2017 onwards.

For each Course, Three Assignments/ On line tests are to be given/ conducted each for 20 marks and the average marks scored should be reduced for 10 marks.

All Test Papers and Assignment note books after getting the signature with date from the students must be kept in the safe custody in the Department for verification and audit. It should be preserved for 2 Terms and produced to the inspection team at the time of inspection/verification.

#### Total : 25 marks

# **B.** For Practical Courses:

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

a) Attendance	5 Marks (Procedure for
	the Award of marks is the
	same as theory courses)
b) Procedure / Observation and	10 Marks
tabulation/ Other Practical related Work	
c) Record writing	10 Marks
TOTAL	25 Marks

• All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Autonomous examinations.

• The Record for every completed exercise should be submitted in the subsequent Practical classes and marks should be awarded for 20 for each exercise as per the above allocation.

• At the end of the Term, the average marks of all the exercises should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive the internal assessment marks for Practical.

• The students have to submit the duly signed bonafide record note book/file during the Practical Autonomous Examinations.

• All the marks awarded for assignments, tests and attendance should be entered in the Personal Log Book of the staff, who is handling the subject. This is applicable to both Theory and Practical courses.

#### 10. Life and Employability Skills Practical:

Life and Employability Skills Practical with more emphasis is being introduced in IV Term for Circuit Branches and in V Term for other branches of Engineering.

Much Stress is given to increase the employability of the student

# 11. Project Work:

The students of all the Diploma Programmes have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamilnadu. The Project work must be reviewed twice in the same semester.

# a) Internal assessment mark for Project Work:

Project Review I	10 marks
Project Review II	10 marks
Attendance	<b>05 marks</b> (Procedure for the Award of marks is the same as theory courses)
Total	25 marks

Proper records are to be maintained for the two Project Reviews, and they should be preserved for 2 Semesters and produced to the inspection team at the time of inspection/verification.

# b) Allocation of Mark for Project Work & Viva Voce in Board Examination:

Viva Voce	30 marks
Marks for Report Preparation, Demonstration	35 marks
Written Test Mark \$ (from 2 topics for 30	10 Marks
minutes duration)	
Total	75 marks

# Written Test Mark \$:

i) Environment Management: 2 questions X 2 <sup>1</sup>/<sub>2</sub> marks = 5 marks

ii) Disaster Management: 2 questions  $X 2 \frac{1}{2}$  marks = 5 marks

#### Total = 10marks

Selection of Questions should be from Question Bank, by the External Examiner.

No choice to be given to the candidates.

# **12. Scheme of Examinations:**

The Scheme of examinations for courses is given in Curriculam outline

# 13. Criteria for Pass:

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the courses prescribed in the curriculum.

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

#### 14. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2019 onwards (Joined in first year in 2016-2017 / Joined in second year in 2017-2018) will be done as specified below.

#### First Class with Superlative Distinction:

A candidate will be declared to have passed in **First Class with Superlative Distinction** if he/she secures not less than 75% of the marks in all the courses and passes all the terms in the first appearance itself and passes all courses within the stipulated period of study  $3/3\frac{1}{2}$  years (Full Time/Sandwich) without any break in study.

#### First Class with Distinction:

A candidate will be declared to have passed in **First Class with Distinction** if he/she secures not less than 75% of the aggregate of marks in all the terms put together and passes all the terms except the I and II terms in the first appearance itself and passes all the courses within the stipulated period of study  $3/3\frac{1}{2}$  years (Full Time/Sandwich) without any break in study.

#### First Class:

A candidate will be declared to have passed in **First Class** if he/she secures not less than 60% of the aggregate marks in all terms put together and passes all the courses within the stipulated period of study 3/3<sup>1</sup>/<sub>2</sub> years (Full Time/Sandwich) without any break in study.

#### Second Class:

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

#### 15. Duration of a period in the Class Time Table:

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

# CURRICULUM OUTLINE TERM-I

# **DURATION: 15WEEKS**

# WITH EFFECT FROM: 2016-2017.

COURSE TITLE	COUR SE	TEACHING SCHEME		CR EDI	SCHEME OF EXAM			MIN FOR	DURATIO N
	CODE	THEO	DDACT	Т	IN T	EXT	TOTA L	PASS	(HOURS)
		RY	ICAL/ DRAW ING				MAR K		
COMMUNICATION ENGLISH-I (CE1)	E1101	4	-	4	25	75	100	40	3
ENGINEERING MATHEMATICS- I(M1)	E1102	7	-	7	25	75	100	40	3
ENGINEERING PHYSICS-I (P1)	E1103	5	-	5	25	75	100	40	3
ENGINEERING CHEMISTRY-I(C1)	E1104	5	-	5	25	75	100	40	3
ENGINEERING PHYSICS PRACTICAL-I (PP1)	E1105	-	2	1	25	75	100	50	3
ENGINEERING CHEMISTRY PRACTICAL-I (CP1)	E1106	-	2	1	25	75	100	50	3
ENGINEERING GRAPHICS-I (EG1)	E1107	-	6	4	25	75	100	50	3
WORKSHOP PRACTICE (WP)	E1108	-	4	2	25	75	100	50	3
TOTAL		35 (	(27+8)	29					

#### **CURRICULUM OUTLINE TERM-II**

#### **DURATION: 15WEEKS**

#### WITH EFFECT FROM: 2016-2017.

COURSE TITLE	COUR SE	TEACHING SCHEME		CR EDI	SCHEME OF EXAM		MIN FOR	DURATIO N	
	CODE	THEO RY	PRACT ICAL/ DRAW	T	IN T	EXT	TOTA L MAR K	PASS	(HOURS)
COMMUNICATION ENGLISH-II (CE2)	E2101	5	-	5	25	75	100	40	3
ENGINEERING MATHEMATICS- II(M2)	E2102	5	-	5	25	75	100	40	3
APPLIED MATHEMATICS (APM)	E2103	5	-	5	25	75	100	40	3
ENGINEERING PHYSICS-II (P2)	E2104	5	-	5	25	75	100	40	3
ENGINEERING CHEMISTRY-II(C2)	E2105	5	-	5	25	75	100	40	3
ENGINEERING PHYSICS PRACTICAL-II (PP2)	E2106	-	2	1	25	75	100	50	3
ENGINEERING CHEMISTRY PRACTICAL-II (CP2)	E2107	_	2	1	25	75	100	50	3
ENGINEERING GRAPHICS-II (EG2)	E2108	-	6	4	25	75	100	50	3
TOTAL		35 (	(27+8)	31					

**EXTERNAL ASSESSMENT:** Minimum of 30marks out of 75 in Theory examination, minimum 35marks out of 75 in Practical examination and 25marks in Internal assessment.

**THEORY**: Conduct of three class test for 75marks in each theory subjects. The sum of total marks is converted to 10marks (5marks taken from the best performance of student from two cycle tests and 5marks from Model examination) 10marks is allotted for multiple choice questions (MCQs) and 5marks for attendance. Evaluation is done by subject teacher as per norms.

**PRACTICAL**: Writing of procedure/ Observation/ Tabulation and other practical work 10marks. Record writing 10marks and attendance 5marks as internal assessment. Evaluation is to be done by subject teacher as per the norms.

# **TERM-I**

# E1101-COMMUNICATION ENGLISH – I

#### RATIONALE

With the increasing variety of options and opportunities emerging for Diploma students, fulfilling their communication needs become highly important. Proficiency in communication can equip them to be confident and to cope with the employment and educational situation in any part of the world. Communication levels inspire higher aspiratory levels in the process of upward mobility in career and socio-cultural evolution of the young individuals. At the end of the course the student should be able to express himself in oral and written communication effectively.

#### SPECIFIC INSTRUCTIONAL OBJECTIVES

All the four skills - listening, speaking, reading and writing - should be developed in the communication process for a polytechnic student who is at the intermediate level and transitional period from school to college.

Silent reading of the English text book acquaints him with the grammatical structures and the nuances of the language indirectly and also triggers reaction in the thinking process according to the student's specific learning background. Loud reading equips the student with confidence and practice for oral communication. Both these should be given due importance in the class room situation. Developing listening skills equip them with the necessary focus in understanding oral communication without difficulty to react and interact properly.

Proper exposure in developing these two skills facilitates speaking and writing which are very essential in day to day interaction in any official, social or personal context. Matching to the entry level quality of the polytechnic student and his technical background, this text book is aimed at fulfilling the needs of all the four communication skills with suitable texts, language exercises and activities.

Grammar items prescribed in the syllabus are embedded in the prescribed texts to make the teaching learning process contextualised and activity based to ensure proper textual orientation. Exercises and group activities are given in the text itself for the students to get practiced.

Apart from the prescribed Textbook, a little exposure to American English is attempted, considering the growing trends in American English.

# TRAINING AND SCHEME OF EXAMINATION Weeks

#### No. of Weeks per Semester: 15

Subject	Instructions		Examination			
Communication English - I	Hours / Week	Hours / Semester	Marks		Duration	
	5 Hrs.	75 Hrs.	Internal Assessment	Semester Examination	Total	
			25	75	100	3 Hrs

# E1101-COMMUNICATION ENGLISH – I

# **DETAILED SYLLABUS**

Content	Competencies	Transactional	Learning	Contact
	_	Strategies	Outcomes	Hrs.
Unit I Names	Grammar	Through Activities	Identify nouns &	7
& Actions	Nouns & Verbs	Presentation: Practice:	Verbs Distinguish &	
		use Presentation of	use singular &	
		rules Adequate	plural nouns	
		contextual examples	Differentiate	
		Practice	tense(time) from	
			verbs(actions) Learn	
			tense using	
	<b>.</b>		timelines	
	Listening	Activities to sensitize	Distinguish the	4
	Plurals, past	Pronunciation Plurals	Pronunciation of	
	tense endings	& Past of tense verbs	Past tense & Plural	
		Activition	words with similar	
		homonhones	pronunciation but	
		nomophones	different spelling &	
			meanings	
	Reading		Comprehend &	4
	iteuung	Task based: Factual.	respond to simple	·
		Inferential Vocabulary	texts	
		&		
		Experiential questions		
Unit 2	Grammar	Through activities	Recognize	6
Description &	Adjectives &	Presentation:	adjectives	
Connections	prepositions	Practice: use	Transform adjectival	
		presentation of rules	forms(Word level)	
		Adequate contextual	Compare	
		examples practices	prepositions & use	
			them in context Use	
			adjectives &	
			prepositions productively in	
			speech and writing	
	Listening	Activities Rhyming	Identify and use	4
	Listening	sounds Homonhones	appropriate	Ŧ
		sounds monophones	pronunciation	
	Speaking &	Activities: Pair work.	Introduce	2
	Writing	Individual work	themselves &	
	U		describe friends	
			using adjectives	
	Reading	Task based Factual,	Comprehend,	3
	_	Inferential	interpret & analyze	
		Vocabulary&	simple reading	

		Experiential Questions	passages	
Unit 3	Grammar	Through Activities	Recognize kinds of	7
Resources &	Kinds of	Presentation, Practice,	sentences Convert	
Environment	sentences	Use presentation of	sentences as directed	
	Phrases,	Rules Adequate	Differentiate	
	Clauses	contextual practice	Phrases, Clauses,	
	sentences	-	Sentences, Use	
	Negative		articles Identify &	
	sentences		use negative	
	Articles		sentences	
	Listening	Activities	Distinguish & Use	2
	-	Homophones	words with similar	
			pronunciation.	
	Reading	Task based Factual,	Draft main points	4
	_	Inferential	Comprehend,	
		Vocabulary&	interpret & analyze	
		Experiential Questions	small passages	
	Writing	Activity	Use capitals,	2
	Punctuation		commas & periods	
Unit 4	Writing	5- step writing process	Interpret Visuals	15
		Pre-	Brainstorm,	
		writing(brainstorming)	Organize & write	
		Clustering/grouping	Paragraphs using	
		ideas Rough draft	linkers Write	
		Revision/editing Final	messages for given	
		draft	contexts	
Unit 5	Writing	Activities / tasks	Develop hints Write	
	Ads personal	(Sample, guided	ads Identify &	15
	letters	controlled, free)	compose Personal	
	(invitation,		letters for different	
	permission &		purposes	
	thanking)			
	<b>Develop hints</b>			
	Reading	Task based:	Comprehend,	
		Factual, Inferential	interpret & analyze	
		Vocabulary &	texts	
		Experiential questions		

# E1101-COMMUNICATION ENGLISH – I

# Section-A

- 1. Pronunciation of Mono Syllabic and Di-syllabic words
- 2. Long and Short selective vowel sounds (/u//u: //i//i :/)
- 3. Homophones (textual)
- 4. Naming words
- 5. Number
- 6. Action words
- 7. Adjectives
- 8. Articles
- 9. Prepositions
- 10. Kinds of Sentences
- 11. American equivalents for British words (Annexure unit) (from the Bank)

# Section-B

- 1. Phrases and clauses
- 2. Rearranging the jumbled words into sentences
- 3. Kinds of Sentences. (conversion)
- 4. Sentence Patterns
- 5. Punctuation

# Section-C

- 1. Comprehension (Non-Textual)
- 2. Creative writing
- 3. Personal letter writing (Invitation, Asking Permission, Appreciation & Congratulation, Reply letters)

# Section-D

- 1. SMS writing
- 2. Describing the visual
- 3. Linkers
- 4. Dialogue Comprehension
- 5. *Note-making* (Annexure unit)

# Note: 1. M-Scheme DOTE Syllabus text book is to be adopted

- 2. DOTE M-scheme Question Pattern is to be adopted
- 3. New units are included as Annexure units.

# **ONLINE SOURCES:**

1.www.englishteacher.eu

2.www.englishgrammar.org

3.www.englishgrammar101.org

# E1102- ENGINEERING MATHEMATICS- I

#### **Rationale:**

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

# **Objectives:**

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

#### SCHEME OF INSTRUCTION AND EXAMINATION: No. of weeks per semester: 15Weeks

Subject	Instructions		Examination			
Engineering Mathematics-I	Hours/week	Hours/Semes ter		Marks		Duration
			Internal	External		
	7Hrs	105Hrs	Assessment	Assessment	Total	3Hrs
			25	75	100	

# TOPICS AND ALLOCATION OF HOURS:

Sl.no	Topics	Time (Hrs.)
1	Algebra-Determinants, Matrices and Binomial Theorem	19
2	Complex numbers	19
3	Trigonometry	19
4	Inverse trigonometric ratios & Differential Calculus-I	19
5	Differential Calculus-II	19
	Test and Tutorial	10
	Total	105

#### UNIT I ALGEBRA

#### **Chapter - 1.1 DETERMINANTS**

Definition and expansion of determinants of order 2 and 3. Properties of determinants(not for examination). Solution of simultaneous equations using Cramer's rule (in 2 and 3 unknowns) - Simple Problems.

#### **Chapter - 1.2 MATRICES**

Definition –Singular Matrix, Non-singular Matrix, Adjoint of a matrix and Inverse of a matrix up to  $3 \times 3$  only. Simple Problems. Finding the rank of a matrix by determinant method(matrix of order 3x4) –simple problems. Consistency and inconsistency of system of linear Algebraic equations-simple problems.(not for examination)

#### **Chapter - 1.3 BINOMIAL THEOREM**

Definition of Factorial notation - Definition of Permutation and Combinations –values of nPr and nCr (results only) [not for examination]. Binomial theorem for positive integral index (statement only) - Expansion - Finding of general term, middle term, coefficient of xn and term independent of x. Simple Problems. Binomial Theorem for rational index up to - 3 (statement only), Expansions only for - 1, - 2, - 3.

#### UNIT II COMPLEX NUMBERS

#### Chapter - 2.1 ALGEBRA OF COMPLEX NUMBERS

Definition – Real and Imaginary parts, Conjugates, Modulus and amplitude form, Polar form of a complex number, multiplication and division of complex numbers (geometrical proof not needed)– Simple Problems .Argand Diagram – Collinear points, four points forming square, rectangle, rhombus and parallelogram only . Simple Problems.

#### Chapter - 2.2 DE MOIVER'S THEOREM

Demoivre's Theorem (statement only) - related simple problems.

#### **Chapter - 2.3 ROOTS OF COMPLEX NUMBERS**

Finding the n th roots of unity -solving equation of the form  $x^n \pm 1 \le 0$ , where  $n \le 7$ . Simple Problems

#### UNIT III TRIGONOMETRY

#### Chapter – 3.1 COMPOUND ANGLES

Expansion of sin ( A  $\pm$  B) , cos ( A  $\pm$  B) and tan ( A  $\pm$  B) [without proof] . Problems using above expansions.

#### Chapter - 3.2 MULTIPLE ANGLES

Trigonometrical ratios of multiple angles of 2A and 3A and sub multiple angles. Simple Problems

#### Chapter - 3.3 SUM AND PRODUCT FORMULAE

Trigonometrical ratios of sum and product formulae. Simple Problems.

# UNIT IV INVERSE TRIGONOMETRIC RATIOS & DIFFERENTIAL CALCULUS – I Chapter - 4.1 INVERSE TRIGONOMETRIC FUNCTIONS

Definition of inverse trigonometric ratios – Relation between inverse trigonometric ratios. Simple Problems.

#### Chapter - 4.2 LIMITS

Definition of Limits. Problems using the following results:

(i)  $\lim_{x \to a} \frac{x^n - a^n}{x - a} = n a^{n-1}.$ (ii)  $\lim_{x \to a} \frac{\sin \theta}{\sin \theta} = 1$ 

(ii) 
$$\lim_{\theta \to 0} \frac{\sin \theta}{\theta} =$$

(iii)  $\lim_{\theta \to 0} \frac{\tan \theta}{\theta} = 1$  ( $\theta$ s - in radians) (results only). Simple Problems.

#### **Chapter - 4.3 DIFFERENTIATION**

Definition – Differentiation of  $x^n$ , sin x, cos x , tan x , cos ec x, sec x , cot x , log x, e<sup>x</sup> , u ± v , u v, uvw, u/v(v  $\neq 0$ ) (results only). Simple problems using the above results.

#### UNIT V DIFFERENTIAL CALCULUS – II

#### **Chapter – 5.1 DIFFERENTIATION METHODS**

Differentiation of function functions (chain rule), Inverse Trigonometric functions and Implicit functions. Simple Problems.

#### **Chapter - 5.2 SUCCESSIVE DIFFERENTIATION**

Successive differentiation up to second order (parametric form not included).Definition of differential equation, order and degree, formation of differential equation. Simple Problems.

#### **Chapter - 5.3 PARTIAL DIFFERENTIATION**

Definition - Partial differentiation of two variables up to second order only. Simple Problems.

# **Text Book:**

1. Mathematics for Higher Secondary – I year and II year (Tamil Nadu Text Book Corporation) <u>Reference Book:</u>

Sl.No	Title	Author	Publication
1.	Engineering Mathematics	Dr.M.K.Venkatraman	National Publishing Co,
			Chennai
2.	Engineering Mathematics	Dr.P.Kandasamy & Others,	S. Chand Publishers
3.	Problems in Mathematics	V.Govorov, N.Miroshin,	G.K. Publications -2010
		P.Dybov.	

# **ONLINE SOURCE:**

- 1. www.engineersinstitute.com/gate-exam-reference-books-Engineering-mathematics.html.
- 2. https://testbook.com/blog/books-for-engineering-mathematics-gate/.

# E1102- ENGINEERING MATHEMATICS- I

# Question paper pattern

Time: 3 Hrs. Max.Marks: 75

PART A - 5 Questions to be answered out of 8 for 2 marks each.

**<u>PART B</u>** - 5 Questions to be answered out of 8 for 3 marks each.

PART C - All the 5 Questions to be answered

Each question in PART C will contain 3 Sub questions, out of these 3 Sub questions 2 Sub questions is to be answered for 5 marks each.

PART A	5 x 2 marks	<b>10</b> Marks
PART B	5 x 3 marks	15 Marks
Short answer type questions		
PART C	<b>5 x 2</b> x 5 marks	50 Marks
Descriptive answer type questions		
Each question in PART C will contain 3 Sub questions,		
out of these 3 Sub questions 2 Sub questions is to be		
answered for 5 marks each.		
Total		75 Marks

Clarks table will not be permitted for the Board Examinations.

# E1103-ENGINEERING PHYSICS - I

# **RATIONALE:**

The exponential growth of Engineering and Technology has benefited the mankind with extreme sophistication and comfort. To sustain this development, continuous research and development should take place not only in Engineering and Technology but also in Basic Science such as Physics. The various divisions of Physics like Statics, Dynamics, Elasticity, Rotational Motion, Sound, Magnetism etc. provide the Foundation by enlightening the Fundamental facts, Principles, Laws and Correct sequence of events to develop the Engineering and Technology field for the prosperity of human beings. **OBJECTIVES:** 

- At the end of the study of I Semester the student will be able to Understand the importance of SI units and dimensional formulae
- . Acquire broad ideas about resultant, moment of a force and torque of a couple.
- Understand the elastic property and the types of Modulus of elasticity.
- Explain the surface tension of liquids and viscosity of fluids.
- Understand Newton's laws of motion and equations of different types of motion.
- Acquire knowledge about projectile motion, circular motion and its application.
- Understand the concepts of simple harmonic motion
- Gain knowledge about rotational kinetic energy and angular momentum.
- Acquire broader ideas about variation of acceleration with respect to height and its importance in launching satellites.
- Understand the propagation of sound and acoustics of buildings.
- Explain the importance of hysteresis of magnetic materials and its uses.
- Solve simple problems involving expressions derived in all the above topics.

#### SCHEME OF INSTRUCTION AND EXAMINATION

No of weeks per semester: 15 weeks

Subject	Instructions		Examination	n Marks		Duration
ENGINEERING	Hours Weak	Hours/Somestor	Internal	External	Total	
PHYSICS I	Hours/week	Hours/Semester	Assessment	Assessment	Total	3Hrs
	5Hrs	75Hrs	25	75	100	

# **Topics and Allocation of Hours:**

Sl.No.	Торіс	Time (Hrs)
1	S I UNITS AND STATICS	13 Hours
2	PROPERTIES OF MATTER	13 Hours
3	DYNAMICS-I	13 Hours
4	DYNAMICS-II	13 Hours
5	SOUND AND MAGNETISM	13 Hours
	REVISION + TEST + MODEL EXAM	10 Hours
	Total	75 Hrs

# UNIT - I: S I UNITS AND STATICS 1.1 UNITS AND MEASUREMENTS:

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. **1.2 STATICS:** 

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

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

# **UNIT – II : PROPERTIES OF MATTER**

# **2.1 ELASTICITY:**

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 and Poisson's ratio– 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. Simple problems based on stress, strain and Young's modulus.

#### 2.2 VISCOSITY:

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

#### 2.3 SURFACE TENSION:

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.

#### UNIT – III : DYNAMICS – I

#### **3.1.STRAIGHTLINE MOTION:**

Introduction-Newton's Laws of motion-Fundamental Equations of motion for objects-horizontal motionfalling freely-thrown vertically upwards.

#### **3.2 PROJECTILE MOTION:**

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-Derivation of the equation to show that the trajectory of the projectile is a parabola. Simple problems based on expressions for maximum height, time of flight and horizontal range.

#### **3.3 CIRCULAR MOTION:**

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.= v2/ (r g) }Simple problems based on the expressions for centripetal force and angle of banking. Simple harmonic motion, amplitude, frequency and period-Definitions.

# UNIT – 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.

# **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

# **4.3 SATELLITES:**

Satellites-Natural and artificial-Escape velocity and orbital velocity-Definitions- Expression for escape velocity-Expression for orbital velocity –Uses of artificial satellites. Simple problems based on the expressions for escape velocity and orbital velocity

#### **UNIT - V : SOUND AND MAGNETISM**

#### 5.1 SOUND:

Wave motion–Introduction and definition–Audiable range-Infrasonic- Ultrasonics -Progressive waves, longitudinal and transverse waves–Examples-Amplitude, wave length, period and frequency of a wave– Definitions-Relation between wave length, frequency and velocity of a wave-Stationary or standing waves. length, frequency and velocity of a wave-Stationary or standing waves. Vibrations-Free & forced vibrations and resonance–definitions and examples– Laws of transverse vibrations of a stretched string– Sonometer–Experimental determination of frequency of a tuning fork. Acoustics of buildings–Echo-Reverberation, reverberation time, Sabine's formula for reverberation time (no derivation) –Coefficient of absorption of sound energy–Noise pollution. Simple problems based on expression for frequency of vibration.

#### **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 problem based on intensity of magnetization.

#### **Text Book:**

- 1. Published by DOTE-Govt of Tamil Nadu
- 2. Physics-Higher secondary-First year-Volume I & II TamilNaduTextbook Corporation

#### **Reference Book :**

Sl.No	Title	Author	Publication
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.

# **ONLINE SOURCE:**

- 1. www.ustudy.in
- 2. https://en.wikipedia.org/wiki/Engineering\_physics
- 3. engineeringscience.berkeley.edu/engineering-physics/

# E1103-ENGINEERING PHYSICS - I

#### **Question paper pattern**

#### Time : 3 Hrs

Max.Marks:75

**PART** A - 5 Questions to be answered out of 8 for 2 marks each.

**PART B** – Questions to be answered out of 8 for e marks each.

**PART** C – All the 5 Questions to be answered.

Each questions in part c will contain 3 Sub questions, out of these 3 Sub questions 2 Sub questions is to be answered for 5 marks each.

PART A	5 x 2 marks	10 marks
PART B Short answer type questions	5 x 3 marks	15 marks
Part C Descriptive answer type questions. Each questions in Part C will contain 3 sub questions, out of these 3 sub questions 2 sub questions is to be answered for 5 marks each	5 x 2 x5 marks	50 marks
Total	75 Mai	rks

Out of these 3 Sub questions in PART C, one sub questions must be on problem based to test the analytical ability/logical ability/ diagnostic ability/conceptual ability relevant to that subject content. Equal weightage is to be given to whole syllabus. Clarks table will not be permitted for the Autonomous Board Examination.

# E1104-ENGINEERING CHEMISTRY -I

# RATIONALE

Chemistry is a basic science subject which is essential to all engineering courses. It gives knowledge of engineering material; their properties, related application & selection of material for engineering application. Due to technological progress there are hazardous effects on environment & human life. The core knowledge of environmental effects will bring awareness in students about the precaution & prevention to be taken to reduce the ill effects. This subject will generate curiosity of carrying out further development in engineering fields.

# **OBJECTIVES**

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

- ✤ Understand the basic knowledge of chemistry in formation of ionic and covalent bonding.
- Calculate the molecular mass and equivalent mass of metals. Represent the formation of molecules schematically
- Realize the importance of p H factor in all industries and get ideas about it application in its.
- ◆ Understand the need of Rain water harvesting and softening of hard water for industries.
- ✤ Describe the mechanisms of electrolysis and electro-less plating and advantages.
- ♦ Understand the composition, manufacturing and application of glass.
- ✤ Understand the application of Nano particles in medicine, electronic, and biomaterial.
- Distinguish various types of batteries and their application.
- ✤ Explain corrosions and its control.

#### SCHEME OF INSTRUCTION AND EXAMINATIONS: No of weeks per semester: 15 weeks

Subject	Instructions		Examination Marks			Duration
ENGINEERING	Hours/Weak	Hours/Somostor	Internal	External	Total	
CHEMISTRY -	Hours/Week	Hours/Semester	Assessment	Assessment	Total	3Hrs
Ι	5Hrs	75Hrs	25	75	100	

# TOPICS AND ALLOCATION OF MARKS

S.No.	Торіс	Time (Hrs)
1	ATOMIC STRUCTURE, MOLECULAR MASS, ACIDS	13
	AND BASES	
2	SOLUTIONS, COLLOIDS, NANO-PARTICLES	13
3	TECHNOLOGY OF WATER, CATALYSIS, GLASS	13
4	ELECTROCHEMISTRY, ELECTROCHEMICAL CELL,	13
	ENERGY SOURCES	
5	CORROSION, METHODS OF PREVENTION OF	13
	CORROSION,	
	ORGANIC COATINGS	
	REVISION+CYCLE TEST+MODEL EXAM	10
	TOTAL	75

# E1104-ENGINEERING CHEMISTRY – I

# UNIT I ATOMIC STRUCTURE, MOLECULAR MASS, ACIDS AND BASES

#### **1.1 Atomic Structure**

Atom – Definition – Fundamental particles of Atom – their Mass, Charge and Location – Atomic number and Mass number – Definition – Isotopes and Isobars – Definition with suitable examples – Formation of cation and anion by electronic concept of oxidation and reduction – Octet rule –Formation of electrovalent compound (NaCl) – Formation of covalent compound (NH3).

#### **1.2 Molecular Mass**

Molecule – Molecular Formula – Molecular Mass – Mole – Definition – Simple calculations – Avogadro's Hypothesis – Relationship between Molecular Mass and Vapour Density – Avogadro Number – Definition.

#### **1.3 EQUIVALENT MASS**

Definition -determination of equivalent mass - oxide method (direct method only) - chloride method ( alkali metal only) -probles based on the above two method only -oxidation and reduction - electronic concept of oxidation and reduction -oxidizing and reducing agents.

#### **1.4 Acids and Bases**

Theories of Acids and Bases – Arrhenius Theory – Lowry – Bronsted Theory – Lewis Theory – Advantages of Lewis Theory – pH and pOH – Definition – Numerical problems – Indicator – Definition and Examples only – Buffer solution – Definition – Types of buffer solution with examples – Application of pH in Industries.

# UNIT II SOLUTIONS, COLLOIDS, NANO-PARTICLES

#### **2.1 SOLUTIONS**

Definition – Methods of expressing concentration of a solution – Molarity, Molality, Normality, Mole fraction and Percentage Mass – Simple problems

#### **2.2 DILLUTE SOLUTION**

# 2.3 COLLOIDS

True solution and Colloidal solution – Definition- 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, Tanning of leather and Sewage disposal.

# 2.4 NANO-PARTICLES

Definition – Importance of Nano-particles – Area of application – Medicine, Electronics and Biomaterials.

# UNIT III TECHNOLOGY OF WATER, CATALYSIS, GLASS

# **3.1 TECHNOLOGY OF WATER**

Sources of water – Reasons for depletion of underground water – Rain water harvesting (Basic ideas) – Advantages – Hard water and soft water – Hardness of water – Carbonate and Non-carbonate hardness – Methods of expressing hardness – mg/lit and ppm – Simple problems Estimation of total hardness of water by EDTA method – Problems involving Total, Carbonate and Non-carbonate hardness in ppm – Softening of hard water – Ion-Exchange method and Reverse Osmosis method – Municipal water supply – Purification (Sedimentation, Filtration and Sterilization) – Disadvantages of using hard water in boilers – Scale formation, Corrosion of boiler metal, Caustic Embrittlement and Priming and Foaming.

# **3.2 CATALYSIS**

Catalyst – Positive catalyst – Negative catalyst – Definition – Types of catalysis – Homogeneous and Heterogeneous – Promoter – Catalyst poison – Definition – Characteristics of a catalyst – Industrial applications of catalysts.

# 3.3 GLASS

Definition - Manufacture of Glass - Varieties of Glass - Optical Glass, Windshield Glass and Photo chromatic Glass.

# UNIT IV ELECTROCHEMISTRY, ELECTROCHEMICAL CELL, ENERGY SOURCES

# 4.1 ELECTROCHEMISTRY

Electrolyte – Definition – Mechanism – Industrial application of Electrolysis – Electroplating – Preparation of surface – Process – Factors affecting the stability of the coating – Chrome plating – Electroless plating – Definition – Advantages of Electroless plating over electroplating –Applications of Electroless plating.

# 4.2 ELECTROCHEMICAL CELL

Electrochemical Cell – Definition – Representation of a Cell – Single Electrode Potential – Definition – Galvanic Cell – Formation of Daniel Cell– Electrochemical Series – Definition and Significance – Electrolytic Concentration Cell – Definition and Formation.

# 4.3 ENERGY SOURCES

Primary Battery – Definition and example – Construction, Working and Uses of Dry cell – Secondary Battery – Definition and example – Construction, Working and Uses of Lead-acid Storage Cell – Nonconventional Energy Sources – Solar Cell – Definition – Principle, Construction, Working and Uses. Definition – Strong and Weak electrolytes – Examples – Electrolysis

# UNIT-V CORROSION, METHODS OF PREVENTION OF CORROSION, ORGANIC COATINGS

# 5.1 CORROSION

Definition – Types of Corrosion – Theories of corrosion – Galvanic Cell Formation Theory – Differential Aeration theory – Factors influencing the rate of corrosion.

# **5.2 METHODS OF PREVENTION OF CORROSION**

Control of Environment – Alloying – Surface coatings – Metal coatings – Electroplating, Galvanization and Tinning – Inorganic coating – Anodizing – Cathodic Protection – Sacrificial Anode Method and Impressed Voltage Method.

# **5.3 ORGANIC COATINGS**

Paint – Definition – Components of Paints and their functions – Varnish – Definition – Preparation of Oil Varnish – Differences between Paint and Varnish – Special Paints – Luminescent Paints, Fire Retardant Paints, Aluminium Paints and Distemper.

# **Text Book:**

- 1. Engineering Chemistry I Tamil Nadu Text Book Corporation
- 2. Engineering Chemistry Jain & Jain Dhanpat Rai & Sons.
- 3. A Text Book of Engineering Chemistry S.S. Dara S. Chand Publication.

#### **Reference Book :**

Sl.No	Title	Author	Publication
1.	A Text Book of	S.S. Dara	S. Chand
	Environmental Chemistry		
	and Pollution Control		
2.	Engineering Chemistry	Uppal	Khanna Publishers
3.	Chemistry – Higher	Tamil Nadu Text Book	
	Secondary – Second Year – Volume I & II	Corporation – 2014.	

# **ONLINE SOURCE** :

- 1. www.goodreads.com/book/show/15919612-a-text-book-of-engineering-chemistry
- 2. www.sanfoundry.com/best-reference-books-engineering-chemistry/

# E1104-ENGINEERING CHEMISTRY – I

#### **Question paper pattern**

# Time : 3 Hrs

#### Max.Marks:75

**PART** A - 5 Questions to be answered out of 8 for 2 marks each.

**PART B** – Questions to be answered out of 8 for S3 marks each.

**PART** C – All the 5 Questions to be answered.

Each questions in part c will contain 3 Sub questions, out of these 3 Sub questions 2 Sub questions is to be answered for 5 marks each.

Total	75 Marks		
Part C Descriptive answer type questions. Each questions in Part C will contain 3 sub questions, out of these 3 sub questions 2 sub questions is to be answered for 5 marks each	5 x 2 x5 marks	50 marks	
PART B Short answer type questions	5 x 3 marks	15 marks	
PART A	5 x 2 marks	10 marks	

Out of these 3 Sub questions in PART C, one sub questions must be on problem based to test the analytical ability/logical ability/ diagnostic ability/conceptual ability relevant to that subject content. Equal weightage is to be given to whole syllabus. Clarks table will not be permitted for the Autonomous Board Examination.

# E1105 - ENGINEERING PHYSICS PRACTICAL- I

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

# TEACHING AND SCHEME OF EXAMINATION:

# No. of Weeks per Semester: 15

	Instructions			Examination		
				Marks		
			Internal			
			Assessment/	Board		
Subject	Hours/Week	Hours/Semester	Record	Examination	Total	Duration
ENGINEERING PHYSICS PRACTICAL-I	2	30	25	75	100	3 Hours
### E1105 - ENGINEERING PHYSICS PRACTICAL- I

### LIST OF EXPERIMENTS WITH OBJECTIVES:

### 1. MICROMETER (SCREW GAUGE).

To measure the thickness of the given irregular glass plate using micrometre. 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. CONCURRENT FORCES.**

To verify the parallelogram law of forces and Lami's theorem.

### 4. COMPARISON OF VISCOSITIES

To compare the co-efficient of viscosities of two low viscous Liquids by capillary flow method.

### 5. STOKES' METHOD.

To determine the coefficient of viscosity of a high viscous liquid.

### 6. SURFACE TENSION.

To determine the surface tension of water by capillary rise method.

### 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 .

### ALLOCATION OF MARKS

FORMULA, EXPLANATION& DIAGRAM	15 marks
TABULATION WITH PROPER UNITS	10 marks
OBSERVATION (INCLUDING TAKING READINGS)	35 marks
CALCULATION	10 marks
RESULT	05 marks
Total	75 marks

### E1105 - ENGINEERING PHYSICS PRACTICAL- I

### LIST OF EQUIPMENT

### 1. MICROMETER (SCREW GAUGE).

Screw gauge, graph sheet and irregular glass plate.

### 2. VERNIER CALIPERS.

Vernier Calipers and Solid Cylinder

### **3. CONCURRENT FORCES.**

Vertical drawing board, two Z pulleys, three sets of slotted weights (5 x 50g) and twine thread.

### 4. COMPARISON OF VISCOSITIES

Burette stand, graduated burette without stopper, rubber tube, Capillary Tube, beaker, digital stop watch, twoliquids and funnel.

### 5. STOKES' METHOD.

Stokes' Apparatus, high viscous liquid (Castrol oil), glass beads of Different radii, digital stop watch and screw gauge.

### 6. SURFACE TENSION.

Beaker with water, capillary tube, iron stand with clamp, pointer, Travelling microscope and hydro static bench.

### 7. SONOMETER.

Sonometer, screw gauge, tuning fork, rubber hammer, slotted weight hanger set  $(5 \times 0.5 \text{kg})$  and paper rider. scale and two bar magnets.

### 8. DEFLECTION MAGNETOMETER

Deflection Magnetometer, meter scale and two bar magnets

### E1106-ENGINEERING CHEMISTRY PRACTICAL- I

### **OBJECTIVE:**

- > Titration and Calculation of masses.
- ▶ Knowing Units for concentration of Solution.
- > Understand about volumetric analysis in Acidimetric, Alkalimetry, and Permanganimetry.
- ➤ Know about estimation of Hardness presents in the Water.
- > Know about measurement of pH in various solutions.
- ➢ Measures the quantities accurately.
- $\succ$  Handling the apparatus carefully.

### TEACHING AND SCHEME EXAMINATIONS

Subject	Instructi Periods	on / Weeks	Total Periods Per Term	Scheme Of Examinations		5	Duration (hrs)
ENGNEERING	Theory	Practical		Internal	Board	Total	
CHEMISTRY				Assessment	Examination	Marks	
PRACTICAL-I		2	30	25	75	100	3 Hours

ALLOCATION OF MARKS: VOLU

### VOLUMETRIC ANALYSIS

SHORT PROCEDURE	05 marks
VIVA-VOCE	05 marks
TITRATION-I	25 marks
TITRATION-II	25 marks
CALCULATIONS	15 marks
Total	75 Marks

### **DETERMINATION OF** pH:

ANSWER FOR SHORT QUESTIONS ON pH	05 marks
VIVA-VOCE	05 marks
DETERMINATION OF PH (5-SAMPLES) (5x8)	40 marks
CALCULATION OF (H+) (5x5)	25 marks
Total	75 Marks

### Acidimetry and Alkalimetry

- 1. Estimation of weak base (sodium carbonate) using a standard solution of sodium hydroxide and sulphuric acid as link solution. [Test solution should be made up to 100 ml]
- 2. Estimation of strong base (sodium hydroxide) using a standard solution of sodium carbonate and sulphuric acid as link solution. [Test solution should be made up to 100 ml]
- 3. Comparison of strengths of two acid solutions using a standard solution of sodium hydroxide
- 4. Comparison of strengths of two alkaline solutions using a standard solution of oxalic acid

### Permanganometry

- 5. Estimation of Mohr's salt using a standard solution of ferrous sulphate and potassium permanganate as link solution. [Test solution should be made up to 100 ml]
- 6. Estimation of Iron in ferrous sulphate solution using a standard solution of ferrous ammonium sulphate and potassium permanganate as link solution. [Test solution should be made up to 100 ml]
- 7. Comparison of strengths of two potassium permanganate solutions using a standard solution of ferrous sulphate

### Water Analysis

- 8. Estimation of total hardness of a water sample using EDTA.
- 9. Determination of pH using a pH meter and calculation of hydrogen ion Concentrations in the solutions (For five given samples). (This question may begiven to any two students per batch)

### E1107-ENGINEERING GRAPHICS-I

### **OBJECTIVES**

At the end of the practice, the students will be able

- To state the importance of drawing
- To identify the drawing instruments
- To practice lettering as per BIS
- To acquire knowledge about geometric construction
- To construct conic curves
- To draw the projection of points, straight lines and planes
- To compare conventional and computer-aided drafting
- To practice basic AutoCAD 2D commands
- To draw orthographic views from isometric drawings
- To draw orthographic views in Auto CAD

### TEACHING AND SCHEME OF EXAMINATION

### No. of Weeks per Term: 15 Weeks

SUBJECT	INSTRUCTIONS		EXAMINATION				
			MARKS				
Engineering Graphics – I	Hours / Week	Hours / Term	Internal Assessment	Term End Examination	Total	Duration	
	6 Hrs.	90 Hrs.	25	75	100	3 Hrs.	

### TOPICS AND ALLOCATION OF HOURS

Sl.No.	Topics	Hours
1.	Drawing office practice, lettering and dimension	12
2.	Geometric Constructions and Construction of Conics	18
3.	Projections of points and Strait Lines	16
4.	Introductions to CAD Software	20
5.	Orthographic Projections - Conventions and using CAD Software	21
	Model Practical Examinations	03
	TOTAL	90

### Unit-I

### 1.1. Drawing office practice and lettering

1.1.1. Importance of engineering drawing- drawing instruments: drawing board, mini drafter, compass, divider, protractor, drawing sheets, drawing, drawing pencils, set squares etc. title block – folding of drawing sheets. Importance of legible lettering and numbering – single stroke letters – upper case and lower case letters – general procedures for lettering and numbering – height of letters – guidelines – practices. Scales – full scale, reduced scale and enlarged scale.

### 1.1.2. Dimensioning

Dimensioning – terms and notations as per BIS – requirement of dimensioning – Dimension line, Extension lines and leader lines – Dimensioning systems – Methods of dimensioning – important dimensioning rules – Exercises (One view of the object).

### UNIT-II

### 2.1 Geometric Constructions

Geometric constructions: Bisect a line – bisect given arc – bisect given angle – divide straight line into number of equal parts – divide the circle in to number of equal divisions – draw an arc touching two arcs.

### 2.2 Constructions of conics

Conics: Cone – conic sections – Definition of locus, focus, directrix, axis, vertex and eccentricity. Definition: ellipse, parabola and hyperbola.

Ellipse: Construction of ellipse by concentric circle method, rectangular method and Eccentricity method when focus and directrix are given – Exercises in practical applications.

Parabola: Construction of parabola by rectangular method, parallelogram method and eccentricity method when focus and directrix are given – Exercises in practical applications.

Hyperbola: Construction of hyperbola by rectangular method and eccentricity method when focus and directrix are given – exercises in practical applications.

### UNIT-III

### 3.1 Projection of Points.

Projection of Points - points on the different quadrants and on the reference planes.

### **3.2 Projection of straight lines**

Projection of straight lines – Line on the first quadrants and on the reference planes – perpendicular to one plane and parallel to other plane – inclined to one plane and parallel to the other plane – parallel to both the planes – inclined to both the planes – Exercises.

### UNIT-IV

### 4.1 Introduction to CAD Software

**4**.1.1 Introduction to computer – CAD hardware – printer – plotter – digitizer – CAD software – comparison between conventional and computer aided drafting.

4.1.2 Introduction to AutoCAD – Windows Desktop – starting Auto CAD – Screen elements – Save and exit drawings – Setting up of units and limits – Co-ordinate systems – absolute, relative and polar co-ordinates.

4.1.3 Draw commands – point, line, mline, circle, arc, polygon, ellipse, rectangle, hatch, donut, bhactch, pline, spline, fill commands.

4.1.4 Modify commands – erase, copy, move, mirror, offset, array, rotate, scale, stretch, trim, extend, lengthen, beak, chamfer, fillet, explode, divide, and measure commands.

4.15 Other commands – osnap, tracking, snap, dim, ddim, zoom, pan, plot, layer, Itype, Dtext, mtext, area, dist, list, color, vpoint, block, insert commands.

### UNIT-V

### 5.1 Orthographic projection - Conventional and using CAD software

Introduction – Orthographic projection – terms – First angle projection – Third angle projection – Draw symbols – Compare first and third angle projections. Draw the projection of the simple isometric object using first angle projection only – Draw front view, top view and right/left side view. (Any two views only)

### **Text Books**

- 1. Gill P.S., "Engineering drawing", S.K.Kataria & Sons, New Delhi.
- 2. Bhat N.D., "Engineering drawing", Charotar Publishing House.

### **Reference Books**

- 1. Gopalakrishnan.K.R, "Engineering Drawing", (Vol.I and Vol.II), Dhanalakshmi publishers, Edition 2, 970
- 2. Venugopal.K, Sreekanjana G, "Engineering Graphics" New Age International Publishers.
- 3. K V Nataraajan "A Text Book of Engineering Drawing", 19th edition, 2005, KVN publications.
- 4. Thomas E.French, Charles J.Vierck, Robert J.Foster, 'Engineering drawing and graphic
- 5. technology", McGraw Hill International Editions.
- 6. Parkinson & Sinha, "First Year Engineering Drawing", Pitman Publishers.
- 7. Shah/Rana, "Engineering Drawing", Pearson Longman.
- 8. AutoCAD Manual, Autodesk Inc.

### **QUESTION PAPER PATTERN**

Time : 3 Hrs

Max. Mars: 75

3x5=15 Marks

### Answer Part-A and Part-B in the drawing sheet only.

### Part-A

### Answer ALL questions. Each question carries five marks.

Note: Three questions will be asked from Unit-1, Unit-2 and Unit-3.

(From Lettering, Geometric constructions and Projection of points only.)

### Part-B

## Answer ANY TWO questions. Each question carries fifteen marks.2x15=30Marks

- 1. One question from conic curves.
- 2. One question from projection of lines.
- 3. One question from orthographic projection.

Draw any two views in the first angle projection. .

(Front view-10 Marks, Side view-05 Marks or Top view-05 Marks)

### Part-C

### (Using CAD Software)

### Answer ALL questions.

1. One question from	dimensioning.	10 Marks
2. One question from	orthographic projection.	20 Marks

Draw any two views in the first angle projection

(Front view-10 Marks, Side view-10 Marks and or Top view-10 Marks)

### E1108 -BASIC WORKSHOP PRACTICE - I

### **Rationale :**

Workshop SKILL is also a kind of ESSENTAL PRACTICAL KNOWEDGE required for the Engineering students in general and Diploma Students in particular. A Diploma holder must know how to behave and work on shop floor. This helps to develop psychomotor skill and attitude. The knowledge & skill to use machines, equipment, tools and measuring instruments is required to be developed. Safe handling of machines and tools is also very important. So, it is essential for students of 1st year to undergo basic fundamental workshop practical training irrespective of their field. The topics include practical works in Fitting, carpentry, Sheet Metal and Basic Wiring. It is required to fulfil these objectives.

In order to have a balanced overall development of diploma engineers, it is necessary to integrate theory with practice. General workshop practices are included in the curriculum in order to provide hands on experience about use of different tools and basic manufacturing practices.

Manual abilities to handle engineering materials with hand tools need to be developed in the students. This course aims at developing generic manual, forming and machining skills of the students. They will be using different types of tools/equipment in different shops for fabrication purposes. Besides above, the development of dignity of labour, precision, safety at work places, team working and development of right attitude, are other objectives.

### **Objectives**

At the end of the practice, the students will be able,

- > To acquire skills in basic workshop practices
- > To identify the hand tools and measuring instruments
- > To acquire measuring skills
- > To acquire practical skills in the respective trades

# To have idea about the Industrial environment for all branch students. Note:

The students should be given training in both sections. All the exercises should be completed in allotted time. Exercise Lesson plan should be prepared and get prior approval from the Principal. The students

should maintain record notebook for the concerned trades and submit during the Autonomous Practical Examinations.

Wearing shoes in the workshop(s) is compulsory. Importance of safety and cleanliness, safety measures and upkeep of tools, equipment and environment in each of the following shops should be explained and practiced. The students should prepare sketches of various tools/jobs in their workshop Notebook.

The Section Staff shall give demonstration to the students by preparing a specimen job as per the job drawing. The workshop observation note shall be maintained by each student duly signed by instructor of respective shop.

Student shall calculate the cost of material and labor cost for their job from the drawing.

### SCHEME OF INSTRUCTION AND EXAMINATION No. of Weeks per Semester: 15

Course & Code	Instruction		Credit	Examination				
PASIC	Hours / Week	Hours / Semester		Marks			Duration	
WORKSHOP	4	15 x 4 =	2	Internal	Examination	Total	Duration	
TRACILLE	60	60		25	75	100	3 Hrs.	

### SCHEME OF EXAMINATION.

Each student will be examined either (A). Fitting and (B). Electrical Wiring OR (C). Plumbing

NOTE:- Students will be examined either (A) and (B) or (C) by lot

The students should be given training in all the sections. All the exercises should be completed. The students should maintain record notebook for the concerned trades and submit during the Board Practical Examinations.

All the exercises should be given in the question paper and students are allowed to select by a lot. Students should have liberty to do the examination for 3 Hrs. No fixed time for each trade. The number of instrument /equipment facility should be available for each batch strength during examination.

### **ALLOCATION OF MARKS.**

Max. Marks:- 100.

### Fitting - 35 marks

Marking & Cutting	- 10
Filing	- 10
Dimensions	- 10
Joint / Finish	- 05
	(AND)
Plumbing - 3	5 marks
Preparation of materia	- 10
Connection	- 10
Testing	- 10
Result	- 05
	( <b>OR</b> )
Wiring - 35 n	narks
Circuit d	iagram - 10
Connectio	on -10
Checking	-10
Result	- 05
Viva-voce	- 05 m

- 05 marks

- 75 marks TOTAL

### **MAJOR DIVISIONS.**

- Fitting Metal Joining, Wooden Joining, Sheet Metal Joining I.
- Electrical Wiring II.
- III. Plumbing

### E1108 -BASIC WORKSHOP PRACTICE - I

### I. FITTING PRACTICE.

### (a). METAL FITTING (Metal Joints).

- Need of Fitting section
- > Industrial application of Fitting practice
- > Introduction about Fits, Tolerance, Allowance
- Introduction to fitting shop
- Study about layout of fitting shop
- General Safety precaution in Workshop
- Study about First Aid
- Common materials used in fitting shop
- > Identify, select and use various measuring, marking, holding, striking and cutting tools & equipments
- > Description and demonstration of various types of work benches, holding devices and files
- > Precautions to be taken while filing, punching & chipping operations
- Care & maintenance of tools and Safety precautions
- Marking and Punching Practices
- ➤ Hacksaw cutting practice
- > Chipping practice, Demonstration on chipping and its applications.
- Marking practice for cutting plan
- > Drilling & Tapping practice
- Study of measuring Instruments and handling of measuring instruments, checking of zero error, finding of least count (all gauges including dial gauge).
- Study about errors in the measuring Instruments
- Induction visit to all other sections in workshop
- Read and interpret job drawings
- > Identification of different types of materials such as Steel, Brass, Copper, Aluminium etc.,
- Identification of various sections of steel structures such as Flat, Angle, Tee, Channel, Bar Girder, Square, Z-Section, etc.

### EXERCISES

Introduction about various types of engineering materials, Common materials used in fitting shop.

Identification of metals. Description of identification tests such as appearance, sound, spark, weight, magnetic, bend and filing.

### a) JOINT PRACTICE

Single piece cutting and filing, L-Joint, V - Joint, and Taper Joint of an accuracy of  $\pm 0.5$ mm

### b) DRILLING & TAPPING

Drilling Ø 5, Ø 10, Counter shrinking & Tapping M10

### c) **DEMO EXERCISES**

Table Weight, Dovetail Joints, Prepare utility articles like screw drivers, Hinges, Hexagonal nut.

Drilling and Tapping operations should be exercised in the Fitting section itself and not in Machine Shop section.

### (b). WOODEN FITTING (Wooden Joints).

Need of Wood Working section (Carpentry).

- ✤ Industrial application of Carpentry practice
- Introduction to Carpentry shop, procedure and safety precautions
- Study about layout of Carpentry shop
- Introduction to various types of wood by demonstration and their identification
- Demonstration of different wood working tools, equipments and accessories
- ✤ Different types carpenter joints and their applications
- ✤ Care, maintenance of tools and Safety precautions
- \* Identify, select and use various measuring, marking, holding, striking and cutting tools & equipments.
- Identification of joint in a particular job articles of furniture items

### EXERCISES

### a) JOINT PRACTICE

HALF LAP joint, MOTISE & TENON joint, DOVETAIL joint.

### b) DEMO EXERCISES

T-Lap joints, Cross Half Lap joints. Hammer handle, Coat hanger. Legs of Table: Straight, Tapered and Ornamental etc., Preparation of surface for polishing, Polishing.

### (b) SHEET METAL FITTING (Sheet Metal Joints).

- Need of Sheet metal section
- ✤ Industrial application of Sheet metal practice

- ✤ Introduction to sheet metal shop, procedure and safety precautions
- ✤ Study about layout of Sheet metal shop
- Various types of tools, equipment's and accessories
- Application of Development in sheet metal trade
- Different types of operations in sheet metal shop
- Soldering and riveting
- ✤ Care, maintenance of tools and Safety precautions
- ✤ Identify, select and use various measuring, marking, holding, striking and cutting tools & equipment's.
- Preparation of development and marking practice for cutting plan.
- Use the knowledge of sheet metal joint preparation and Brazing for preparing panels, switch Boxes etc.,
   Student shall calculate the cost of material and labor cost required for their job from the drawing.

### EXERCISES

### a) JOB PRACTICE

Cylinder with flange, truncated cone, Scoop of an accuracy of  $\pm 1$  mm.

### b) **DEMO EXERCISES**

Funnel, Letter box, Dust bin, Cover for Centrifugal pump motor, Electricity Meter panel box

**NOTE:** Each student will be trained either (a). Fitting and Electrical wiring OR (b). Plumbing and Sheet metal during a term Students will be examined in any one trade by lot.

### **II. PLUMBING**

- Plumbing is the skilled trade of working with pipes, tubing and plumbing fixtures for drinking water systems and the drainage of waste.
- The plumbing industry is a basic and substantial part of every developed economy due to the need for clean water, and proper collection and transport of wastes.
- Plumbing also refers to a system of pipes and fixtures installed in a building for the distribution of potable water and the removal of waterborne wastes.
- Plumbing is usually distinguished from water and sewage systems, in that a plumbing system serves one building, while water and sewage systems serve a group of buildings or a city.
- > To install pipes and fixtures.
- > To repair or replace all kinds of leaks.
- > Use personal protective equipments.

Student shall calculate the cost of material and labor cost required for their job from the drawing.

### Exercises

- 1. BASIC OPERATIONS (Filling, Marking, Cutting etc.,),
- 2. Install a sink / washbasin with tap,
- 3. Pipe Cutting, bending,
- 4. External threading of GI pipes using Die and fix water meter,
- 5. Preparation of pipe connection using coupling and also with nipple coupling,
- 6. Preparation of pipe connection using Flange with packing material

### c) DEMO EXERCISES

Line diagram of

- 1. Piping of Centrifugal pump
- 2. Piping of Centrifugal pump
- 3. Piping of Sump and Over Head Tank

### **III. ELECTRICAL WIRING**

- Study about the safety in wiring
- > Study of Hand & Power Tools and Testing tools
- Study the purpose of earthing
- > Identify all Electrical Fittings and Accessories
- > Identify standard types of wires with colour codes
- > Identify symbols used in the circuit diagram
- Practice the simple wiring methods
- ➢ Soldering practice

### **EXERCISES**

- 1. Single lamp controlled by single switch
- 2. Two lamps controlled by two independent switches
- 3. Stair case wiring
- 4. Fluorescent lamp circuit
- 5. Circuit diagram of a fan
- 6. Circuit diagram of an iron box
- 7. Circuit diagram of a mixie
- 8. Soldering practice

# **TERM II**

### E2101 - COMMUNICATION ENGLISH - II

### RATIONALE

With the increasing variety of options and opportunities emerging for Diploma students, fulfilling their communication needs become highly important. Proficiency in communication can equip them to be confident and to cope with the employment and educational situation in any part of the world. Communication levels inspire higher aspiratory levels in the process of upward mobility in career and socio-cultural evolution of the young individuals. At the end of the course the student should be able to express himself in oral and written communication effectively.

### SPECIFIC INSTRUCTIONAL OBJECTIVES

All the four skills - listening, speaking, reading and writing - should be developed in the communication process for a polytechnic student who is at the intermediate level and transitional period from school to college.

Silent reading of the English text book acquaints him with the grammatical structures and the nuances of the language indirectly and also triggers reaction in the thinking process according to the student's specific learning background. Loud reading equips the student with confidence and practice for oral communication. Both these should be given due importance in the class room situation. Developing listening skills equip them with the necessary focus in understanding oral communication without difficulty to react and interact properly.

Proper exposure in developing these two skills facilitates speaking and writing which are very essential in day to day interaction in any official, social or personal context. Matching to the entry level quality of the polytechnic student and his technical background, this text book is aimed at fulfilling the needs of all the four communication skills with suitable texts, language exercises and activities.

Grammar items prescribed in the syllabus are embedded in the prescribed texts to make the teaching learning process contextualised and activity based to ensure proper textual orientation. Exercises and group activities are given in the text itself for the students to get practiced.

Apart from the prescribed Textbook, a little exposure to American English is attempted, considering the growing trends in American English.

#### Instructions Subject Examination Communication Hours / Week Hours / Marks Duration English – I Semester Total 5 Hrs. 75 Hrs. **Internal** Semester Examination Assessment 25 75 3 Hrs 100

### TRAINING AND SCHEME OF EXAMINATION:

### No. of Weeks per Semester: 15 Weeks

### DETAILED SYLLABUS

Content	Competencies	Transactional Strategies	Learning Outcomes	Contact Hrs
Unit 1	Grammar	Through Activities	Recognize &	7
Matter	Active/Passive	Presentation, practice,	distinguish	
	voice	use presentation of	active/Passive forms	
		rules Adequate	use active & Passive	
		contextual examples	forms	
		Practice		
	Direct to	Tasks	Convert from direct	3
	indire ct		to indirect, indirect to	
			direct	
	Reading &	Tasks based complex	Respond to, interpret	5
	Writing	texts	and analyze texts for	
			academic purposes	
			Complete cloze	
			Summarize texts in	
			own words	
	Vocabulary	Activity	Build and expand	
	Lexical sets		vocabulary use.	
Unit 2	Reading	Task based complex	Comprehend,	6
		passages for academic	interpret, analyze	
		purposes. Factual,	texts	
		Inferential		
		Vocabulary&		
		Experiential Questions		
	Grammar	Activities	Identify, recognize,	1
	words forms	presentation, practice,	use word forms	
	1ags	use presentation	appropriately convert	
	prefix/suffix	Adequate contextual	words into others	
		examples practice	tors Lies profivious	
			appropriately	
	Speaking	Activity: Pair work	Speak on given	2
	Speaking	information Gan	frames in pairs	2
Unit 3	Grammar	Activities	Sort positive	5
Disasters	Degrees of	Presentation practice	comparative	5
Disasters	comparison	uses presentation of	superlative forms	
	companison	structure & rules	Recognize	
		Adequate contextual	distinguish & use	
		examples Practice	degrees	
		enamples i fuetiee.	appropriately.	
	Verbal	Activities	Use verbal questions	5
	questions Wh	Presentation. practice	in contexts use wh	-
	questions	uses presentation of	questions in contexts	

		structure & rules Adequate contextual examples Practice		
	Reading	Task based: Factual, Inferential Vocabulary & Experiential questions	Comprehend, interpret & analyze texts for academic purposes	2
	Speaking	Opining Activities Gap: Pair/ group work	Speak on given situation to register one's opinion.	3
Unit 4	Writing	5-Step writing Process – Prewriting (brainstorming) – Clustering/Grouping -Rough draft - Revision/Editing -Final draft	Recognize structure of reports use Passive forms to write Develop hints by framing sentences & write paragraphs Recognize internalize the structure & compose emails	15
Units 5	Writing	Activities: tasks job application ordering goods. Lodging complaints (sample, guided, final draft Activites/ tasks Controlled, free)	Write own resumes.	
	Reading	Task based Factual inferential vocabulary & Experiential Questions	Respond, Interpret & analyze passages for academic purpose.	

### E2101-Syllabus-Communication English –II

Section-A

- 1. Lexical sets
- 2. Interjections (Annexure UNIT)
- 3. Conversion of verbs into nouns
- 4. Conversion of verbs into adjectives
- 5. Synonyms and Antonyms
- 6. Prefixes and Suffixes
- 7. Active and Passive Voice & Impersonal passive voice8.
- 8 Corrections of Errors
- 9. Infinitives and Gerunds

10. American spellings for British spellings (non-textual) (Annexure UNIT) (from the Bank)

Section-B

1. Verbal Questions

- 2. Tag Questions
- 3. Direct to Indirect to Direct
- 4. Tense forms
- 5. Degrees of Comparison
- 6. Writing road Directions
- 7. Idioms and Phrases

### Section-C

1. Advertisement Comprehension

- 2. Formal and Business Letters (Placing orders, complaint letters, asking for Testimonials)
- 3. Précis Writing (Annexure)

### Section-D

- 1. Process Report/Newspaper Report
- 2. E-mail writing
- 3. Conversion of Graphics into Text (Table/Pie chart/Flow chart)
- 4. Conversion of Text into Diagram

5. Hints Development

Note: 1. M-Scheme DOTE Syllabus text book is to be adopted

2.DOTE M-scheme Question Pattern is to be adopted

### **ONLINE SOURCES:**

1.www.englishteacher.eu

- 2.www.englishgrammar.org
- 3.www.englishgrammar101.org

### E2102 -ENGINEERING MATHEMATICS - II

### **Rationale:**

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

### **Objectives**:

The student will be able to acquire knowledge of algebra of vectors and its application in finding work done, moment, volumes , to acquire knowledge of Integration principles and different methods of Integration.

Subject	Instructions		Examination			
	Hours /	Hours /		Marks		
	Week	Semester				
Engineering Mathematics - II	5 Hrs.	75 Цто	Internal	Semester	Total	Duration
		/J HIS.	Assessment	Examination		
			25	75	100	3 Hrs

### **SCHEME OF INSTRUCTION AND EXAMINATION:**

### TOPICS AND ALLOCATION OF HOURS:

Sl.No.	Topics	Time (Hrs.)
1	Analytical Geometry	14
2	Vector Algebra – I	14
3	Vector Algebra – II	14
4	Integral Calculus – I	14
5	Integral Calculus – II	14
	Test and Tutorial	5
	TOTAL	75

#### UNIT I ANALYTICAL GEOMETRY

### **Chapter - 1.1 EQUATION OF CIRCLE**

Equation of circle – given centre and radius. General equation of circle – finding centre and radius. Equation of circle on the line joining the points  $(x_1, y_1)$  and  $(x_2, y_2)$  as diameter. Simple problems.

### **Chapter - 1.2 FAMILY OF CIRCLES**

Concentric circles, contact of two circles (Internal and External) -Simple problems. Orthogonal circles (results only). Problems verifying the condition.

### **Chapter - 1.3 INTRODUCTION TO CONIC SECTION**

Definition of a Conic, Focus, Directrix and Eccentricity. General equation of a conic a  $x^2 + 2h x y + b y$  $^{2}$  + 2g x+2fy+ c= 0 (statement only). Condition for conic (i) for circle: a=b and h=0 (ii) for pair of a h g straightline h = b = f = 0 (iii) for parabola:  $h^2 - ab = 0$  (iv) for ellipse:  $h^2 - ab < 0$  and (v) for hyperbola:  $h^2 - ab < 0$ g f C

ab > 0. Simple Problems.

#### UNIT II **VECTOR ALGEBRA – I**

### **Chapter - 2.1 VECTOR - INTRODUCTION**

Definition of vector - types, addition, and subtraction of Vectors, Properties of addition and subtraction. Position vector. Resolution of vector in two and three dimensions. Directions cosines, Direction ratios.Simple problems.

### **Chapter - 2.2 SCALAR PRODUCT OF VECTORS**

Definition of Scalar product of two vectors – Properties – Angle between two vectors. Simple Problems.

### **Chapter - 2.3 APPLICATION OF SCALAR PRODUCT**

Geometrical meaning of scalar product. Work done by Force. Simple Problems.

#### UNIT III **VECTOR ALGEBRA – II**

### **Chapter - 3.1 VECTOR PRODUCT OF TWO VECTORS**

Definition of vector product of two vectors. Geometrical meaning. Properties – Angle between two vectors - unit vector perpendicular to two vectors. Simple Problems.

### Chapter - 3.2 APPLICATION OF VECTOR PRODUCT OF TWOVECTORS & SCALAR **TRIPLE PRODUCT**

Definition of moment of a force. Definition of scalar product of three vectors - Geometrical meaning -Coplanar vectors. Simple Problems.

### Chapter - 3.3 VECTOR TRIPLE PRODUCT & PRODUCT OF MORE VECTORS

Definition of Vector Triple product, Scalar and Vector product of four vectors Simple Problems.

### UNIT IV INTEGRAL CALCULUS – I

### Chapter - 4.1 INTEGRATION – DECOMPOSITION METHOD

Introduction - Definition of integration – Integral values using reverse process of differentiation – Integration using decomposition method. Simple Problems.

### **Chapter - 4. 2 INTEGRATION BY SUBSTITUTION**

Integrals of the form  $[f(x)]^n f'(x)dx$ ,  $n \neq 1$ ,  $\frac{f'(x)}{f(x)}dx$  and F[f(x)] f'(x)dx. Simple Problems.

### **Chapter - 4.3 STANDARD INTEGRALS**

Integrals of the form  $\int \frac{dx}{a^2 \pm x^2}$ ,  $\int \frac{dx}{x^2 - a^2}$ , and  $\int \frac{dx}{\sqrt{a^2 - x^2}}$ , Simple problems.

UNIT V INTEGRAL CALCULUS – II

### **Chapter - 5.1 INTEGRATION BY PARTS**

Integrals of the form xsin nx dx , xcos nx dx , x  $e^{nx}$  dx,  $x^n$  log x dx and log x dx . Simple Problems.

### Chapter - 5.2 BERNOULLI'S FORMULA

Evaluation of the integrals  $x^m \sin nx \, dx$ ,  $x^m \cos nx \, dx$  and  $x^m e^{nx} \, dx$  where  $m \le 2$  using Bernoulli's formula. Simple Problems.

### **Chapter - 5.3 DEFINITE INTEGRALS**

Definition of definite Integral. Properties of definite Integrals - Simple Problems.

### Text Book:

1. Mathematics for Higher Secondary – I year and II year (Tamil Nadu Text Book Corporation)

### **Reference Book:**

Sl.No	Title	Author	Publication
1.	Engineering Mathematics	Dr.M.K.Venkatraman	National Publishing Co,
			Chennai
2.	Engineering Mathematics	Dr.P.Kandasamy & Others,	S. Chand Publishers
3.	Problems in Mathematics	V.Govorov, N.Miroshin,	G.K. Publications -2010
		P.Dybov.	

### **ONLINE SOURCE:**

- 1. www.engineersinstitute.com/gate-exam-reference-books-Engineering-mathematics.html.
- 2. https://testbook.com/blog/books-for-engineering-mathematics-gate/.

### E2102-Question paper pattern

### Time: 3 Hrs.

### Max.Marks: 75

<u>**PART A**</u> - 5 Questions to be answered out of **8** for 2 marks each. <u>**PART B**</u> - 5 Questions to be answered out of **8** for 3 marks each. <u>**PART C**</u> - All the **5** 

Questions to be answered

Each question in PART C will contain **3** Sub questions, out of these **3** Sub questions **2** Sub questions is to be answered for 5 marks each.

PART A	5 x 2 marks	10 Marks
PART B	5 x 3 marks	15 Marks
Short answer type questions		
PART C	<b>5 x 2</b> x 5 marks	<b>50</b> Marks
Descriptive answer type questions		
Each question in PART C will contain 3 Sub questions,		
out of these 3 Sub questions 2 Sub questions is to be		
answered for 5 marks each.		
Total		75 Marks

Clarks table will not be permitted for the Board Examinations.

### **E2103 - APPLIED MATHEMATICS**

### Rationale:

Many of Physical Engineering Problems like vibration of two side tied strings, Heat flow, decaying of radioactive material comes only in the form of differential equation, solution of differential equation gives solution of Physical Problems.

### **Objectives**:

This subject helps the students to acquire knowledge of finding areas and volumes using Integration and various methods of solving first and second order differential equations. This subject also helps the students to become aware of Binomial, Poisson and Normal distributions which can be used in Quality control.

Subject	Instructions			Examination		
	Hours /	Hours /				
				Marks		
	Week	Semester				
Applied						Duration
			Internal	Semester		
Mathematic s					Total	
	5 Hrs.	75 Hrs.	Assessment	Examination		
			25	75	100	3 Hrs

### SCHEME OF INSTRUCTION AND EXAMINATION:

### TOPICS AND ALLOCATION OF HOURS:

Sl. No.	Topics	Time (Hrs.)
1	Probability Distribution – I	14
2	Probability Distribution – II	14
3	Application of Differentiation	14
4	Application of Integration – I	14
5	Application of Integration – II	14
	Test and Tutorial	5
	TOTAL	75

### **E2103 - APPLIED MATHEMATICS**

### UNIT I PROBABILITY DISTRIBUTION – I

### **Chapter - 1.1 RANDOM VARIABLE**

Definition of Random variable – Types – Probability mass function – Probability density function. Simple Problems.

### **Chapter - 1.2 MATHEMATICAL EXPECTATION**

Mathematical Expectation of discrete random variable, mean and variance. Simple Problems.

### **Chapter - 1.3 BINOMIAL DISTRIBUTION**

Definition of Binomial distribution P(X=x)=nC<sub>X</sub>  $p^x q^{n-x}$  where x= 0, 1, 2,.. Statement only. Expression for mean and variance. Simple Problems.

### UNIT II PROBABILITY DISTRIBUTION – II

### **Chapter - 2.1 POISSION DISTRIBUTION**

Definition of Poission distribution  $P(X = x) = \frac{e^{-\lambda} - \lambda^x}{x!}$ , Where x = 0, 1, 2..... (statement only). Expressions of mean and variance. Simple Problems.

### **Chapter - 2.2 NORMAL DISTRIBUTION**

Definition of normal and standard normal distribution – statement only. Constants of normal distribution (Results only). Properties of normal distribution - Simple problems using the table of standard normal distribution.

### Chapter - 2.3 CURVE FITTING

Fitting of straight line using least square method (Results only). Simple problems.

### UNIT III APPLICATION OF DIFFERENTIATION

### Chapter – 3.1 VELOCITY AND ACCELERATION

Velocity and Acceleration - Simple Problems.

### Chapter - 3.2 TANGENT AND NORMAL

Tangent and Normal - Simple Problems.

### Chapter - 3.3 MAXIMA AND MINIMA

Definition of increasing and decreasing functions and turning points. Maxima and Minima of single variable only – Simple Problems.

### UNIT IV APPLICATION OF INTEGRATION – I

### Chapter - 4.1 AREA AND VOLUME

Area and Volume – Area of Circle. Volume of Sphere and Cone – Simple Problems.

### **Chapter - 4.2 FIRST ORDER DIFFERENTIAL EQUATION**

Solution of first order variable separable type differential equation. Simple Problems.

### **Chapter - 4.3 LINEAR TYPE DIFFERENTIAL EQUATION**

Solution of linear differential equation. Simple problems.

### UNIT V APPLICATION OF INTEGRATION – II

### Chapter – 5.1 SECOND ORDER DIFFERENTIAL EQUATION – I

Solution of second order differential equation with constant co-efficient in the form  $a \frac{d^2 y}{dx^2} + b \frac{dy}{dx} + c = 0$  where a, b, c are constants. Simple Problems.

### Chapter - 5.2 SECOND ORDER DIFFERENTIAL EQUATION – II

Solution of second order differential equations with constant co-efficient in the form  $a\frac{d^2y}{dx^2} + b\frac{dy}{dx} + c = f(x)$  where a, b, c are constants  $f(x)=k e^{mx}$ . Simple problems.

### Chapter - 5.3 SECOND ORDER DIFFERENTIAL EQUATION - III

Solution of second order differential equation with constant co-efficient in the form  $a\frac{d^2y}{dx^2} + b\frac{dy}{dx} + c = f(x)$  where a, b, c are constants  $f(x)=k \sin mx$  or  $\cos mx$ . Simple problems.

### Text Book:

1. Mathematics for Higher Secondary - I year and II year (Tamil Nadu Text Book Corporation)

### **Reference Book:**

Sl.No	Title	Author	Publication
1	Engineering Mathematics	Dr.M.K.Venkatraman	NationalPublishing Co.,
2.	Engineering Mathematics	Dr.P.Kandasamy & Others,	S. Chand Publishers
3.	Problems in Mathematics	V.Govorov,N.Miroshin,P.Dybov.	G.K. Publications -2010

### **ONLINE SOURCE:**

- 1. www.engineersinstitute.com/gate-exam-reference-books-Engineering-mathematics.html.
- 2. https://testbook.com/blog/books-for-engineering-mathematics-gate/.

### E2103-Question paper pattern

### Time: 3 Hrs

Max.Marks: 75

**<u>PART A</u>** - 5 Questions to be answered out of **8** for 2 marks each.

**<u>PART B</u>** - 5 Questions to be answered out of **8** for 3 marks each.

**<u>PART C</u>** - All the **5** Questions to be answered

Each question in PART C will contain 3 Sub questions, out of these 3 Sub questions 2 Sub questions is to be answered for 5 marks each.

PART A	<b>5</b> x 2 marks	10 Marks
PART B Short answer type questions	<b>5</b> x 3 marks	<b>15</b> Marks
<b>PART C</b> Descriptive answer type questions.Each question in PART C will contain <b>3</b> Sub questions, out of these <b>3</b> Sub questions <b>2</b> Sub questions is to be answered for <b>5</b> marks each.	<b>5 x 2</b> x 5 marks	<b>50</b> Marks
Total	7	<b>5</b> Marks

Out of the **3 Sub questions** in **PART C**, one sub question must be on problem based to test the analytical ability/logical ability /diagnostic ability/conceptual ability relevant to that subject content. Equal weightage is to be given to whole syllabus.

Clarks table will not be permitted for the Board Examinations.

### **E2104-ENGINEERING PHYSICS – II**

### **RATIONALE:**

The exponential growth of Engineering and Technology has benefited the mankind with extreme sophistication and comfort. To sustain this development, continuous research and development should take place not only in Engineering and Technology but also in Basic Science such as Physics. The various divisions of Physics like Heat, Optics, Acoustics, Semiconductor Physics, Nuclear Physics, Energy Studies, Materials Science, etc provide the foundation by enlightening the **Fundamental facts, Principles, Laws and Correct sequence of events** to develop the Engineering and Technology field for the prosperity of human beings.

### **OBJECTIVES:**

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

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

### TEACHING AND SCHEME OF EXAMINATION:

### No of weeks per semester: 15 weeks

	Instructio	ons		Examination	n			
Subject	Hours	Hours /	Marks					
	/ Week	Semester	Internal Assessment	Board Examination	Total	Duration		
ENGINEERING PHYSICS II	5 Hrs	75 Hrs	25	75	100	3Hrs		

### **Topics and Allocation of Hours:**

Sl.No	Торіс	Time(Hrs)
1	HEAT	13
2	THERMODYNAMICS, LIQUEFACTION OF GASES& NON- CONVENTIONAL ENERGY	13
3	LIGHT AND REMOTE SENSING	13
4	ELECTRICITY	13
5	ELECTRONICS	13
6	REVISION+TEST+MODEL EXAM	10
	Total	75

### UNIT - I : HEAT

### **1.1 TRANSFER OF HEAT**

concept of Heat and Temperature - Centigrade, Fahrenheit and Kelvin scales of temperature measurement-Conduction, convection and radiation – Definitions and explanations-Coefficient of thermal conductivity-Definition and SI unit- good and poor conductors- Examples-Properties of thermal radiation.

### **1.2 KINETIC THEORY OF GASES**

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

### **1.3 SPECIFIC HEAT CAPACITY**

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

# UNIT – II : THERMODYNAMICS, LIQUEFACTION OF GASES - AND NON CONVENTIONAL ENERGY

### 2.1 THERMODYNAMICS

First law of thermodynamics – Statement-Isothermal and Adiabatic changes - Explanation – Equations for isothermal and adiabatic changes (No derivation)Simple problems. Based on equations P1V1 = P2V2 and P1V1 $\gamma$ =P2V2 $\gamma$  Second law of thermodynamics –Clausius statement and Kelvin's statement – Working of Carnot's reversible engine with indicator diagram and its efficiency.

### 2.2 LIQUEFACTION OF GASES

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

### 2.3 NON – CONVENTIONAL ENERGY

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

### UNIT – III: LIGHT AND REMOTE SENSING

### **3.1 OPTICS**

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Refraction – Laws of refraction – Refractive index of a medium – Definition – Spectrometer –Derivation of refractive index of glass prism using minimum deviation-Experimental determination of refractive index using spectrometer- Fiber optics – Introduction –Phenomenon of total internal reflection – problemsusing the refractive index .

### 3.2 LASER

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

### **3.3 REMOTE SENSING**

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

### **UNIT – IV: ELECRICITY**

### **4.1 ELECTRICAL CIRCUITS**

Ohm's law – Laws of resistances – Resistivity, Conductivity, Super conductivity and Meissner effect-Definitions – Kirchhoff's current and voltage laws – Condition for balancing the Wheatstone's bridge .Simple problems based on expression for resistivity.

### **4.2 EFFECTS OF CURRENT**

Joule's law of heating – Experimental determination of specific heat capacity of a liquid using Joule's calorimeter –Faraday's laws on electrolysis – Electro chemical equivalent(e.c.e) of an element – Definition – Experimental determination of e.c.e. of copper- Capacitance of a capacitor – Definition –

' farad '- Definition- expressions for effective capacitance when capacitors are connected in series and in parallel -Simple problems based on expressions for e.c.e., effective capacitance for series and parallel connections of capacitors.

### **4.3 MEASURING INSTRUMENTS**

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

### **UNIT-V:ELECTRONICS**

### **5.1 SEMI CONDUCTORS**

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

### **5.2 DIODES AND TRANSISTORS**

P-N junction diode – Forward bias and reverse bias –Rectification action of diode – Working of full wave rectifier using P N junction diodes -PNP and NPN transistors – Three different configurations –Advantages of common emitter configuration – Working of NPN transistor as an amplifier in common emitter configuration.

### **5.3 DIGITAL ELECTRONICS**

Digital electronics – Introduction – Logic levels – Basic logic gates: OR, AND ,NOT gates – Universal logic gates:NAND and NOR gates –Symbolic representation, Boolean expression and Truth table for all above logic gates – Integrated circuits– Levels of integration – SSI, MSI, LSI and VLSI-Advantages of ICs.

### **Text Book:**

- 1. Engineering Physics, DOTE, Tamil Nadu
- Physics Higher secondary First & Second year– Volume I & II Tamil Nadu Text Book Corporation - 2004 & 2005.

### **Reference Book :**

Sl.No.	Title	Author	Publication
1.	Fundamentals of physics	Brijlal and Subramaniam	Toppan publishers-England
2.	A test book of sound	D.N. Vasudeva	S. Chand & co
3.	Non- Conventional energy sources	G.D. Rai	Khanna publishers
4.	Text book of Remote sensing and Geographical information systems	M. Anji Reddy	Reddy BS publications

### **ONLINE SOURCE:**

- 1. www.ustudy.in
- 2. https://en.wikipedia.org/wiki/Engineering\_physics
- 3. engineeringscience.berkeley.edu/engineering-physics/

### E2104-Question paper pattern

### Time: 3 Hrs.

### Max.Marks: 75

**<u>PART A</u>** - 5 Questions to be answered out of **8** for 2 marks each.

**PART B** - 5 Questions to be answered out of 8 for 3 marks each.

### <u>**PART C</u>** - All the **5** Questions to be answered</u>

Each question in PART C will contain 3 Sub questions, out of these 3 Sub questions 2 Sub questions is to be answered for 5 marks each.

PART A	5 x 2 marks	10 marks
PART B Short answer type questions	5 x 3 marks	15 marks
Part C Descriptive answer type questions. Each questions in Part C will contain 3 sub questions, out of these 3 sub questions 2 sub questions is to be answered for 5 marks each	5 x 2 x5 marks	50 marks
Total 75 Marks		ks

Out of the **3 Sub questions** in **PART C**, one sub question must be on problem based to test the analytical ability/logical ability /diagnostic ability/conceptual ability relevant to that subject content. Equal weightage is to be given to whole syllabus.

### E2105-ENGINEERING CHEMISTRY – II

### RATIONALE

The role of chemistry and chemical products in every branch of engineering is expanding greats, Now a day's various products of chemical industries are playing important role in the field of engineering with increasing number of such products each successive years. The strength of materials, the chemical composition of substance, their behavior when subjected to different treatment and environmental, and the laws of heats and dynamic energy have entered in almost every activity of modern life. Chemistry is considered as one of the core subjects for diploma students in engineering and technology for developing in them scientific temper appreciation of chemical properties of materials, which they have to handle in their professional career. Effort should be made to teach this subject through demonstration and with active involvement of students.

### **OBJECTIVES:**

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

- ✤ Understand the basic knowledge of chemistry in goal of green chemistry.
- ✤ Identify the properties of metals & alloys related to engineering application.
- ♦ Understand about lubricants, adhesives, refractories & ceramics.
- ♦ Identify the properties of non-metallic materials, related to engineering application.
- Compare the effect of pollutants on environmental to suggest preventive measure & safety.
- Understand the solid waste management, advantage of recycling in solid waste and combustion. Explain the polymer and its application.
- ✤ Understand the need of bio material and in use of surgery.
- ✤ To learn advantage of composite materials.
- ✤ Understand the manufacture of Portland cement and wet process.

### SCHEME OF INSTRUCTION AND EXAMINATIONS No of weeks per semester: 15 weeks

Subject	Instructions		Examination Marks			Duration
ENGINEERING	Hours/Weak	Hours/Somostor	Internal	External	Total	
CHEMISTRY -II	110urs/ week	110015/501105001	Assessment	Assessment	Total	3Hrs
	5Hrs	70 Hrs	25	75	100	

### **Topics and Allocation of Hours:**

S.NO.	Торіс	Time(Hrs.)
1	ENVIRONMENTAL CHEMISTRY: AIR POLLUTION, WATER POLLUTION, SOLID WASTE MANAGEMENT, GREEN CHEMISTRY	12
2	FUELS, COMBUSTION AND REFRACTORIES	12
3	METALLURGY, POWDER METALLURGY, ALLOYS AND ABRASIVES	12
4	LIME AND CEMENT, CERAMICS, LUBRICANTS, ADHESIVES	12
5	<u>POLYMERS</u> : PLASTICS, RUBBER, COMPOSITE MATERIALS	12
6	REVISION+CYCLE TEST+MODEL EXAM	10
	Total	70
#### E2105-ENGINEERING CHEMISTRY - II

#### **UNIT – I : ENVIRONMENTAL CHEMISTRY**

#### **1.1 AIR POLLUTION**

Pollution and Air pollution – Definition – Air pollutants (SO2, H2S, HF, CO and Dust) – Sources and Harmful effects – Formation of Acid Rain – Harmful effects – Green House Effect – Causes – Global warming – Harmful effects – Ozone Layer – Importance – Causes for Depletion of Ozone Layer (No equations) – Harmful effects of Ozone Layer Depletion – Control of Air Pollution.

#### **1.2 WATER POLLUTION**

Causes of Water Pollution – Sewage, Effluents, Algae and Microorganisms – Harmful effects –Sewerage – Definition – Sewage Disposal – Industrial Effluents – Harmful effects of Effluents – Harmful effects of Heavy Metal Ions – Lead, Cadmium, Zinc and Copper Treatment of Effluents – Eutrophication – Definition and harmful effects.

#### **1.3 SOLID WASTE MANAGEMENT**

Solid Waste – Definition – Problems – Types of Solid Waste–Methods of disposal–Land fill and Incineration.

#### **1.4 GREEN CHEMISTRY**

Definition – Goals of Green Chemistry (Basic ideas) – Recycling – Definition – Examples – Advantages of Recycling (Basic ideas)

#### **UNIT-II: FUELS, COMBUSTION AND REFRACTORIES**

#### 2.1 FUELS

Fuel and fossil fuel – Definition – Calorific value – Classification of fuels – Solid fuels – Wood – Coal – Varieties of Coal – Composition – Specific uses – Liquid fuels – Petroleum – Fractional distillation – Fractions and uses – Cracking (Concept only) – Liquid Hydrogen as fuel – Gaseous fuels – Preparation, composition and specific uses of Producer gas and Water gas – Composition and uses of CNG and LPG – Relative advantages of solid, liquid and gaseous fuels.

#### **2.2 COMBUSTION**

Definition – Combustion calculation by mass (for solid and liquid fuels) – Combustion calculation by volume (for gaseous fuels) – Stoichiometric calculations – Volume of air required – Excess air – Definition of Flue gas – Flue gas Analysis – Orsats Apparatus – Simple numerical problems.

#### 2.3 REFRACTORY'S

Definition – Requirements of a good Refractory – Classification – Acidic, Basic and Neutral Refractory's – Examples and uses – Uses of Fireclay bricks, Alumina bricks and Silica bricks.

#### UNIT-III: METALLURGY, POWDER METALLURGY, ALLOYS AND ABRASIVES

#### 3.1 METALLURGY

Principle of metallurgy – mineral, ores, and gangue – metallurgy processes- concentration of ores, Extraction of metals, refining metal .Metallurgy of iron- extraction of cast iron from its ore.

#### **3.2 EXTRACTION OF METALS**

Extraction of Tungsten and Titanium - Uses of Tungsten and Titanium.

#### **3.3 POWDER METALLURGY**

Definition – Preparation of Metal Powder – Atomization – Reduction of Metal Oxide – Applications of Powder Metallurgy.

#### 3.4 ALLOYS

Definition – Purpose of alloying – Types – Ferrous Alloys – Composition and uses of Stainless Steel, Chromium Steel and Vanadium Steel – Nonferrous alloys – Composition and uses of Nichrome, Dutch metal, German silver, Gun metal and Duralumin.

#### **3.5 ABRASIVES**

Definition – Classification – Hardness in Mohr's scale – Natural abrasives – Diamond, Corundum, Emery and Garnet – Synthetic abrasives – Carborundum – Boron carbide – Manufacture – Properties and uses.

#### UNIT-IV : LIME , CEMENT, CERAMICS, LUBRICANTS AND ADHESIVES

#### 4.1 LIME AND CEMENT

Lime-Type of lime - Manufacture of hydraulic lime by continuous Vertical Kiln process - propertiesslaking , plasticity , and setting

Cement-Definition - Manufacture of Portland cement - Wet Process - Setting of Cement (No equation).

#### 4.2 CERAMICS

White pottery – Definition – Manufacture of White pottery – Uses – Definition of glazing – Purpose – Method – Salt glazing.

#### 4.3 LUBRICANTS

Definition - Characteristics of Lubricant - Types of Lubricants - Solid - Semi-solid - Liquid Lubricants.

#### 4.4 ADHESIVES

Definition – Requirements of good adhesives – Natural adhesive – Uses of Shellac, Starch, Asphalt – Synthetic adhesive – Uses of Cellulose Nitrate, PVC, Phenol-formaldehyde and Urea-formaldehyde.

#### UNIT-V : POLYMERS

#### **5.1 PLASTICS**

Plastics – Definition - Polymerization – Definition – Types of polymerization – Addition polymerization – Formation of Polythene – Condensation polymerization – Formation of Bakelite – Types of plastics – Thermoplastics and Thermoset plastics – Differences – Mechanical properties of plastics – Advantages of plastics over traditional materials (Wood and Metal) –Reinforced or filled plastics – Definition – Advantages – Applications – Polymers in Surgery – Biomaterials – Definition, Biomedical uses of Polyurethane, PVC, Polypropylene and Polyethylene.

#### 5.2 RUBBER

Definition – Preparation from Latex – Defects of natural rubber – Compounding of rubber – Ingredients and their functions – Vulcanization – Definition and Purpose – Reclaimed rubber – Definition – Process – Properties and uses.

#### **5.3 COMPOSITE MATERIALS**

Definition - Examples - Advantages over metals and polymers - General applications.

#### **Text Book:**

1. Engineering Chemistry – Jain & Jain – Dhanpat Rai & Sons.

2. A Text Book of Engineering Chemistry - S.S. Dara - S. Chand Publication.

#### **Reference Book :**

Sl.No.	Title	Author	Publication
1.	Chemistry of Engineering Material	C.V.Agarwal,Andranaidu C. Parameswara Moorthy	B.S. Publications.
2.	Engineering Chemistry	Uppal	Khanna Publishers.
3.	A Text Book of Inorganic Chemistry	P.L. Soni	S. Chand Publication.
4.	Rain Water Harvesting	Hand Book	Chennai Metro Water

#### **ONLINE SOURCE :**

- 1. www.goodreads.com/book/show/15919612-a-text-book-of-engineering-chemistry
- 2. www.sanfoundry.com/best-reference-books-engineering-chemistry/
- 3. https://books.google.co.in/books/about/Engineering\_Chemistry.html?id...

#### E2105-Question paper pattern

Time: 3 Hrs.

#### Max.Marks: 75

**<u>PART A</u>** - 5 Questions to be answered out of **8** for 2 marks each.

**PART B** - 5 Questions to be answered out of 8 for 3 marks each.

<u>**PART C</u>** - All the **5** Questions to be answered</u>

Each question in PART C will contain 3 Sub questions, out of these 3 Sub questions 2 Sub questions is to be answered for 5 marks each.

PART-A	5x2 Marks	10 Marks
PART-B Short answer type questions	5x3 Marks	15 Marks
<b>PART-C</b> Descriptive answer type questions. Each question in PART C will contain <b>3</b> Sub questions, out of these <b>3</b> Sub questions <b>2</b> Sub questions is to be answered for 5 marks each.	5x2x5 marks	<b>50</b> Marks
TOTAL		<b>75</b> Marks

Out of the **3 Sub questions** in **PART C**, one sub question must be on problem based to test the analytical ability/logical ability /diagnostic ability/conceptual ability relevant to that subject content. Equal weightage is to be given to whole syllabus.

#### E2106-ENGINEERING PHYSICS PRACTICAL - II

#### **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 equipment. This is accomplished by doing engineering related experiments in practical classes in various laboratories.

#### **GUIDELINES:**

All the Eight experiments given in the list of experiments should be completed and given for the end semester practical examination.

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

#### SCHEME OF INSTRUCTION AND EXAMINATIONS: No. of Weeks per Semester: 15

	Instructions		Examination			
			Marks			
Subject	Hours/ Week	Hours/ Semester	Internal Assessment/ Record	Board Examination	Total	Duration
ENGINEERING PHYSICS - II PRACTICAL	2	30	25	75	100	3 Hours

#### **ALLOCATION OF MARKS**

Formula & Diagram	15 marks
Tabulation with proper units	10 marks
Observation (including taking readings)	35 marks
Calculation	10 marks
Result	05 marks
Total	75 Marks

#### E2106-ENGINEERING PHYSICS PRACTICAL - II

#### LIST OF EXPERIMENTS WITH OBJECTIVES:

#### **1. REFRACTIVE INDEX**

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

#### 2. SPECTROMETER.

To measure the angle of the prism and the angle of minimum deviation using Spectrometer and to calculate the refractive index of glass.

#### **3. SOLAR CELL.**

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

#### 4. LAWS OF RESISTANCES.

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

#### **5.JOULE'S CALORIMETER.**

To determine the specific heat capacity of water.

#### 6. COPPER VOLTAMETER.

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

#### 7. P-N JUNCTION DIODE.

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

#### 8. LOGIC GATES.

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

#### LIST OF EQUIPMENT

#### 1. REFRACTIVE INDEX

Travelling Microscope, Beaker with transparent liquid and Saw dust.

#### 2. SPECTROMETER.

Spectrometer, Sodium vapour lamp, Reading lens and Glass prism

#### 3. SOLAR CELL.

Solar cell Kit for drawing the V - I characteristics

#### 4. LAWS OF RESISTANCES.

Battery Eliminator, key, rheostat, ammeter, voltmeter, Connecting wires and two known standard resistances.

#### 5. JOULE'S CALORIMETER.

Joule's Calorimeter, Battery eliminator, Rheostat, Key, Ammeter, voltmeter, stop clock, thermometer, digital Balance and connecting wires.

#### 6. COPPER VOLTAMETER.

Copper Voltameter, Battery eliminator, Rheostat, Key, Ammeter, stop clock, digital balance, emery sheet and Connecting wires.

7. P-N JUNCTION DIODE.

P-N Junction Diode forward characteristics kit.

#### 8. LOGIC GATES.

Logic gates testing apparatus kit with bread board for Mounting ICs and Integrated circuit chips (IC 7404 – NOTGate, IC 7408 – AND Gate, IC 7432 – OR gate, IC 7400 – NAND Gate, IC 7402 – NOR Gate)

#### E2107-ENGINEERING CHEMISTRY PRACTICAL – II

#### **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 equipment. This is accomplished by doing engineering related experiments in practical classes in various laboratories.

#### **OBJECTIVE:**

- > Study the effect of heating on materials and reagents.
- Study of the reactions of the following radicals leading to qualitative analysis of the given inorganic simple salt soluble in water of dilute acids.
- > Identify the Acid and Basic Radicals in a given chemical substance like pollutant, fungicide and mordant.
- Analysis effluent to find out the presence of heavy metals and to know their bad effect.

#### SCHEME OF INSTRUCTION AND EXAMINATIONS: No. of Weeks per Semester: 15

	Instructions			Examination		
			Marks			
Subject	Hours/ Week	Hours/ Semester	Internal Assessment/ Record	Board Examination	Total	Duration
ENGIN EE RING CHE MISTR Y - II PRACTICA L	2	30	25	75	100	3 Hours

#### ALLOCATION OF MARKS

Identification of	
Acid radical with systematic procedure	23 marks
Identification of Basic radical with systematic	
procedure	23 marks
Identification of Metallic pollutant with	
systematic procedure	20 marks
Harmful effects	04 marks
Viva-voce	05 marks
Total	75 Marks

#### **GUIDELINES:**

All the Eight experiments given in the list of experiments should be completed and given for the end semester practical examination.

• In order to develop best skills in handling Instruments/Equipment and taking readings in the practical classes, every two students should be provided with a separate experimental setup for doing experiments in the laboratory.

• The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

Acid radicals: Chloride, Carbonate, Sulphate and Nitrate.

Basic radicals: Lead, Copper, Aluminium, Zinc, Barium, Calcium, Magnesium and Ammonium.

I. Analysis of Inorganic simple salt (QUALITATIVE ANALYSIS)

The Students may be asked to analyse eight inorganic simple salts containing any of the acid and basic radicals in each salt without omitting any of the above mentioned radicals and write the analysis in record book mentioning the name of the salt.

II. Analysis of effluents containing the following metal ions - Lead, Copper, Cadmium and Zinc.

Students may be given above four pollutants, in four separate test tubes in solution form and asked to report metallic pollutants with procedure (basic Radical Analysis Procedure ) and their harmful effects.

#### E2108-ENGINEERING GRAPHICS - II

#### **OBJECTIVES**

At the end of the practice, the students will be able

- To acquire knowledge about the construction of special curves.
- To draw projection of solids
- To draw section of solids
- To draw the development of surfaces for the given sheet metal objects
- To know the basics of 3D modelling
- To practice on 3D model creation methods
- To construct isometric drawing for the given orthographic views
- To practice 3D modelling of the given object in CAD software

#### SCHEME OF INSTRUCTION AND EXAMINATIONS No. of Weeks per Term: 15 Weeks

COURSE	INSTRUCTION			EXAMINATIO	N	
		MARKS				
Engineering Graphics - II	Hours / Week	Hours / Term	Continuous Assessment	Term End Examination	Total	Duration
	6 Hrs.	90 Hrs.	25	75	100	3 Hrs.

#### TOPICS AND ALLOCATION OF HOURS

Sl.No.	Topics	Hours
1.	Construction of special curves and polygon	18
2.	Projection of solids	16
3.	Section of solids	15
4.	Development of surfaces	18
5.	Introduction to 3D Modeling, Isometric Projection and 3D Modeling using CAD software	20
	Model Practical Examinations	03
	TOTAL	90

#### Unit I

#### 1.1Constructions of special curves - Polygons

Geometric curves: Definition - construction of cycloid - epicycloids - hypocycloid - exercises. Involutes of a circle - Archimedean spiral - helix - exercises.

#### **1.2Construction of Polygon:**

Construct triangle, square, pentagon, hexagon by side distance in various positions – construction by inscribe & circumscribe a circle and by angle.

#### UNIT II

#### 2. Projection of solids

Introduction - important terms - classification of solids – polyhedron – solids of revolution - triangular and hexagonal prisms and pyramids cylinder and cone. Projections of solids in simple positions – Axis parallel to one plane and perpendicular to other plane - axis inclined to one plane and parallel to other plane - axis parallel to both planes - exercises.

#### UNIT III

#### **3.Section of Solids**

Introduction – terminology - true shape - sectional view - need for sectional view - cutting plane – section lines - triangular and hexagonal prisms and pyramids - cylinder and cone. Position of solids – Axis parallel to one plane and perpendicular to other plane - axis parallel to both planes - exercises. Position of cutting planes – cutting plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane and parallel to another plane - section plane perpendicular to one plane - section plane - section plane - section plane - section - s

#### UNIT IV

#### 4. Development of surfaces

Methods of development - Need for development - Development of prism, cylinder, cone and pyramids, truncated prisms and cylinder, frustum of pyramids and cone – Exercises in triangular, square, pentagon and hexagon prisms and pyramids - Cylinder and cone. Development of miscellaneous objects - T-pipe, elbow, ducts, tray, lamp shade and funnel.

#### UNIT V

#### 5.1 Introduction to 3D modeling using CAD

Introduction – axes convention – co-ordinate system – WCS, UCS – 3D object creation methods: solid primitive method, sweep method: creating region – extrusion and revolve. Creating composite solids – Boolean operation – union, subtract and intersect – viewing 3D model UCS option – dimensioning and adding text in 3D model.

#### 5.2 Isometric projection and 3D Modeling using CAD software

Introduction – isometric view - isometric projection – difference between isometric view and isometric projection - isometric scale - methods of drawing an isometric view- box method – isometric view of regular solid – isometric view of truncated solids – isometric views of arcs and circles – four centre method for drawing an ellipse – arcs of circle in isometric view. Isometric view of the machine parts from the given simple orthographic view – exercises.

#### **Text Books**

1. Gill P.S., "Engineering drawing", S.K.Kataria & Sons, New Delhi.

2. Bhat N.D., "Engineering drawing", Charotar Publishing House.

#### **Reference Books**

1. Gopalakrishnan.K.R, "Engineering Drawing", (Vol.I and Vol.II), Dhanalakshmi publishers, Edition 2, 1970

- 2. Venugopal.K, Sreekanjana G, "Engineering Graphics" New Age International Publishers.
- 3. K V Nataraajan "A Text Book of Engineering Drawing", 19<sup>th</sup> edition, 2005, KVN publications.

4. Thomas E.French, Charles J.Vierck, Robert J.Foster, "Engineering drawing and graphic technology", McGraw Hill International Editions.

- 5. Parkinson & Sinha, "First Year Engineering Drawing", Pitman Publishers.
- 6. Shah/Rana, "Engineering Drawing", Pearson Longman.
- 7. AutoCAD Manual, Autodesk Inc.

#### E2108-ENGINEERING GRAPHICS-II

#### **QUESTION PAPER PATTERN**

Time : 3 Hrs

#### Answer Part-A and Part-B in the drawing sheet only.

#### Part-A

### Answer ALL questions. Each question carries five marks.3x5=15 Marks

Note: Three questions will be asked from Unit-1, Unit-2 and Unit-4.

(From construction of polygon, projection of solids (axis perpendicular to one plane) and development of regular polygon only)

#### Part-B

#### Answer ANY THREE questions. Each question carries fifteen marks.

1. One question from special curves.

- 2. One question from projection of solids.
- 3. One question from section of solids.
- 4. One question from development of surfaces.

#### Part-C

#### (Using CAD Software)

#### Answer ALL questions.

1. One question to draw 3D model using CAD software

(Draw isometric view from the given orthographic views.)

Max. Mars: 75

3x15=45 Marks

15 Marks

## MODEL QUESTION PAPER (TERM-I)

E1101- COMMUNICATION ENGLIS	H-I
Time: 3 Hours I. Answer <u>any ten</u> of the following: 1. Find the odd word in each group according to pronunciation.	Maximum Marks: 75 10 X 3 = 30
a) Wood, would, mood, could	
b) Shut, cut, mutt, put	
c) Walked, talked, mocked, planted	
2. Identify short and long sounds and write "short" or "long"	next to each word.
a) bit b) sleep c) pool	
<ul> <li>d) beat e) pull f) slip</li> <li><b>3. Fill in the blanks with the suitable word from the homophor</b></li> <li>a) He asked the conductor what the bus was. (fair / fare)</li> </ul>	nes given in brackets.
b) The convict was put in the (cell /sell)	
c) The passengers use the as the escalators do not function.(Stairs/star	res)
<ul><li>4. Identify three naming words in the following sentence:</li><li>Raju went to the library to collect the books from the clerk.</li><li>5. Fill in the blanks with plural form of the word given in the</li></ul>	e bracket.
a) A porter carries tiffin (box).	
b) They travel by different (mode) of transport.	
c) The farmers buy (cow) in the market.	
<b>6. Identify three action words in the following sentence:</b> He took a piece of paper, wrote a poem and read it to the class.	
7. Find the odd word based on the verb form.	
a) made, play, make, plan	
b) sell, help, tell, hell	
c) would, might, should, fight	
<b>8. Fill in the blanks with appropriate adjectives given in bra</b> a) I wear a ( white / pure ) shirt.	ckets:
b) They like to read ( comic / comedy ) books.	

c) People prefer to travel by \_\_\_\_\_ ( locale / local ) trains.

#### 9. Fill in the blanks with suitable articles in the following sentences:

a) Gopinath is \_\_\_\_\_ enterprising person.

b) Ooty is \_\_\_\_\_ tourist spot.

c) My mother goes to \_\_\_\_\_ market.

#### 10. Fill in the blanks with suitable prepositions:

d) The college begins \_\_\_\_ (on / at) 8.30 A.M every day.

e) My birthday falls  $(on / in) 10^{th}$  July.

f) I was born \_\_\_\_\_ (in / on) 1990.

#### 11. Rewrite and Identify the kind of the following sentences:

a. How beautiful the TajMahal is!

b. Be silent.

c. I went to Chennai last week.

#### 12. Write the equivalent American terms for the given British terms: a) Biscuits b) Ground floor c) Lift

## II. Answer any five of the following.5x3=151. Underline the main clause in the following sentences.

a) As soon as the teacher entered the class, the students greeted her.

b) Being sick, I did not attend the meeting.

c) Though he was an orator, he did not deliver an impressive speech.

#### 2. Underline the subordinate clause in the following sentences.

a) I met the girl who had helped me.

b) I bought a table that costs Rs.1000.

c) As he is suffering from a fever, he goes to meet the doctor.

#### 3. Rearrange the jumbled words into meaningful sentences

- a) a, writes, in, Kumar, the, room, class, letter.
- b) learn, the, grammar, students.
- c) doctor, kala, an, is, efficient.

#### 4. Frame questions for the following responses:

- a) The rainbow looks very beautiful.
- b) I met my friend in his college.
- c) The Class will start at 9 O' clock.

#### 5. Convert the statements into exclamatory sentences:

- a) The tiger is a very ferocious animal.
- b) His handwriting is very good.
- c) The moon is very bright today.

#### 6. Rewrite and label the pattern of the following sentences:

- a. We played well.
- b. Rama is a good boy.
- c. They bought a car.

#### 7. Punctuate and use capital letters wherever necessary:

- a) ram is in london at present
- b) when sheela wants to buy a house her husband objects
- c) our parliament is in new delhi

#### III. Answer the following as directed: $3 \times 5 = 15$ 1. Read the questions and find answers in the given paragraph.

- a) Who is Sona to the speaker of this passage?
- b) Does Sona study?
- c) How old is Sona?
- d) Describe Sona's appearance.
- e) What is your opinion of Sona?

#### SONA

My niece Sona is an adorable girl. She is five years old, but is tall for her age. She has curly, dark black hair and black eyes. When she smiles, her little white teeth seem to light up her face. Sona is also a friendly girl. She is always playing funny jokes on people to make them laugh. She likes to talk a lot to show how smart she is. She is always eager to recite lessons or poems. Finally, my niece Sona is a very active little girl. She goes to nursery school every day, and she loves t o play. She plays ball in the yard with her friends after school. Other times, she likes to play quietly with her Barbie dolls. I love my little niece, Sona and if you saw her you would love her, too.

2. a) Describe a "market" (5 sentences) OR

b) Write your experience on the first day in a polytechnic college (5 sentences).

3. Write a letter to your friend inviting him for your birthday celebrations to be arranged at your home .

IV. Answer any three of the following.  $3 \times 5 = 15$ 

1. Write a short message to your friend about being late to college as you have missed the bus because of the traffic in your area.

2. Study the visual carefully and write five sentences:



- Sheela : Last week I went to Chennai
- Mala : whether to attend any function?
- Sheela : yes, to attend my friend's marriage
- Mala : your friend!

Sheela : She studied with me in elementary school. You do not know her.

- Mala : You still remember your elementary school friends? Oh,God! You got such a tremendous memory and sense of remembrance.
- Sheela : Oh! thank you.

#### 3. Fill up the blanks by choosing the suitable linkers given in brackets.

#### (then, thus, and, after that, so)

Yesterday, I was working in my office without break for tea, even after 5 P.M. The time was 6.00 P.M. \_\_\_\_I felt tired. \_\_\_\_\_, I went to a restaurant and had a cup of coffee. \_\_\_\_\_, I went for a walk \_\_\_\_\_ resumed my work in the office, later. \_\_\_\_\_, relaxation helps us to refresh ourselves, even after a tiresome work.

#### 4. Read the following questions and find the answers in the dialogue:

#### Questions:

- 1) Name the speakers.
- 2) What is the relationship between the speakers?
- 3) What is the occasion discussed here?
- 4) Where did Sheela go last week?

#### 5) Mention a characteristic of Sheela.

#### 5. Study the given passage and make notes:

There are millions of people who drink coffee in coffee bars or restaurants all over the world. While drinking coffee they talk about the day's news or they just relax. Coffee bars are a good place to meet people for a chat and drinking coffee is a simple way to relax.

People also drink coffee so that they can keep awake. Students drink it late at night because they want to study. Lorry drivers drink it because they want to keep awake on the road. Most people drink coffee in the morning when they get up and after each mean. Coffee breaks are a good way to relax at work.

Coffee has a bitter and people usually drink it with sugar or milk. Some people like to drink their coffee black. In Italy they drink very strong black coffee. It's called espresso. There are some people who drink their coffee with warm milk and the Irish have a special coffee with whisky in it.

Time : 3 Hrs

Max. Marks: 75

PART - A (5 x 2 = 10 Marks)

#### I (1) Answer any FIVE questions

#### (2)All questions carry equal marks

1. In the determinant  $\begin{pmatrix} 5 & 3 & 1 \\ 2 & 8 & 1 \\ 7 & 4 & 6 \end{pmatrix}$  what is the cofactor of '4'?

2. Find the modulus and amplitude of the complex number 1+ i.

3. If  $x = \cos\theta + i \sin\theta$ , find the value of  $x + \frac{1}{x}$ ?

4. Find the value of  $\omega^4 + \omega^5 + \omega^6$ .

5. Find the value of cos 40 cos 20 - sin 40 sin 20.

6. Find the principal value of  $\cos^{-1}\frac{1}{\sqrt{2}}$ .

7. Evaluate  $\lim_{x \to 2} \frac{x^3 - 8}{x - 2}$ .

8. Find  $\frac{d^2 y}{dx^2}$ , if y=sin3x.

$$PART - B (5 \times 3 = 15 \text{ Marks})$$

#### II (1) Answer any FIVE questions

#### (2) All questions carry equal marks

1. Find the rank of the matrix 
$$\begin{pmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 4 & 3 & 5 \end{pmatrix}$$

- 2. Find the 5<sup>th</sup> term in  $(2x^2 \frac{3}{x})^{11}$ .
- 3. Find the distance between the points 2+i and1-2i.

4. Show that the complex numbers 3+7i,6+5iand 15-i are collinear.

5. If tan A=1/2, tan B=1/3 find the value of tan(A+B).

6. Show that 
$$\frac{\sin 2A}{1+\cos 2A} = \tan 2A.$$

7. Evaluate 
$$\lim_{x \to 2} \frac{x^3 - 8}{x - 2}$$
.

8. Find dy/dx if  $y = \log(\sec x + \tan x)$ .

#### $PART - B (5 \times 10 = 50 \text{ Marks})$

#### III (1) Answer any two sub divisions in each question.

#### (2)All questions carry equal marks.

1.(a) Solve the following equations using Cramer's rule x+y+z=3, 2x-y+z=2, 3x+2y-2z=3.

(b) Find the rank of the matrix 
$$\begin{pmatrix} 1 & 1 & 1 & 3 \\ 2 - 1 & 3 & 4 \\ 5 - 1 & 7 & 11 \end{pmatrix}$$
.

- (c) Find the co-efficient of  $x^{32}$  in the expansion of  $(x^4 + \frac{1}{x^3})^{15}$ .
- 2.(a) Find the modulus and amplitude of  $\frac{1+3\sqrt{3}i}{\sqrt{3}+2i}$ . (b) Simplify using Demoivre's theorem  $\frac{(\cos 3\theta - i \sin 3\theta)^5 (\cos 4\theta + i \sin 4\theta)^4}{(\cos 2\theta + i \sin 2\theta)^7 (\cos 3\theta - i \sin 3\theta)^6}$ . (c) Solve  $x^5$ -1=0. 3 (a) If A+B=45°, prove that (1 + tanA)(1 + tanB) = 2. and hence Deduce the value of  $\tan 22\frac{1}{2}^\circ$ . (b) Prove that  $\frac{\cos 3\theta}{\cos \theta} + \frac{\sin 3\theta}{\sin \theta} = 4\cos 2\theta$ . (c) Prove that  $\cos 20^\circ \cos 40^\circ \cos 80^\circ = \frac{1}{2}$ . 4(a) Prove that  $tan^{-1}(\frac{4}{3}) - tan^{-1}(\frac{1}{7}) = \frac{\pi}{4}$ . (b) Evaluate the following.(i)  $\lim_{x\to 0} \frac{x^2 + 7x}{x^2 + 5x}$  (ii)  $\lim_{x\to 0} \frac{\sin 3\theta}{\sin 2\theta}$ . (c) Find dy/dx (i)  $y = e^x \log x \sin x$  (ii)  $y = \frac{\sin x}{1 + \cos x}$ . 5(a) Find dy/dx (i)  $y = tan^{-1}(x^3)$  (ii)  $x^2 \sin y = c$ . (b) If  $y = e^x \sin x$ , prove that  $y_2 - 2y_1 + 2y = 0$ . (c) If  $u = \log(x^2 + y^2)$ , find the value of  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$ .

#### Max. Marks: 75

#### Time : 3 Hrs

#### PART -A (5 X 2=10)

#### Answer any FIVE questions – All Questions carry equal marks.

- 1. Write the two supplementary quantities with units.
- 2. What is elasticity?
- 3. Why is droplet of rain spherical in shape?
- 4. Define centripetal force.
- 5. Define radius of gyration.
- 6. Write any two uses of artificial satellite.
- 7. What do you understand by transverse wave?
- 8. Define hysteresis.

#### PART - B (5 X 3 = 15)

#### Answer any FIVE questions – All Questions carry equal marks.

- 9. What is a vector quantity? Give two examples.
- 10. State Lamis theorem and write the equation.
- 11. Write any three differences between streamline and turbulent motion.
- 12. Define time of flight and write its formula.
- 13. Define angular velocity and give the SI unit.
- 14. State the law of conservation of angular momentum.
- 15. Define Reverberation time and write Sabine's formula.
- 16. Write the three types of magnetic materials with examples.

#### PART - C (10 X 5 = 50)

#### i) Answer all questions choosing any TWO sub divisions from each question.

#### ii) All sub divisions carry equal marks.

17. a) List the conventions followed in S.I system.

b) Derive the expression for magnitude and direction of the resultant of two forces acting at a point with an acute angle between them.

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

18. a) Describe an experiment to determine the young's modulus of the material of a beam by uniform bending method.

b) Derive Poiseuille's formula for the co-efficient of viscosity of a liquid by dimensional method.

c) A capillary tube of radius 0.04 cm is dipped in water vertically and water rises to height of

4 cm. If the density of water is 1000 kgm-3, calculate the surface tension of water. (g = 9.8 ms-2).

19. a) Derive the expression for i) Maximum height ii) Time of flight

b) Derive the expression for normal acceleration and centripetal force of a body executing

uniform circular motion.

c) An electric train has to travel a curved railway line of radius 50 m with a maximum speed of 36 kmph. Calculate the angle through which the outer rail should be raised so that there is no lateral thrust on the rails. (g = 9.8 ms-2)

- 20. a) Derive the expression for kinetic energy of a rigid body rotating about an axis.b) Derive the expression for variation of acceleration due to gravity with altitude.c) If the radius of earth is 6400 km, find the value of escape velocity. (g = 9.8 ms-2 )
- 21. a) Explain the production of ultrasonic waves by piezo-electric method.
  - b) Describe how the frequency of a tuning fork is determined using a Sonometer.
  - c) Explain the method of drawing hysteresis loop of a specimen taken in the form of a rod using solenoid.

b) Explain the industrial applications of catalysts.

c) List any 2 varieties of glass and give its composition and uses.

#### E1104-ENGINEERING CHEMISTRY -I

#### Max.Mark: 75

#### PART - A

#### I Answer the any five question

- 1. Define pH Write the formula.
- 2. What is one normal solution?
- 3. What is Tyndall effect?
- 4. What is rain water harvesting?
- 5. Give the uses of optical glass.
- 6. What is meant by electrochemical series?
- 7. Mention any two factors connected with metal surface that influence the rate of corrosion.
- 8. What is a luminescent pain?

#### PART - B

#### II Answer any five questions (All questions carry equal marks)

- 1. Name the three fundamental particles of atom.
- 2. What is Avogadro's hypothesis? State the relationship between molecular mass and vapour density of a gas.
- 3. What are the methods by which the concentration of a solution can be expressed?
- 4. Define catalysis. How is it classified?
- 5. What are the methods involved in the preparation of surface for electroplating?
- 6. What is a solar cell? State its uses.
- 7. How does tinning protect iron from corrosion?
- 8. What are the differences between a paint and varnish?

#### PART - C

#### Answer the following questions, by choosing either (a), (b) &(c), of each question (5x10=50)

a. Explain the formation of sodium chloride. III

- b. How many molecules of carbon dioxide are found in 2.5 moles of carbon dioxide?
- c. Explain the application of pH in industries.

a) List the methods that are used to express the concentration of a solution and define IV them.

b). Explain the industrial applications of colloids.

c). Explain the application of nano-particles in medicine and biomaterials.

a) A sample of 50ml of water from a well when titrated with 0.009M EDTA solution consumed 20.5 ml V of the same. Calculate the hardness of the sample i) in mg/lit and ii) in ppm of CaCo3.

(5x2=10)

Time : 3 Hours

(5x3 = 15)

- VI a) Define electro less plating. List its applications.
  - b) Explain the concentration cell with an example.
  - c) Describe the construction and working of a dry cell.
- VII a) Write a note on differential aeration theory of corrosion.
  - b) Explain the various methods of prevention of corrosion.
  - c) What are the components present in paint? Give their functions with examples.

#### E1105-ENGINEERING PHYSICS PRACTICAL- I

#### **Time: 3Hours**

#### Max marks: 75

- 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 and Lami's theorem using concurrent forces.
- 4. Compare the coefficient of viscosity of two Liquids by capillary flow method, using graduated burette.
- 5. Determine the coefficient of viscosity of a high viscous liquid by Stokes' method.
- 6. Determine the surface tension of water by capillary rise method.
- 7. Determine the frequency of the given tuning fork using sonometer.
- Compare the magnetic moments of the two bar magnets using deflection magnetometer in Tan-A position, by equal distance method.

#### **Time: 3Hours**

#### Max marks: 75

#### **MODEL 1: 3 Hours**

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.

#### MODEL 2: 3 Hours

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.

#### **MODEL 3: 3 Hours**

Determine the pH of five given samples using pH meter and calculate the hydrogen ion concentration of the samples. (Any two students per batch).

## Answer ANY TWO questions. Each question carries fifteen marks.

- Draw a parabola by rectangle method, given its span and rise as 100 mm and 60 mm respectively. 1.
- 2. A straight line AB, 60 mm long makes an angle of 45° to HP and 30° to VP. The end A is 20 mm in front of VP and 15 mm above HP. Draw the projections of the line.
- 3. The pictorial view of an object is shown in Fig-1. Draw the following views:
  - a) Elevation in the direction of arrow
  - b) Side view

Time: 3 Hrs

Fig-1

#### E1107-ENGINEERING GRAPHICS-I

#### Answer Part-A and Part-B in the drawing sheet only.

#### Part-A

#### Answer ALL questions. Each question carries five marks.

- 1. Write free hand, in single stroke vertical capital letters of 5 mm height, of the following line "Small things make perfection but perfection is not small thing"
- 2. Draw a line AB 100 mm long and divide into 7 equal parts.
- 3. A point 'A' is 30 mm above HP and 30 mm in front of VP. Draw its projections.

#### Part-B



3x5=15 Marks

2x15=30 Marks

10 Marks 5 Marks

Max. Mars: 75

#### Part-C

#### (Using CAD Software)

#### Answer ALL questions.

Read the dimensioned drawing shown in Fig-2. Draw the figure using CAD software and dimension it as per BIS and take the printout to full size.
 10 Marks



Fig-2

2. The pictorial view of an object is shown in Fig-3. Draw the following views using CAD software and take the printout to full size

a) Elevation in the direction of arrow

b) Side view



Fig-3

10 Marks

10 Marks

# MODEL QUESTION PAPER (TERM-II)

### E2101-Communication English II

Time: 3 Hours	Max Marks: 75
I. Answer <u>any ten</u> of the following:	$10 \ge 3 = 30$
1. Write 3 words related to 'school'.	
2. Identify the mood expressed in the following sentence	es:
a. Wow! We won the match.	
b. Alas! We lost the match.	
c. Hurrah! We have won lakhs in a lottery.	
3. Convert the followingVerbs into nouns.a) Singb) Examine	c)free
4. Convert the following verbs into adjectives. a) Play b) risk	c) beautify
5. Write the synonyms using the words given in bracket a) Shut (open/close/end) b) Complete (Final/ Relevant/part) C) fundamental (secondary/ advanced/	ts. / Primary)
<ul> <li>6. Match the following with the relevant opposite word: <ul> <li>a) idle</li> <li>b) basic</li> <li>c) foolish</li> &lt;</ul></li></ul>	
a) proper b) able c) pleasure	
8. Write suitable suffixes for the following words: a) free b) meaning c) develop	
<ul> <li>9. Identify and write the passive verb in the following s <ul> <li>a) People weren't forced to buy anything wh</li> <li>b) The students have been informed to bring</li> <li>c) Some questions are being asked from the examination</li> </ul> </li> <li>10. Correct the errors in the following sentences. <ul> <li>a) He going to the market.</li> <li>b) Water has flown to the fields.</li> <li>c) we are fond is music.</li> </ul> </li> </ul>	entences. hen they were in an exhibition. g their textbooks, without fail. e exercise which are in the book for the

11. Rewrite the sentences using the Gerund or infinitive as the case may be

a) I like to fly.b) Seeing is believingc) I hate carrying tales.

#### 12. Write the American spelling for the given words with British spellings:

a) programme b) labour c) colour

#### II Answer any five of the following:

#### 5x3=15

- 1. Answer the following verbal question first in affirmative and then in negative. Do you like the to drink coffee?
- 2. Supply suitable tags for the following sentences.
  - a. They went to Chennai.
  - b. We don't like to swim
  - c. He is my dearest friend
- Convert the dialogue into reported speech. Ravi: Where are you going? Gopi: I am going to the market.

#### Or

#### Convert the following into direct speech.

My mother asked me if had taken my breakfast. I replied to her that i had taken it at my friend's home.

4. Fill in the blanks with suitable tense forms of the verbs given in the brackets. Substances\_\_\_\_\_(be) made up of smaller particles which \_\_\_\_\_(move) around. Some of

these particles \_\_\_\_\_ (split) further into yet smaller particles.

5. Identify the degrees of comparison and write as positive degree/comparative degree/ superlative degree for the following sentences.

Rama is the cleverest boy in the class. This cell tower is taller than our building. Black colour is not as bright as yellow.

#### 6. Match the following idioms/Phrases with their relevant meaning.

a) This or that

- 1. In human relationships
- b) Dos and don'ts 2.Options that can be explored
- c) Friend or foe 3. Instructions

#### 7. A man approaches you to direct him to a nearby hospital. Write three instructions.



#### III. Answer the following questions as directed:

Read the following advertisement and answer the questions that follow: 1.



#### **Ouestions**

- What is the title of the drama? 1.
- 2. Mention the venue of the drama?
- 3. Where can you get the tickets?
- 4. Who present the drama?
- 5. Give the meaning of the word "ace"
- 2. Place an order for the purchase of sports items for your college.

#### 3. Make a précis of the following passage with a title, topic sentence and note-Making:

Success in life depends largely on good health. Keep your body fit and by cleanliness, fresh air, regular habits and suitable recreation, make yourself strong to play the game and to do it in every sense of the word. Avoid anything that will sap your strength. Smoking in youth stunts the body and clouds the brain. Be temperate in all things and beware of drinks. It is a deadly enemy of health and efficiency.

Above all, remember that your character is a priceless possession. Therefore keep it untarnished. Be truthful in all things, courteous and considerate to everybody, fair to your rivals, kind and helpful to all who are weak and suffering and do not be afraid to have the courage to stand for what is good, pure and noble. Avoid gambling in any form: it is a mean game, trying to get something for nothing at other people's expense.

Make provision for hard times. In your leisure hours, avoid mere idling. Fill such hours with interesting hobbies, good books and with companionships and associations calculated to exercise

over you an influence for good. To a large extent you will be known by the company you keep. 5x3=15

#### IV. Answer any three of the following:

Write a news paper report to the Editor, the Hindu on the Sports day held at your 1. Polytechnic College.

Or

Write a short report( in 50 words) on the process of preparing any fruit juice.

Write an email to your friend inviting him to spend the weekend at Mahabalipuram. 2.

Flacement details of KTC Polytechnic in 2010						
Branch	Accenture	IBM	TCS			
Civil	10	25	45			
Mechanical	50	30	55			
Electrical	30	45	70			
Electronics	20	35	20			

#### **3.** Convert the chart into a paragraph of about 75 words: Placement details of KVC Polytechnic in 2016

#### 4. Convert the verbal text into any suitable diagram:

#### The solar system

Our solar system consists of the sun, the nine planets and the asteroids, comets and meteoroids that are associated with the planets. The nine planets that make up our solar system are Mercury, Venus, Earth, Mars, Jupiter, Uranus, Neptune and Pluto. Mercury is closest to the sun. Venus is after the sun and the moon. Next is the Earth, the only living planet. After Earth is Mars. After Uranus is Neptune. Pluto is the farthest planet from the sun.

#### 5. Develop the following hints into a passage of about 50 words.

Books – best companions – some books entertain – time pass – other books instruct us – enrich knowledge – improve logical thinking – reasoning ability – overall – treasure house of knowledge.

Time: 3 Hrs.

- 1) Answer any five questions in each of Part-A and Part-B and any two divisions of each question in Part-C.
- 2) Each questions carries 2(two marks) in Part-A,3(three marks) in Part-B and 5(five marks) for each division in Part-C.

#### PART – A

- 1. Find the centre and radius of the circle  $x^2 + y^2 + 2x + 2y 7 = 0$ .
- 2. Write down the condition for two circle  $x^2 + y^2 + 2gx + 2fy + c = 0$  and  $x^2 + y^2 + 2g_1x + 2f_1y + c_1 = 0$  to cut orthogonally.
- 3. Find the unit vector along the vector direction  $2\vec{i} \vec{j} \vec{k}$ .
- 4. What are the value of (i) $\vec{i}$ .  $\vec{i}$  and (ii)  $\vec{i} \times \vec{j}$ .
- 5. Evaluate  $\begin{bmatrix} \vec{i} & \vec{j} & \vec{k} \end{bmatrix}$ .
- 6. Evaluate  $\int (x^2 + \sec^2 x) dx$ .
- 7. Evaluate  $\int \frac{dx}{\sqrt{4-x^2}}$ .
- 8. Evaluate  $\int_{1}^{2} x^{2} dx$ .

#### PART-B

- 9. Find the equation of the circle passing through the point (1,1) and concentric to the circle  $x^2 + y^2 + 4x + 6y 15 = 0$ .
- 10. Find the equation of the parabola with its focus at (-1,-2) and x+2y=0 as its directriex.
- 11. Find the modulus and direction cosines of the vector  $2\vec{i} + 3\vec{j} + 4\vec{k}$ .
- 12. Find the value of m' if the vectors  $2\vec{i} + m\vec{j} 3\vec{k}and 3\vec{i} + \vec{j} + 4\vec{k}$  are perpendicular.
- 13. Prove that the vectors  $2\vec{i} \vec{j} + 2\vec{k}$ ,  $5\vec{i} + 2\vec{j} + 3\vec{k}$  and  $4\vec{i} \vec{j} + 4\vec{k}$  are co-planar.
- 14. Evaluate  $\int \cos^3 dx$ .
- 15. Evaluate  $\int \frac{dx}{\sqrt{25-x^2}}$ .
- 16. Evaluate  $\int xe^{6x} dx$ .

#### PART-C

- 17. (a) Find the equation of the circle passing through the point A(1,2) and having its centre at C(4,6).
  - (b) Prove that the circles  $x^2 + y^2 8x + 6y 23 = 0$  and  $x^2 y^2 2x 5y + 16 = 0$  cut orthogonally. (c) Find 'k' such that the equation  $2x^2 + 3xy - 2y^2 - 5x + 5y + k = 0$  represent a pair of straight lines.

18. (a) Show that the points whose position vectors are  $2\vec{i} + 4\vec{j} + 3\vec{k}$ ,  $4\vec{i} + \vec{j} - 4\vec{k}$  and  $6\vec{i} + 5\vec{j} - \vec{k}$  form a right angled triangle.

(b) Prove that the vectors  $\vec{i} + 2\vec{j} + \vec{k}$ ,  $\vec{i} + \vec{j} - 3\vec{k}$  and  $7\vec{i} - 4\vec{j} + \vec{k}$  are mutually perpendicular.

(c)A particle acted on by the forces  $3\vec{i} + 2\vec{j} - 3\vec{k}and\vec{i} + 7\vec{j} + 7\vec{k}$  is displaced from the point  $\vec{i} + 2\vec{j} + 3\vec{k}to$  the point  $3\vec{i} - 5\vec{j} + 4\vec{k}$ , find the total work done by the forces.

19. (a) Find the area of the triangle whose vertices are having position vectors  $\vec{i} + 2\vec{j} + 2\vec{k}$ ,  $\vec{i} + \vec{6j} - 3\vec{k}$  and  $7\vec{i} - 4\vec{j} + 4\vec{k}$ .

(b) find the moment about the point (4,3,2) of the forces represented by  $5\vec{i} - 4\vec{j} + 2\vec{k}$  acting through the point (2,1,-3).

- (c) If  $\vec{a} = \vec{2i} \vec{j} + 2\vec{k}$ ,  $\vec{b} = \vec{i} + \vec{j} + \vec{k}$ ,  $\vec{c} = \vec{i} + 2\vec{j} + 3\vec{k}$  and  $\vec{d} = \vec{i} \vec{j} \vec{k}$  find  $(\vec{a} \times \vec{b})$ .  $(\vec{c} \cdot \vec{d})$ .
- 20.(a) Evlauate: (i)  $\int (x+1)(2x-3)dx$ . (ii)  $\int cos5xcos2xdx$ .
- (b) Evaluate: (i)  $\int (x^2 + x + 1)^5 (2x + 1) dx$  (ii)  $\int \frac{\sec^2 x}{1 + \tan x} dx$ .
- (c) Evaluate: (i)  $\int \frac{dx}{x^2 36}$ . (ii)  $\int \frac{dx}{\sqrt{49 (x+5)^2}}$ .
- 21.(a) Evaluate: (i)  $\int x \cos 3x \, dx$  (ii)  $\int x^2 \log x \, dx$ .
- (b) Evaluate (i)  $\int x^2 \sin 3x \, dx$  (ii)  $\int x^2 e^{5x} \, dx$ .
- (c) Evaluate  $\int_0^{\frac{\pi}{2}} (2 + \sin x)^3 \cos x dx$ .
TIME: 3Hrs

Maximum marks: 75

- 1) Answer any five questions in each of Part-A and Part-B and any two divisions of each question in Part-C.
- 2) Each questions carries 2(two marks) in Part-A, 3(three marks) in Part-B and 5(five marks) for each division in Part-C.

#### Part-A

- 1. If f(x) is a probability density function then what is the value of  $\int_{-\infty}^{+\infty} f(x) dx$ ?
- 2. If the mean and variance of a binomial distribution are 12 and 6, find 'p'.
- 3. If a random variable 'X' follows Poisson distribution such that P(X=1)=P(X=2), find the mean.
- 4. Write down the mean and standard deviation of the standard normal distribution.
- 5. If  $s = 5t^2 + 6t + 5$ , find the initial velocity.
- 6. Find the slope of the normal to the curve  $y = x^3$  at (4,-2).
- 7. State the order and degree of  $\left(\frac{dy}{dx}\right)^2 + 7\frac{d^2y}{dx^2} + 2y = 0.$
- 8. Solve:  $(D^2-48)y=0$ .

#### Part-B

9. If a random variable 'X' has the following probability distribution, find E(X).

X	1	2	3
P(X)	1/2	0	1/2

10. Mention any three properties of Normal curve.

11. If  $x = ae^{t} + be^{-t}$ , that acceleration is always equal the distance passed over.

12. Find the minimum value of  $y = x^2 - 4x$ .

- 13. Solve xdx+ydy=0.
- 14. Find the integrating factor of  $\frac{dy}{dx} + \frac{1}{x}y = x$ .
- 15. Solve :  $(D^2 5D + 6)y = 0$ .
- 16. Find the particular integral of  $(D^2 10D + 1)y = e^{-x}$ .

#### Part-C

17. (a) A random variable 'X' has the following probability distribution

Х	0	1	2	3
P(X)	1/3	1/6	1/6	1/3

Find (i) E(X) and (ii)  $E(X^2)$ .

(b) A random variable 'X' has the following probability distribution

Х	0	1	2	3	4
P(X=x)	a	3a	5a	7a	9a

Find (i)  $a(ii) P(X \ge 2)$ .

(c) In a Binomial distribution if n=15 and P(X=1)=3P(X=0), find the value of 'p'.

18. (a)If 3% electric bulbs manufactured by a company are defective, find the probability that in a sample of 100 bulbs, exactly 5 are defective.

(b) In a normal distribution mean is 10 and standard deviation is 3. Find the probability interval from X=8.6 to X=12.8.

(c) Fit a straight line to the following data

Х	0	1	2	3	4
Y	10	14	19	26	31

19 (a)If the distance travelled equation of a particle is given by s=acos 6t+b sin 6t, show that the acceleration varies as its distance.

(b) Find the equation of the tangents to the curve  $y = x^2 + x - 6at$  the point where it cuts the x-axis.

(c) Find the max. and min. values of  $y = 2x^3 - 15x^2 - 36x + 18$ .

20. (a) Find the volume of a cone of base radius 'r' and height 'h' by using integration.

(b) Solve  $\tan x \sec^2 y dy + \tan y \sec^2 x dx = 0$ .

(c)Solve  $\frac{dy}{dx} - \frac{2y}{x} = x^2 sinx$ .

21. (a)Solve: $(D^2 + D - 2)y = 0$ .

(b) Solve  $(D^2 - 8D + 16)y = 2e^x$ .

(c)Solve  $(D^2 + 16)y = \sin 9x$ .

	E2104-Engineering Physics – II		
	Time : 3 Hrs	Max. Marks : 75	
	PART –A	(5 X 2 = 10)	
	Answer any FIVE questions – All Question carry equal marks.		
1.	Define convection.		
2.	Define critical temperature.		
3.	Mention any two advantages of solar energy.		
4.	What are the conditions for total internal reflection?		
5.	What is remote sensing?		
6.	State Ohm's law.		
7.	How will you convert a galvanometer into ammeter?		
8.	What is doping?		
	PART – B	(5 X 3= 15)	
	Answer any FIVE questions – All Questions carry equal marks.		
9.	Define co-efficient of thermal conductivity and write its unit.		
10.	Define specific heat capacity at constant pressure and at constant volume.		
11.	Write Clausius statement of second law of thermodynamics.		
12.	Define refractive index of the material of the prism.		
13.	States Joule's law of heating and write its equation.		
14.	State Faraday's first and second law of electrolysis.		
15.	Define capacitance of a capacitor and give its unit.		
16.	What are the three different configurations of a transistor?		
	PART – C	(5 X 10 = 50)	
	i) Answer all questions choosing any TWO sub divisions from each question.		
	ii) All sub divisions carry equal marks.		
17.	a) Write the properties of thermal radiation.		

- b) Derive an expression for pressure of gas on the basis of postulates of kinetic theory of gases.
- c) Calculate the value of R from the equation PV=RT.
- 18. a) Air at a pressure of 0.75 m of mercury and volume 1 litre is compressed to a pressure of 1.5 m of mercury under isothermal process. Calculate the resulting volume.
  - b) Describe Linde's process for the liquefaction of air.
  - c) Explain Solar energy and Wind energy.

- 19. a) The angle of a glass prism is 600 and the angle of minimum deviation is 300. Calculate the refractive index of the prism.
  - b) Explain the construction and working of Ruby Laser.
  - c) Explain the components of remote sensing.

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20. a) Derive the condition for balancing Wheatstone's bridge using Kirchoff's laws.

b) A current of 1.5 ampere liberates 600 mg of a metal in 20 minutes, from electrolyte. Calculate the electro chemical equivalent of the metal.

c) Obtain an expression for the torque on a rectangular coil carrying current placed in a uniform magnetic field.

21. a) Explain the energy band diagram of good conductors, insulators and semiconductors.

b) Describe the working of full wave rectifier with a neat circuit diagram using PN junction diode in bridge type configuration.

c) Explain the various levels of integration.

### E2105-ENGINEERING CHEMISTRY – II

# Max.Mark: 75

# PART –A

Time: 3 Hrs

(5x2=10)

(5x3=15)

- I Answer the any five question
- 1. What is greenhouse effect?
- 2. What is green chemistry?
- 3. Give two examples for solid fuel
- 4. What is spalling?
- 5. Give the ores of titanium
- 6. Mention the methods of preparation of metallic powder
- 7. What is grease?
- 8. Give the reaction involved in the polymerization of ethylene.

# PART – B

## II Answer any five questions (All questions carry equal marks)

- 1. Write a note about the formation of acid rain
- Calculate the mass of air required for complete combustion of 10kg of coal containing 80% C, 15% H and 5% ash.
- 3. Give the composition and uses of gun mental
- 4. Write a note on diamond
- 5. State the purposes of glazing
- 6. Write a note on urea formaldehyde resin
- 7. List any three properties of reclaimed rubber
- 8. What is a composite material? Give examples.

# PART - C

(5x10=50)

# Answer any two sub divisions in each of the following question

- III a.Give the harmful effects of ozone layer depletion.
  - b. What is Eutrophication? Give its harmful effects.
  - c. Write a note on sanitary landfill

IV a. What are the produces obtained from petroleum? Mention their uses?

b. The flue gas analysis showed it contained 13.5% CO2, 3.2%O2 and 83.3% N2 by volume. Find the percent excess air supplied.

- c. What are refractory's? How are they classified? Give their Uses.
- V a . How is titanium extracted from its ores?
- b. Write a short note on preparation of metallic powders using chemical reduction of metal oxide
- c. Explain the composition and uses of any three non-ferrous alloys
- VI a. Explain the manufacture of white pottery
- b. Explain classification of lubricants with examples
- c. Write a note on synthetic adhesive
- VII a. Define addition polymerization. Explain the preparation of polyethylene.
- b. How is rubber obtained from latex?
- c. What are the advantages of composite materials over traditional materials?

## **E2106-ENGINEERING PHYSICS PRACTICAL-II**

#### Time: 3Hrs

#### Max.Marks:75

- 1. Determine the refractive index of the given transparent liquid using traveling Microscope.
- 2. Draw the V-I characteristics of the solar cell.
- 3. Measure the angle of the prism and the angle of minimum deviation using Spectrometer and then calculate the refractive index of glass.
- 4. Verify the laws of resistances by connecting the two given standard resistances
- a. in series and (ii) in parallel, using Ohm's law.
- 5. Determine the specific heat capacity of water, using Joule's calorimeter.
- 6. Determine the electro chemical equivalent (e.c.e.) of copper using Copper Voltameter.
- 7. Draw the voltage current characteristics of a P-N junction diode in forward bias and then find the 'dynamic forward resistance' & 'knee voltage' from the graph.
- 8. Find the output conditions for different combinations of the input for NOT gate and 2 inputs AND, OR, NAND & NOR logic gates using IC chips.

# Max.marks:75

# Time:3Hrs

1. Analyse the given Inorganic simple salt and report the acid radical and basic radical present in it.

2. Analyse the given sample of effluent and report the metallic pollutant present in it with procedure and its harmful effects.

#### **E2108-ENGINEERING GRAPHICS-II**

Time: 3 Hrs

Max. Mars: 75

# Answer Part-A and Part-B in the drawing sheet only.

#### Part-A

# Answer ALL questions. Each question carries five marks. $3 \times 5 = 15$ Marks

1. Construct a regular octagon of side 30 mm.

2. A hexagonal prism of base sides 30 mm and its axis 95 mm resting on HP such that two of its base edges parallel to VP. Draw its projections.

3. Draw the development of a cone with radius 25 mm and 70 mm height. The base of the cone is resting on HP and the axis parallel to VP.

#### Part-B

## Answer ANY THREE questions. Each question carries fifteen marks. $3 \times 15 = 45$ Marks

1. A circle of 50 mm diameter rolls along a straight line without slipping. Draw the curve traced out by a point P on the circumference, for one complete revolution of the circle. Name the curve.

2. A triangular prism of base side 30 mm and axis length 55 mm lies on the ground on one of its rectangular faces. Draw its top, front view and when the axis perpendicular to the VP.

3. A cone of base diameter 55mm and height 65mm rests on its base on HP. It is cut by a plane perpendicular to the HP at a distance of 20mm away from the axis. Draw the plan and sectional elevation.

4. Draw the development of surface of the given funnel shown as fig.1.



fig.1.

### Part-C

(Using CAD Software)

# Answer ALL questions.

1. Using CAD create the 3D model of the object whose 2D views are given in Fig.2 15 Marks



Fig.2

# Equivalent of E – Scheme Syllabus:

No equivalent papers.