Diploma in Electronics and Instrumentation Engineering

TEACHING AND EXAMINATION SCHEME

	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			Instruction Periods per week			Total Periods per semester	Credits	Continuous internal evaluation			Semester end examination			
			L	T	P			Mid Sem1	Mid Sem 2	Internal Evaluation	Max marks Min marks		Total Marks	Min marks for passing including internal
1	18EI-101F	Basic English	3	1	0	60	3	20	20	20	40	14	100	35
2	18EI-102F	Basic Engineering Mathematics	3	1	0	60	3	20	20	20	40	14	100	35
3	18EI-103F	Basic Physics	3	1	0	60	3	20	20	20	40	14	100	35
4	18EI-104F	General Engineering Chemistry	3	1	0	60	3	20	20	20	40	14	100	35
5	18EI-105C	Basics of Electrical and Electronics Engineering	3	1	0	60	3	20	20	20	40	14	100	35
6	18EI-106P	Basic Engineering Drawing	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18EI-107P	Basic Computer Aided Drafting	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18EI-108P	Basics of Electrical and Electronics Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18EI-109P-A+B	Basic science lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18EI-110P	Computer Fundamentals Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
11		**Skill Upgradation**	0	0	7	105	2.5	0	0	**Rubrics**			--	-
		TOTAL	20	5	17	630	**25**	200	200	200	400	170	1000	470
	Activities: student performance is to be assessed through Rubrics													

Department of Technical Education

State Board of Technical Education & Training, Telangana

Course Title :Basic English	**Course Code : 18EI-101F**
Semester : I	**Course Group : Foundation**
Teaching Scheme in Periods (L:T:P:) : 36:24:0	**Credits : 3**
Type of Course : Communicative Language Teaching + Assignments	**Total Contact Hours : 60 periods**
CIE : 60 % Weightage	**SEE : 40 % Weightage**

Prerequisites: Basic knowledge of English Language

COURSE OUTCOMES

	At the end of the course the students will have the ability to:
101.1	acquire vocabulary for social interaction
101.2	listen and reciprocate appropriately
101.3	analyse and evaluate the written material
101.4	convey ideas in the form of letters
101.5	express feelings and make requests
101.6	speak and write grammatically correct sentences

CO-PO Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	Mapping POs
101.1	2	1	1	-	-	2	-	3	3	3	1,2,3,6,8,9,10
101.2	2	2	--	2	--	2	--	3	3	3	1,2,4,6,8,9,10
101.3	2	2	--	--	1	1	2	3	3	3	1,2,5,6,7,8,9,10
101.4	2	2	2	--	2	1	2	3	3	3	1,2,3,5,6,7,8,9,10

101.5	2	2	--	--	2	--	2	3	3	3	1,2,5,6,7,8,9,10
101.6	2	2	--	--	--	--	--	3	3	3	1,2,8,9,10

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

S.No	Unit Name	Period	Questions to be set for SEE			Marks Weightage	Weightage %
			R	U	A		
1	Speaking	8	3	1	0	11	10.00%
2	Listening	3	2	0	0	4	3.63%
3	Vocabulary	5	2	1	0	9	8.18%
4	Reading	6	0	2	0	10	9.09 %
5	Grammar	14	3	1	1	21	19.09%
6	Writing	24	0	1	5	55	50.00%
	Total	60	10	6	6	110 marks	100

Legend: R; Remembering, U: Understanding A: Applying

COURSE CONTENTS

UNIT – 1 SPEAKING **Duration: 8 Periods**

1. Need For English
2. Classroom English
3. Expressing Feelings
4. Expressing Likes & Dislikes
5. Making Requests

UNIT - 2: LISTENING **Duration: 3 Periods**

6. Describing Words

UNIT –3: VOCABULARY **Duration: 5 Periods**

7. How to use a Dictionary

8 Words Often Confused

UNIT - 4: READING **Duration: 6 Periods**

9 The Mighty Mountain and Little Lads of Telangana

10 The Adventures of Toto

11 Tiller turns Engineer - An Innovation

UNIT -5: GRAMMAR **Duration: 14 Periods**

12. Tenses

13. Basic Sentence Structures

14. Voice

15. Asking Questions

UNIT- 6: WRITING **Duration: 24 Periods**

16. Paragraph Writing - I

17. Paragraph Writing - II

18. Letter Writing – I

19. Letter Writing – II

Suggested Learning Outcomes:

On completion of the course the students will be able to:

- express feelings, likes and dislikes and make requests
- use describing words, dictionary and distinguish confusing words.
- read, comprehend and answer the questions
- use appropriate tenses, voices, structures and ask questions
- write paragraphs and letters.
- communicate fluently

Internal evaluation

Test	Units	Marks	Pattern
Mid Sem 1	Speaking: 1,3 Listening: 0 Vocabulary:7 Reading:9	20	Part A 5 Short answer questions Part B 2 Essay questions out of 3 Questions Part C 2 Essay questions out of 3 Questions

	Grammar:12,15		
Mid Sem 2	Speaking: 2,4,5 Listening: 6 Vocabulary:8 Reading:10,11 Grammar:13,14	20	Part A 5 Short answer questions Part B 2 Essay questions out of 4 Questions Part C 2 Essay questions out of 3 Questions
Slip Test 1	Speaking: 1,3 Listening: 0 Vocabulary:7 Reading:9 Grammar:12,15	5	2 Essay Questions out of 3 Questions
Slip Test 2	Speaking: 2,4,5 Listening: 6 Vocabulary:8 Reading:10,11 Grammar:13,14	5	2 Essay Questions out of 3 Questions
Assignment	One assignment per one semester	5	Different group assignments of Higher order Questions that develop problem solving skills and critical thinking should be given
Seminars	One seminar per one semester	5	
	Total	60	

Suggested Student Activities

- Listen to a song and answer the questions
- Listen to a passage/conversations/dialogues/speeches and answer the questions
- Role Plays
- Quiz
- Self introduction
- Talking about routines
- Debates
- Elocution
- Selling a product with appropriate vocabulary
- Reading a selected text/news paper for specific purpose
- Using a dictionary
- Reading aloud with proper pronunciation and intonation
- Writing about routines
- Describing people
- Describing places
- Creating Advertisements
- Writing short messages
- Writing a recipe/process
- Interpreting advertisements/classified
- How to use google translate

- Surprise test
- Vocabulary games**:**
    - Cross words
    - Guessing the missing letter
    - Dumb charades

Textbook: English for Polytechnics

REFERENCES:

1. Practical English Grammar by A.J Thomson and A.V. Martinet

2. A Course in Phonetics and Spoken English by J. Sethi and P.V Dhamija

3. Word Power Made Easy by Norman Lewis

4. Games for Language Learning by Andrew Wright, David Betteridge and Michael Buckby

5. Five Minute Activities by Penny Ur

6. Englsh Dialogues by M. Martin

e-learning:

1.www.duolingo.com

2. www.bbc.co.uk

3. www.babbel.com

4. www.merriam-webster.com

5. www.ello.org

6. www.lang-8.com

7. youtube.com

8. Hello English(app)

9. mooc.org

10. https://onlinecourses.nptel.ac.in

Semester End Examination marks distribution

	Short answer	Essay	Marks
Part A	10	0	20
Part B	0	4/6	20
Part C	0	4/6	40
Total	10	8/12	80

Note: Semester end examination will be conducted for 80 marks but will be calculated for 40 marks.

State Board of Technical Education, Telangana State
C18-Semester End Examination (SEE)
Model Paper- 18Common-101F
(Basic English)

Time: 3 Hours **Total Marks: 80**

PART – A

Instructions: **10 Q X2 M = 20 Marks**

i) Answer all the following questions:
ii) Each question carries two marks

1. Write any two expressions used by the students in the classroom.
2. Fill the blanks with suitable expressions of feelings:
    a) I feel _____when I get a first class in diploma first semester.
    b) The teacher was _____ with me when I was late to class.
3. Change the following into requests:
    a) Switch on the fan.
    b) Give me your book.
4. Identify any four describing words in the following paragraph:
    We have a beautiful house near a long, muddy road. Our house is surrounded by rose plants. The tiny white roses shower snowy petals every day. My friends frequently visit our house to enjoy the greenery.
5. Fill the blanks with suitable describing words:
    a) As he is very _____(fat/fit) he cannot run fast.
    b) The tree is so ____(tall/high) that it is difficult to climb.
    c) The____(more/much) money one gets, the ____(less/little) one spends.
6. Use *raise* and *rise* in your own sentences.
7. Use *expect* and *except* in your own sentences**.**
8. Fill in the blanks with the suitable verb forms given in brackets:
    a. She _____ (drink/drinks/drunk) tea every morning.
    b. My parents _____(has been/have been/is been) looking after an orphanage for seven years.
9. Write one sentence each for the following structures:
    a. S V IO DO
    b. S V SC
10. Change the voice of the following sentences:
    a. He teaches English.
    b. He was served tea by his mother.

PART- B

GROUP-I ANSWER ANY TWO QUESTIONS 2x5=10

11. List any five problems you face in learning English and suggest solutions.
12. List at least five steps involved in finding the meaning of 'engineer' in a dictionary
13. Read the following passage and answer the questions that follow:

Subhas Chandra Bose was born in a Bengali Kayasth family on January 23, 1897 in Cuttack (OdiyaBaazar), Orissa, to Janakinath Bose, and Prabhavati Devi. He studied in an Anglo school at Cuttack (now known as Stewart School) until standard 6. He then shifted to Ravenshaw Collegiate School of Cuttack. Then he went to the prestigious Presidency College where he studied briefly. His nationalistic temperament came to light when he was expelled for assaulting Professor Oaten for his anti-India comments.

His high score in the Civil Service examinations meant an almost automatic appointment. He then took his first conscious step as a revolutionary and made up his mind not to jooin the government service. Meanwqhile, Indian nationalists were shocked and outraged because of the Amritsar massacre and the repressive Rowlatt legislation of 1919. Returning to India, Bose wrote for the newspaper Swaraj and took charge of publicity for the Bengal Provincial Congress Committee. His mentor was Chittaranjan Das, spokesman for aggressive nationalism in Bengal. Bose worked for Das when the latter was elected mayor of Calcutta in 1924. In a roundup of nationalists in 1925, Bose was arrested and sent to prison in Mandalay, where he contracted tuberculosis.

Questions:

a. Where was Subhas Chandra Bose born?
b. Who were his parents?
c. Why was Bose expelled from Presidency College?
d. What is the synonym of ‘outrage’?
e. Why was he arrested and sent to Mandalay?

GROUP-I ANSWER ANY TWO QUESTIONS 2x5=10

14. Read the following passage and answer the questions that follow.

In the pond, we find that different organisms live in different regions. This is due to some conditions like availability of different amounts of food, air light, etc. We find organisms like dragonfly, mayfly and kingfisher living above the surface hovering above the pond and then resting over a bamboo pole or a stick jutting out of the surface of the pond. They get food from the surface of the pond.

Organisms like snail, whirling beetle and pond skater live on the surface. The larva of mayfly and dragonfly also live on the surface of the pond. Plants like pistia float on the surface completely while those like the lotus have roots going deep under. On the surface organisms are easily eaten up by others because there is little protection for them. However, there is plenty of food and air and this is why fish usually come to the surface to feed.

Great water boatman, leech and mosquito larva are found in midst of water. Fish and crabs also swim around this region. Pond margins have several grasses, frogs, cranes, crabs, etc. Fish usually lay eggs here. The bottom of the ponds has plants like Hydrilla and animals like mussels, flatworms and some maggots (larva of some insects). Light is minimum here, but food, in the form of dead and decaying matter is in plenty.

Questions:

a) Why do different organisms live in different regions?
b) Where do we find organisms like dragonfly, mayfly and kingfisher?
c) Why do fish usually come to the surface to feed?
d) Where do fish usually lay eggs?
e) Where do plants like Hydrilla grow?

15. Write a paragraph using the hints given below.

Library in our polytechnic – a big hall – several tables and chairs – newspapers – journals – visiting hours – two computers with internet – three cards to each student – 20000 books – many reference books

16. Frame five questions on the basis of the following passage.

Floods generally occur when there is very heavy rainfall. Most commonly, floods are caused when a river overflows its banks and the water spreads to the surrounding areas. Floods are also caused by collapse of a dam built across a river, blocking of river channel by landslides, cyclones, tsunamis, strong tides, storms and sudden melting of large

amounts of snow on mountains. Floods are very common in India. They mostly occur in the plains of northern India. Floods cause damage to life, property and crops. It causes water-logging for several days. Diseases such as cholera, malaria and dengue generally spread in areas hit by the flood. Trees are very helpful in controlling floods. They stop the water from spreading fast. Special dams can also be built to slow down the speed of water.

PART-C

GROUP-I **ANSWER ANY TWO QUESTIONS** **2x10=20**

17. Write a paragraph in 120 words on a movie seen by you recently.
18. Write a letter to your uncle about your plan to visit his place during summer.
19. Write a letter to the Principal of your institute requesting him to provide you admission into hostel.

GROUP-2 **ANSWER ANY TWO QUESTIONS** **2x10=20**

20. Write a paragraph in 120 words about the importance of following traffic rules
21. Write a letter to Rama Publishers, Abids, Hyderabad requesting them to send you a catalogue of books published by them.
22. Write your routine using present simple tense.

Mid Sem Examination marks distribution

	Short answer	Essay	Marks
Part A	5	0	10
Part B	0	2/3	10
Part C	0	2/3	20
Total	5	4/6	40

Note: Mid sem examinations will be conducted for 40 marks but will be calculated for 20 marks.

State Board Of Technical Education
Basic English
18Common-101F
First Semester
Mid Sem -1 Model Paper

Time: 1 hour 30 minutes **Marks : 40**

PART-A

Instructions: 5 X 2 =10 marks

Answer all questions

Each question carries 2 marks

1. How do you feel in the following situations.
   a) You watched your favourite hero's movie.
   b) You stood first in the exam.
   .
2. Fill in the blanks with appropriate verb forms
   a) She ____(go) to her village every year.
   b) He _____(see) the Tajmahal in 2017.
3. Fill in the blanks with appropriate verb forms
   a) I _____(sing) for the last 10 years.
   b) He ____(travels) to the U.S.A. next week.
4. Rewrite the following as yes or no questions
   a) They wrote the exams.
   b) The train is late.
5. Write any 4 ways a dictionary can be used to improve language skills.

PART-B

Instructions: ***2*** X 5 =10 marks

Answer all questions

Each question carries 5 marks

6. What are the problems you faced in learning English?
7. Write a few suggestions to improve one's English.
8. How do you locate a word in a dictionary?

PART-C

Instructions: ***2*** X 10 =20 marks

Answer all questions

Each question carries 10 marks

9. Frame 10 wh questions for the given passage

   Subhas Chandra Bose was born on 23 January 1897 in Cuttack, Orissa. He studied in Cuttack and then moved to Presidency College in Calcutta for further studies. He did his B.A. in Philosophy and went to England to appear for the Civil Services examination.He returned to India and started a newspaper called Swaraj. His mentor Chittaranjan Das was active and open in his criticism of British rule.Bose followed his footsteps and was arrested and sent to prison in Mandalay. He joined the Indian National Congress. Later he parted ways with the Congress. He revived the Indian National Army.

10. Read the passage given and answer the questions

    It was way back in 1972 that NASA began developing a space shuttle that could launch like a rocket but fly and land like an airplane—a unique transportation system for deploying satellites and payloads into outer space. It was indeed a technological wonder as it was reusable unlike the earlier , one shot disposable rockets, which were used to place astronauts and equipment into the Earth's orbit. Basically , a space shuttle consists of an orbiter that carries astronauts and payload attached to solid rocket boosters and an external fuel tank.To lift the space shuttle , weighing about 2 million kg, from the launch pad to its orbit that is about 185 to 643 km above the Earth , the shuttle uses two poweful solid rocket boosters, which provide a thrust of about 11.7 million N. In addition the SRB's support the entire weight of the space shuttle orbiter and fuel tank on the launch pad.

    a) Why is the space shuttle unique?
    b) What are the parts of the space shuttle?
    c) What are the functions of the solid rocket boosters?
    d) What is the space shuttle used for?
    e) Find one word in the passage that means throw away after use.

11. Write 10 sentences in the present continuous verb form describing what is going on around you as you write your exam.

State Board Of Technical Education
Basic English
C-18-Common-101F First Semester
Mid Sem –II
Model Paper

Time: 1 hour 30 minutes **Marks : 40**

PART-A

Instructions: 5 X 2 =10 marks

Answer all questions
Each question carries 2 marks

1. Write any four expressions used by teachers in the classroom.
2. Select appropriate words and fill in the blanks
   a) I am too _____ (weak/week) to do the work.
   b) She did not____ (except/accept)the award.
3. Write any four things that you like about your college.
4. Rewrite the following sentences as requests
   a) Give me your phone
   b) Buy me a cup of coffee
5. Write two sentences each in the given structure
   a) S.V.O.
   b) S.V.IO.DO.

PART—B

Instructions: 2 X5=10 marks
Answer any 2 questions.
Each question carries 5 marks

6. Change the voice for the following sentences.
   a) He is writing the exam.
   b) She has won the award.
   c) They were told a story by the teacher.
   d) She likes sweets.
   e) He was caught by the police.
7. Identify the structure of the given sentences
   a) Birds fly.
   b) I gave her a book.
   c) She ate an apple.
   d) They made him the class leader.
   e) She is beautiful.
8. Write any ten expressions used by students in the classroom.

PART –C

Instructions: 2 X 10 = 20 marks

Answer any 2 questions
Each question carries 10 marks

9. Read the given passage and answer the questions given:

Subhash Chandra Bose was born on 23 January 1897 in Cuttack, Orissa. He studied in Cuttack and then moved to Presidency College in Calcutta for further studies. He did his B.A. in Philosophy and went to England to appear for the Civil Services examination Although he did well in the exam he soon resigned from the services because it meant working against the interests of his country. .He returned to India and started a newspaper called Swaraj. His mentor Chittaranjan Das was active and open in his criticism of British rule. Bose followed his footsteps and was arrested and sent to prison in Mandalay. He joined the Indian National Congress. Later he parted ways with the Congress. He revived the Indian National Army. He is believed to have coined the slogan Jai Hind.

a) Why did Bose go to England?
a) What was Chittaranjan Das's attitude towards the British?
b) How did Bose fight against the British??
c) Why did Bose resign from the Civil Services?
d) Pick the word from the passage which means trusted advisor or guide.

10. Describe your friend using appropriate descriptive words. Also write three things you like and three things that you dislike in him/ her.

11. Identify 10 words of description from the passage.

On hot summer nights, Julio and the other boys sleep out in the yard. They put up a tent in a dark corner, where the trees and the bushes are thick. that way the boys can easily imagine they are in wild , uninhabited country. One evening Mike suggested that they tell ghost stories or tales of bear hunts. After a particularly spine- tingling story, Mike couldn't sleep; he was too nervous. About midnight he saw something move in the shadows." Yeow ! " he cried out. " There is a big bear! It is really huge!" In the sudden confusion , the small tent collapsed on top of the boys; each one seemed eager to go in a different direction . Anxious parents ran out of the nearby house. They found a coal-black dog. Like a bear , this animal was very curious.

Department of Technical Education - TELANGANA

State Board of Technical Education and Training - HYDERABAD

Course Title **: BASIC ENGINEERING MATHEMATICS**	Course Code **: 18EI-102F**
SEMESTER : **I**	Course Group **: COMMON**
Teaching Scheme (L : T : P) : **36 :24: 0 (** in periods))	Credits : **3 Credits**
Type of Course : **Lecture + Assignments**	Total Contact Periods : **60**
CIE : **60 Marks**	SEE : **40 Marks**
Programmes : **Common to all Engineering Diploma Programmes**	

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Periods	Questions for SEE			Marks weightage	Weightage %
			R	**U**	**A**		
1.	**Logarithms ,Partial Fractions:**	**6(2+4)**	**2(1+1)**	**0+1**	**0**	**09(2+7)**	**8**
2	**Matrices and Determinants**	**12**	**1**	**1**	**0**	**12(2+10)**	**11**
3	**Compound angles , Multiple and sub multiple angles**	**12(6+6)**	**2(1+1)**	**1(1+0)**	**1(0+1)**	**24(4+10+10)**	**22**
4.	**Properties of triangles, Hyperbolic functions, Complex Numbers**	**8(2+2+4)**	**3(1+1+1)**	**1(0+0+1)**	**0**	**11(6+5)**	**10**
5.	**Transformations , Inverse trigonometric functions**	**12(6+6)**	**1(1+0)**	**2(1+1)**	**2(1+1)**	**32(2+5+5+10 +10)**	**29**
6.	**Solution of Simultaneous equations using Matrices & Determinants , Solutions of triangles**	**10(6+4)**	**1(0+1)**	**2(1+1)**	**1(1+0)**	**22(2+5+5+10)**	**20**
	Total	**60**	**10**	**6**	**6**	**110**	**100**

R – Remembering : 20 M ; U – Understanding : 40 M ; A -- Application : 50 M

Pre requisites

This course requires the basic knowledge of Algegra, Trigonometry in Mathematics at Secondary school level

Course Outcomes

CO 1	Solve the problems on Logarithms
CO 2	Resolve a given fraction into Partial Fractions
CO 3	Find the Sum , Product of Matrices , Value of the determinant and Inverse of a Matrix .
CO 4	Solve simple problems using concepts of Trigonometric Functions
CO 5	Solve simultaneous Linear Equations using Matrices and Determinants
CO 6	Solve a Triangle and an Inverse Trigonometric Equation .

Course Content :

Algebra

Unit-I

Duration: 06 Periods (L: 3.6 – T: 2.4)

1. **Logarithms:**

Definition of logarithm and its properties, natural and common logarithms; the meaning of e and exponential function, logarithm as a function and its graphical representation – Solve some simple problems.

2. **Partial Fractions:**

Rational, proper and improper fractions of polynomials. Resolving rational fractions in to their partial fractions covering the types mentioned below:

$$i)\quad \frac{f(x)}{(x+a)(x+b)(x+c)} \qquad ii)\quad \frac{f(x)}{(x+a)^2(x+b)(x+c)}$$

$$iii)\quad \frac{f(x)}{(x^2+a)(x+b)} \qquad iv)\quad \frac{f(x)}{(x+a)(x^2+b)^2}$$

Unit – II

Duration: 12 Periods (L: 7.2 – T:4.8)

3. **Matrices and Determinants :** Definition of matrix, types of matrices-examples, algebra of matrices-equality of two matrices, sum , difference , scalar multiplication and product of matrices. Transpose of a Matrix - Symmetric, Skew symmetric matrices - Minor, cofactor of an element - Determinant of a square matrix up to 3rd order - Laplace's expansion,

properties of determinants. Singular and non-singular matrices - Adjoint and multiplicative inverse of a square matrix – related problems.

Trigonometry:

Unit-III

Duration: 12 Periods (L: 7.2 – T: 4.8)

4. **Compound angles**: Formulae of Sin (A±B), Cos (A±B), Tan (A±B), Cot (A±B), and related identities with problems - Derive the values of $\sin 15^0$, $\cos 15^0$, $\sin 75^0$, $\cos 75^0$, $\tan 15^0$, $\tan 75^0$ etc.- Derive identities like $\sin(A+B)\sin(A-B) = \sin^2 A - \sin^2 B$ etc.,

5. **Multiple and sub multiple angles:** Trigonometric ratios of multiple angles 2A, 3A and submultiples angle A/2 with problems - Derive useful allied formulas like $Sin^2A = \left(\frac{1-Cos2A}{2}\right)$ etc., - Solve simple problems using the above formulae

Unit – IV

Duration: 08 Periods (L: 4.2 – T:3.8)

6. **Properties of triangles**: Statements of Sine rule, Cosine rule, Tangent rule and Projection rule

7. **Hyperbolic functions:** Definitions of hyperbolic functions - Sinh x, cosh x ,tanh x etc., - identities of hyperbolic functions, inverse hyperbolic functions and expression of inverse hyperbolic functions in terms of logarithms.

8. **Complex Numbers:** Definition of a complex number, Modulus and conjugate of a complex number, Arithmetic operations on complex numbers, Modulus - Amplitude (polar) form, Exponential (Euler) form of a complex number.

Algebra & Trigonometry

Unit – V

Duration: 12 Periods (L: 7.2 – T:4.8)

9 . **Transformations**: Transformation of products into sums or differences and vice versa - simple problems - Solve problems by applying these formulae to sum or difference or product of three or more terms.

10 **Inverse trigonometric functions:** Define inverses of six trigonometric functions along with their domains and ranges - Derive relations between inverse trigonometric

functions so that given $A=\sin^{-1}x$, express angle A in terms of other inverse trigonometric functions - with examples - State various properties of inverse trigonometric functions and identities like $\sin^{-1}x+\cos^{-1}x = \frac{\pi}{2}$ etc - Derive formulae like $\tan^{-1}x + \tan^{-1}y = \tan^{-1}\left(\frac{x+y}{1-xy}\right)$ *where* $x \geq 0, y \geq 0, xy < 1$ etc., and solve simple problems.

Unit – VI **Duration: 10 Periods (L: 6 – T: 4)**

11. **Solution of Simultaneous equations using Matrices & Determinants.:** System of linear equations in 3 Variables - Solutions by Cramer's rule, Matrix inversion method – Examples - Elementary row operations on Matrices - Gauss-Jordan method to solve a system of equations in 3 unknowns .

12. **Solutions of triangles:** Solve a triangle when (i) three sides (SSS) (ii) two sides and an Included angle (SAS) (iii) one side and two angles are given (SAA) - Simple problems.

References

1. Text Book of Matrices – by Shanthi Narayan

2. Plane Trigonometry - by S. L .Loney

3. NCERT Mathematics Text Books Of Class XI , XII .

4. Intermediate Mathematics Text Books (Telugu Academy)

Suggested E-Learning references

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html

2.E-books:www.mathebook.net

Suggested Learning Outcomes

Algebra

UNIT – I

1.0 Use Logarithms in engineering calculations

1.1 Define logarithm and list its properties.

1.2 Distinguish natural logarithms and common logarithms.

1.3 Explain the meaning of e and exponential function.

1.4 State logarithm as a function and its graphical representation.

1.5 Use the logarithms in engineering calculations.

2.0 Resolve Rational Fraction into sum of Partial Fractions in engineering problems

2.1 Define the following fractions of polynomials:

1. Rational,
2. Proper and
3. Improper

2.2 Explain the procedure of resolving rational fractions of the type mentioned below into partial fractions

$i)\quad \dfrac{f(x)}{(x+a)(x+b)(x+c)}$ $\qquad ii)\quad \dfrac{f(x)}{(x+a)^2(x+b)(x+c)}$

$iii)\quad \dfrac{f(x)}{(x^2+a)(x+b)}$ $\qquad iv)\quad \dfrac{f(x)}{(x+a)(x^2+b)^2}$

UNIT – II

3.0 Use Matrices for solving engineering problems

3.1 Define a matrix and order of a matrix.

3.2 State various types of matrices with examples (emphasis on 3rd order square matrices).

3.3 Compute sum, scalar multiplication and product of matrices.

3.4 Illustrate the properties of these operations such as associative, distributive, commutative properties with examples and counter examples.

3.5 Define the transpose of a matrix and write its properties.

3.6 Define symmetric and skew-symmetric matrices.

3.7 Resolve a square matrix into a sum of symmetric and skew- symmetric matrices with examples in all cases.

3.8 Define minor, co-factor of an element of a 3x3 square matrix with examples.

3.9 Expand the determinant of a 3 x 3 matrix using Laplace expansion formula.

3.10 Distinguish singular and non-singular matrices.

3.11 Apply the properties of determinants to solve problems.

3.12 Define multiplicative inverse of a matrix and list properties of adjoint and inverse.

3.13 Compute adjoint and multiplicative inverse of a square matrix.

Trigonometry :

UNIT – III

4.0 Solve simple problems on Compound Angles

4.1 Define compound angles and state the formulae of sin(A±B), cos(A±B), tan(A±B) and cot(A±B)

4.2 Give simple examples on compound angles to derive the values of $\sin 15^0$, $\cos 15^0$, $\sin 75^0$, $\cos 75^0$, $\tan 15^0$, $\tan 75^0$ etc.

4.3 Derive identities like $\sin(A+B)\sin(A-B) = \sin^2 A - \sin^2 B$ etc.,

4.4 Solve simple problems on compound angles.

5.0 Solve problems using the formulae for Multiple and Sub- multiple Angles

5.1 Derive the formulae of multiple angles 2A, 3A etc and sub multiple angles A/2 in terms of angle A of trigonometric functions.

5.2 Derive useful allied formulas like $\sin A = (1 - \cos 2A)/2$ etc.,

5.3 Solve simple problems using the above formulae

UNIT – IV

6.0 Appreciate Properties of triangles

6.1 State sine rule, cosine rule, tangent rule and projection rule.

7.0 Represent the Hyperbolic Functions in terms of logarithm functions

7.1 Define Sinh x, cosh x and tanh x and list the hyperbolic identities.

7.2 Represent inverse hyperbolic functions in terms of logarithms.

8.0 Represent Complex numbers in various forms

8.1 Define complex number, its modulus , conjugate and list their properties.

8.2 Define the operations on complex numbers with examples.

8.3 Define amplitude of a complex number

8.4 Represent the complex number in various forms like modulus-amplitude (polar) form, Exponential (Euler) form – illustrate with examples.

UNIT – V

9.0 Apply Transformations for solving the problems in Trigonometry

9.1 Derive the formulae on transforming sum or difference of two trigonometric ratios in to a product and vice versa- examples on these formulae.

9.2 Solve problems by applying these formulae to sum or difference or product of three or more terms.

10.0 Use Inverse Trigonometric Functions for solving engineering problems

10.1 Explain the concept of the inverse of a trigonometric function by selecting an appropriate domain and range.

10.2 Define inverses of six trigonometric functions along with their domains and ranges.

10.3 Derive relations between inverse trigonometric functions so that given A= $\sin^{-1}x$, express angle A in terms of other inverse trigonometric functions - with examples.

10.4 State various properties of inverse trigonometric functions and identities like $\sin^{-1}x+\cos^{-1}x = \frac{\pi}{2}$ etc.

10.5 Derive formulae like $\tan^{-1}x + \tan^{-1}y = \tan^{-1}\left(\frac{x+y}{1-xy}\right),\ where\ x \geq 0, y \geq 0, xy < 1$ etc., and solve simple problems.

UNIT – VI

11.0 Apply Matrices and Determinants in solving system of Linear Equations

11.1 Solve system of 3 linear equations in 3 unknowns using Cramer's rule.

11.2 Solve system of 3 linear equations in 3 unknowns by matrix inversion method

11.3 State elementary row operations.

11.4 Solve a system of 3 linear equations in 3 unknowns by Gauss- Jordan method

12.0 Apply Properties of Triangles to solve a triangle .

12.1 Solve a triangle when (i) three sides, (ii) two sides and an included angle, (iii) two sides and an opposite angle-case of two solutions and (iv) one side and two angles are given.

Suggested Student Activities

1. Student visits Library to refer Standard Books on Mathematics and collect related material .
2 .Quiz
3.Group discussion
4.Surprise test
5. Seminar

Question Paper Blue Print for SEE

Course: ENGG. MATHEMATICS –I CODE: 18COMMON102F

UNIT No./NAME		No. of Hours	PART – A 2 Marks	PART – B 5 Marks	PART– C 10 Marks	Marks weightage	Weightage (%)
1	a).Logarithms	02	01	----	----	09	08
	b).Partial Fractions	04	01	01	----		

2	Matrices and determinants	12	01	----	01	12	11
3	a).Compound Angles	06	01	----	01	24	22
	b)Multiple angles & Submultiple angles	06	01	----	01		
4	a).Properties of triangles	02	01	----	----	11	10
	b).Hyperbolic Functions	02	01	----	----		
	c).Complex numbers	04	01	01	----		
5	a).Transformations	06	01	01	01	32	29
	b).Inverse Trigonometric Functions	06	----	01	01		
6	a).Solutions of Simultaneous Equations	06	----	01	01	22	20
	b).Solutions of Triangles	04	01	01	----		
TOTAL		60	10	06	06	110	100
Questions to be Answered			10	04	04	80	

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Code: C18Common102F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

DIPLOMA EXAMINATIONS, MODEL PAPER ,I SEMESTER

BASIC ENGINEERING MATHEMATICS

SEMESTER END EXAMINATION

TIME : 3 Hours Max. Marks: 80

PART – A Marks: 10 X 2 = 20

*NOTE: 1) Answe r **ALL**questions and each question carries **Two** marks.*

*2) Answers should be brief and straight to the point and shall not exceed**three**simple sentences*

1. Find the value of $\log_8 2$

2. Define Proper fraction and give an example.

3. If A= $\begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}$ *and* $B = \begin{bmatrix} 4 & -1 \\ 3 & 2 \end{bmatrix}$ Compute 3A+ 5B.

4. Write the formulae for Sin (A + B) and Cos (A– B)

5. If TanA = 2, Find the valueof Sin2A.

6. Write the formula for Cosine rule.

7. State any two formulae from Hyperbolic Functions.

8. Find the Modulus of $\frac{2}{3-4i}$

9. Express Sin5A – Sin3A as a Product.

10. Find angle C in any ΔABC, if b = $\sqrt{2}$,c = $\sqrt{3}$, B = 45^0

PART – B

GROUP-1 **Answer any TWO questions** **2 x 5 = 10**

11 .Resolve $\frac{2x+3}{x^2-2x-3}$ into Partial Fractions.

12. Find the additive and multiplicative inverse of the complex number $\frac{9}{2+i\sqrt{5}}$

13. Show that $\frac{Cos17A + Cos7A}{Sin17A + Sin7A} = Cot\ 12A$

GROUP-2 **Answer any TWO questions** **2 x 5 = 10**

14.Prove that $\tan^{-1}\frac{3}{5} + \sin^{-1}\frac{3}{5} = \cot^{-1}\frac{11}{27}$.

15.Solve the following equations by Crammer's rule:

x + y + z = 2, x +2y + 3z = 1 and 3x +y – 5z = 4.

16.Solve the ∆ABC, if a = 5, b = 13, c = 12

PART – C

GROUP-1 **Answer any TWO questions** **2 x 10= 20**

17. Prove that $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix}$ = (a + b+ c)^3.

18. a) If TanA = 5/6 and TanB = 1/11, Show that A + B = π/4**.**

b) If A + B = π/4**,** Prove that (1– CotA)(1– CotB) = 2 .

19 .a)Show that $Sin5\theta = 16Sin^5\theta - 20Sin^3\theta + 5Sin\theta$.

b)Prove that Cos20^0 Cos30^0 Cos40^0 Cos80^0 = $\frac{\sqrt{3}}{16}$.

GROUP-2 **Answer any TWO questions** **2 x 10 = 20**

20a). If Cosx + Cosy = 3/5 and Cosx– Cosy = 2/7, then Prove that

$21\tan\frac{x-y}{2} + 10\cot\frac{x+y}{2} = 0$

b). Prove that Sin^{2}A + Sin^2 (60^0 + A) +Sin^2 (60^0 –A) = $\frac{3}{2}$.

21a). If $Sin^{-1}x + Sin^{-1}y + Sin^{-1}z = \pi$, then Prove that $x\sqrt{1-y^2} + y\sqrt{1-x^2} = z$.

b) Solve: $Tan^{-1}(1+x) + Tan^{-1}(1-x) = Tan^{-1}\frac{1}{2}$.

22. Solve the following equations by Matrix Inversion method

x + y + z = 3, x +2y + 3z = 4 and x +4y + 9z = 6 .

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Code: C18-Common-102F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

BOARD DIPLOMA EXAMINATIONS

MID SEM –I , MODEL PAPER , I SEMESTER

BASIC ENGINEERING MATHEMATICS

TIME : 1: 30 Hours Max. Marks: 40

PART – A Marks: 5 X 2 = 10

NOTE: 1) Answer ***ALL*** *questions and each question carries* ***Two*** *marks.*

2) Answers should be brief and straight to the point and shall not exceed ***three*** *simple sentences*

1. Find the value of $\log_8 2$

2. Define Proper fraction and give an example.

3. If A= $\begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}$ *and* $B = \begin{bmatrix} 4 & -1 \\ 3 & 2 \end{bmatrix}$ Compute 3A+ 5B.

4. Find the value of $\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$

5. Define a Singular matrix and give an example .

PART – B Marks : 2 X 5 = 10

NOTE: 1) Answer ***any two*** *questions and each question carries* ***Five*** *marks*

2) The answers should be comprehensive and the criteria for valuation is the content

but not the length of the answer.

6. Resolve : $\frac{x}{(x-1)(x-2)}$ in to partial fractions

7. If $\begin{pmatrix} 2 & 1 & 2 \\ 1 & 4 & 1 \\ 1 & 3 & 2 \end{pmatrix}$, then Compute $A^2 + 2A - 3I$, where I is a unit matrix of order 3 .

8. Find x , if $\begin{vmatrix} 2 & 3 & 5 \\ 2 & x & 5 \\ 3 & -1 & 2 \end{vmatrix} = 0$

PART – C

Marks : 2 X 10 = 20

NOTE : 1)Answer any **Two** questions and each question carries **Ten** marks
2)The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

9. Resolve **:** $\frac{9}{(x-1)(x+2)^2}$

10 . If $A = \frac{1}{3}\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{bmatrix}$, *then show that* $A^{-1} = A^T$

11. Show that $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$.

Code: C18-Common-102F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

BOARD DIPLOMA EXAMINATIONS

MID SEM –II , MODEL PAPER , I SEMESTER

BASIC ENGINEERING MATHEMATICS

TIME : 1: 30 Hours Max. Marks: 40

PART – A Marks: 5 X 2 = 10

*NOTE: 1) Answe **ALL**questions and each question carries **Two** marks.*

*2) Answers should be brief and straight to the point and shall not exceed **three** simple sentences*

1. Write the formulae for Sin (A - B) and Cos (A – B)
2. If TanA = 2, Find the value of Cos2A.
3. Write the formula for Cosine rule.
4. State any two formulae from Hyperbolic Functions.
5. Find the Modulus of $\frac{2}{3+2i}$

PART – B Marks : 2 X 5 = 10

*NOTE: 1) Answer **any two** questions and each question carries **Five** marks*

2) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

6. Show that $\frac{Cos\,12+Sin12}{Cos12-Sin12}$ = Tan57 .
7. Prove that $Cos20^0\ Cos30^0\ Cos40^0\ Cos80^0 = \frac{\sqrt{3}}{16}$.
8. Find the modulus amplitude form of $z = \frac{1}{2+4i}$

PART – C Marks : 2 X 10 = 20

NOTE : 1)Answer any **Two** questions and each question carries **Ten** marks
2)The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

9a) . If $TanA = \frac{1}{2}$ *and* $TanB = \frac{1}{3}$ *then show that* $A + B = {}^{\pi}/_{4}$

b) If $A + B = 135^0$ *,then prove that* $(1 + CotA)(1 + CotB) = 2$

10a) Prove that $\frac{SinA + Sin2A}{1 + CosA + Cos2A} = TanA$

b) Prove that $Sin10.Sin50.Sin70 = \frac{1}{8}$.

11a) Find the additive and multiplicative Inverse of 4 + 3i

b) Express the complex number $\frac{1+i}{1-i}$ in Exponential form

CO / PO - MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1	3	2	2								1,2,3
CO2	3	2	2							3	1,2,3,10
CO3	3	2	2								1,2,3
CO4	3	2	2							3	1,2,3,10
CO5	3	2	2								1,2,3
CO6	3	2	2								1,2,3

Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title	Basic Physics	**Course Code**	18EI-103F
Semester	Semester-I	**Course Group**	Core
Teaching Scheme in Pds/Hrs(L:T:P)	30:15:0 Hrs 40:20:00 Pds	**Credits**	3
Type of course	Lecture+Assignments	**Total Contact Hrs**	60Pds
CIE	60 Marks	**SEE**	40 Marks

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Question to be set for SEE			Marks Weightage	Weightage (%)
			R	U	A		
1	UNITS, DIMENSIONS AND FRICTION	10	1(2M)	1(5M)	0	07	6.36
2	ELEMENTS OF VECTORS	10	1(2M)	1(5M)	1(10M)	17	15.46
3	MECHANICS	10	1(2M)	1(5M)	1(10M)	17	15.46
4	PROPERTIES OF MATTER	10	1(2M)	1(5M)	0	07	6.36
5	HEAT AND THERMODYNAMICS	10	3(2M+2M+2M)	1(5M)	2(10M+10M)	31	28.18
6	CONSERVATION LAWS AND ENERGY SOURCES	10	3(2M+2M+2M)	1(5M)	2(10M+10M)	31	28.18
	TOTAL	**60**	**10(20M)**	**06(30M)**	**06(60M)**	**110**	**100.00**

Cognitive levels: R=Remember, U=Understand, A=Apply

Pre requisites: Basic High school science, basic mathematics

Course Objectives: After studying this course, the student will be able to understand and appreciate the role of Engineering Physics in different areas of engineering and technology.

Course outcomes: On successful completion of the course, the student will have the ability to attain below Course outcomes (CO):

Course Outcomes		Linked POs	Teaching Hours
CO 1	Write the correct units and dimensions of physical quantities and know the concept of friction	PO1,PO2	10
CO 2	Apply knowledge of vectors as a tool to solve engineering problems	PO1, PO2	10
CO 3	Apply knowledge of mechanics to solve engineering problems	PO1, PO2	10
CO 4	Apply knowledge of properties of matter to understand engineering problems	PO1, PO2	10
CO 5	Apply Heat and thermodynamic processes to solve engineering problems	PO1, PO2	10
CO 6	Apply conservation laws to engineering problems and utilization of energy sources	PO1, PO2, PO3,PO6	10

BASIC PHYSICS

COURSE CONTENTS

1. UNIT – 1 UNITS, DIMENSIONS AND FRICTION

Duration: 10 periods (L: 6.0 – T: 4.0)

Physical quantity - Fundamental and derived quantities – Unit –definitions - S.I units - Advantages of S.I. units - Dimensions and dimensional formula - definitions-units and dimensional formula for physical quantities - Principle of homogeneity - Applications of dimensional analysis–Friction – causes - types of friction - Normal reaction - Laws of static friction - coefficients of friction - expression- rough horizontal surface - expressions for Acceleration, Displacement, Time taken to come to rest and Work done Advantages and disadvantages of friction - Methods to reduce friction – Problems on friction only.

2. UNIT – 2 ELEMENTS OF VECTORS Duration: 10 periods (L:6.0 – T: 4.0)

Scalar and vector quantities – definitions and examples – Graphical representation of a vector - Classification of vectors (Proper vector, Unit vector, Equal vector, Negative vector, Collinear vector and Position vector) Resolution of vector - Triangle law of vector addition – Parallelogram law of vectors – statement- expression for magnitude and direction of resultant vector –derivation- illustrations(working of sling and flying bird) - Representation of a vector in unit vectors **i**, **j** and **k** – Dot product of vectors-definition-application to work done by force – properties of dot product - Cross product of vectors –definition – Right hand thumb rule and right hand screw rule - application to moment of force - properties of vector product - area of parallelogram and triangle in terms of cross product - - related problems

3. UNIT – 3 MECHANICS Duration: 10 periods (L:6.0 – T: 4.0)

Projectile motion – definition - examples - Horizontal projection – Time of flight and Horizontal range – derivations - Oblique projection – Expression for path of a projectile in oblique projection - derivation– Maximum height, Time of ascent, Time of descent, Time of flight and Horizontal range and maximum horizontal range - derivations – Circular motion, angular velocity, time period and frequency of revolutions–Definitions– Relation between linear velocity and angular velocity - derivation–centripetal force – centrifugal force – definitions and expressions only- application (banking of curved path) - angle of banking- expression only - related problems

4. UNIT – 4 PROPERTIES OF MATTER Duration: 10 periods (L:6.0 – T: 4.0)

Elasticity and plasticity- definitions - Stress and Strain – definitions and expressions - elastic limit - Hooke's law – statement - modulus of elasticity - Young's modulus – Derivation – Cohesive and adhesive forces - Surface tension - Illustrations - Capillarity – angle of contact – definition- examples for capillarity- Formula for Surface tension based on capillarity (no derivation) – Viscosity - Illustrations of viscosity - Newton's formula for viscous force – derivation - Coefficient of viscosity - Poiseuille's equation - Effect of temperature on viscosity of liquids and gases– streamlines - laminar flow-turbulent flow-Reynold's number- equation of continuity – statement - related problems.

5. UNIT – 5 HEAT AND THERMODYNAMICS

Duration: 10 periods (L:6.0 – T: 4.0)

Heat – expansion of gases - Boyle's law –concept of absolute zero - Absolute scale of temperature – Charles' laws - Ideal gas equation – derivation - value of universal gas constant 'R' – Isothermal and Adiabatic, processes - Differences between isothermal and adiabatic processes - Internal energy and external work done – Expression for work done – derivation – first law of thermodynamics –application of first law to isothermal, and adiabatic processes - second law of thermodynamics – specific heat of a gas – molar specific heat of a gas – definitions – derive relation between C_P and C_v- related problems.

6. UNIT – 6 CONSERVATION LAWS AND ENERGY SOURCES

Duration: 10 periods (L:6.0 – T: 4.0)

Work and Energy - Potential Energy and kinetic energy–examples – expressions for PE and KE-derivations - Work- Energy theorem – derivation – Law of conservation of energy – examples - Law of conservation of energy in the case of freely falling body – proof – Illustration of conservation of energy in the case of simple pendulum– Non renewable and renewable energy sources – definition and applications (solar cooker, wind mill and biogas) – Green house effect - related problems

References:

1. **Engineering. Physics by R.K. Gaur, S.L. Gupta, Dhanpatrai Publications, New Delhi.**
2. **ISC Physics, Book I&II, P. Vivekanandan, DK Banerjee, S Chand, New Delhi.**
3. **Intermediate Physics, Vol. I&II, Telugu Academy, TS, Hyderabad.**
4. **Fundamentals of Physics by Halliday and Resnick.**

Suggested learning outcomes:

Upon completion of the course the student shall be able to

1. know the concepts of units, dimensions and friction

1.1 Define Physical quantity, fundamental quantity and derived physical quantities
1.2 Define Unit.
1.3 List advantages of S.I. units
1.4 Define dimensions and dimensional formula.
1.5 Write dimensional formulae of physical quantities
1.6 State principle of homogeneity of dimensions.
1.7 State applications of dimensional analysis.
1.8 Define friction and state its causes.
1.9 State types of friction
1.10 Explain normal reaction.
1.11 State laws of friction.
1.12 Define coefficients of friction.
1.13 Derive expression for acceleration of a body moving on rough horizontal surface.
1.14 Derive expressions for displacement and time taken to come to rest and work done in the case of a body moving on a rough horizontal surface.
1.15 List the advantages and disadvantages of friction.
1.16 Solve related numerical problems in friction only.

2. know the concepts of Elements of Vectors

2.1 Define scalar and vector quantities with examples.
2.2 Represent a vector graphically.
2.3 Classify types of vectors – Proper vector, Unit vector, Equal vector, Negative vector,

Collinear vector and Position vector.

2.4 Resolve a vector – Vector and Scalar components and relation between them.
2.5 State and explain Triangle law of vector addition
2.6 State Parallelogram law – derive expression for magnitude and direction of resultant vector.
2.7 Illustrations of parallelogram law – working of sling and flying bird.
2.8 Representation of vector in terms of unit vectors (**i,j,k**)
2.9 Define Dot product of vectors
2.10 Application of dot product for work done by force.
2.11 List the properties of dot product.
2.12 Define Cross product of vectors.
2.13 Apply cross product in the case of moment of force.
2.14 Explain Right hand screw rule and right hand thumb rule.
2.15 Expressions for area of parallelogram and triangle in terms of cross product.
2.16 List the properties of cross product.
2.17 Solve related problems

3. know the concepts of Mechanics

3.1 Define Projectile motion with examples
3.2 Define Horizontal projection – Derive expressions for (a) Time of flight (b) Horizontal range
3.3 Define Oblique projection- Derive expression for path of a projectile in oblique projection.
3.4 Derive expressions for (a) Maximum height (b) Time of ascent (c) Time of descent (d) Time of flight (e) Horizontal range and (f) maximum horizontal range in oblique projection.
3.5 Define circular motion.
3.6 Define angular velocity, time period and frequency of revolutions in circular motion.
3.7 Derive the relation between linear velocity and angular velocity.
3.8 Define centripetal and centrifugal forces.
3.9 Define angle of banking.
3.10 Explain banking of curved path and write the expression for angle of banking.
3.11 Solve related numerical problems.

4. know the concepts of Properties of matter

4.1 Define the terms Elasticity and Plasticity with examples
4.2 Define Stress and Strain and write their expressions.
4.3 Define elastic limit and state Hooke's law.
4.4 Define modulus of elasticity.
4.5 Define Young's modulus
4.6 Derive the formula for Young's modulus.
4.7 Define cohesive force and adhesive force.
4.8 Define Surface tension. Give illustrations of Surface tension
4.9 Define capillarity and angle of contact.
4.10 List the examples for capillarity.
4.11 Write the formula for Surface tension T = ½ hdgr based on capillarity.
4.12 Define Viscosity. Give illustrations of viscosity.

4.13 Derive Newton's formula for viscous force.
4.14 Define coefficient of viscosity.
4.15 Write Poiseuille's equation for coefficient of viscosity.
4.16 Discuss effect of temperature on viscosity of liquids and gases.
4.17 Define streamline flow, turbulent flow.
4.18 Define Reynold's number.
4.19 State equation of continuity and explain the terms with diagram.
4.20 Solve related problems

5. know the concepts of Heat and Thermodynamics

5.1 Explain expansion of gases.
5.2 State and explain Boyle's law and its limitations
5.3 Explain concept of absolute zero using the relations $P_t=P_0(1+t/273)$ and $V_t= V_0(1+ t/273)$
5.4 Define Absolute scale of temperature
5.5 State Charles' law in terms of absolute temperature
5.6 Define Ideal gas and derive ideal gas equation
5.7 Calculate the value of Universal gas constant (R)
5.8 State gas equation in terms of density
5.9 Define Isothermal and Adiabatic processes.
5.10 Distinguish between isothermal and adiabatic processes.
5.11 Explain the terms internal energy and external work done
5.12 Derive the expression for work done by the gas $[W=P(V_2-V_1)]$
5.13 State first law of thermodynamics.
5.14 Application of first law to isothermal and adiabatic processes.
5.15 State second law of thermodynamics.
5.16 Define specific heat a gas.
5.17 Define molar specific heat of a gas.
5.18 Derive the relation between C_P, C_v and R.
5.19 Solve related problems

6. know the concepts of conservation laws and energy sources

6.1 Define work and energy.
6.2 Define potential and kinetic energy with examples
6.3 Derive the expressions for Potential energy and Kinetic energy.
6.4 State and prove Work-Energy theorem.
6.5 State law of conservation of energy with example.
6.6 Derive the law of conservation of energy in the case of a freely falling body.
6.7 Illustrate law of conservation of energy in the case of simple pendulum.
6.8 Define non renewable and renewable energy sources. Give examples
6.9 Explain solar cooker, wind mill and biogas.
6.10 Explain briefly Green house effect.
6.11 Solve related numerical problems.

Internal evaluation

Test	Units	Marks	Pattern
Mid Sem 1	1 and 2	20	Part A-5 Short answer questions Part B-2 Essay questions out of 3 Questions Part C-2 Essay questions out of 3 Questions
Mid Sem 2	3 and 4	20	Part A-5 Short answer questions Part B-2 Essay questions out of 3 Questions Part C-2 Essay questions out of 3 Questions
Slip Test 1	1 and 2	5	2 Essay Questions out of 3 Questions
Slip Test 2	3 and 4	5	2 Essay Questions out of 3 Questions
Assignment	1	5	Different group assignments of Higher order Questions that develop problem solving skills and critical thinking should be given
Seminars	1	5	
	Total	60	

Suggested Student Activities

1. Student visits Library to refer Text books, reference books and manuals to find their specifications.
2. Student inspects the available equipment in the Physics Lab to familiarize with them.
3. Quiz
4. Seminar
5. Group discussion
6. Surprise test

Mid term Examination marks distribution

	Short Answer	Essay	Marks
Part A	5	0	10
Part B	0	2/3	10
Part C	0	2/3	20
Total	5	4/6	40

MODEL QUESTION PAPER (MID SEM-I)

BOARD DIPLOMA EXAMINATION, (C-18)

FIRST SEMESTER, 18 COMMON-103F

BASIC PHYSICS

Time: $1\frac{1}{2}$ Hours] [Max Marks: 40

PART-A

Answer **ALL** questions. Each question carries two marks. 5 x 2 = 10

1. Define fundamental quantity.
2. What is a unit? Give example.
3. Write the causes of friction.
4. Define vector quantity.
5. State whether dot product is a scalar or vector. Give reason.

PART-B

Answer any **TWO** questions. Each question carries five marks. 2 x 5 = 10

6. Define dimensions and dimensional formula. Give the general form of dimensional formula.
7. What is principle of homogeneity? Explain with an example.
8. State Right hand screw rule and right hand thumb rule. Why are these rules used?

PART-C

Answer any **TWO** questions. Each question carries ten marks. 2 x 10 = 20

9. (a) Write base and supplementary units of S.I. system along with symbols. (5)
   (b) State the advantages of S.I. units. (5)
10. (a) State the laws of friction. (5)
    (b) Write the methods of reducing friction. (5)

11.(a) Derive an expression for displacement, time taken to come to rest and work done in case of a body moving on a rough horizontal surface. (6)

(b) Find the work done in moving a body of mass 80 kg through a distance of 60 m on a rough horizontal surface if the coefficient of friction is 0.25. (4)

MODEL QUESTION PAPER (MID SEM-II)

BOARD DIPLOMA EXAMINATION, (C-18)

FIRST SEMESTER, 18 COMMON-103F

BASIC PHYSICS

Time: $1\frac{1}{2}$ Hours] [Max Marks: 40

PART-A

Answer **ALL** questions. Each question carries two marks. 5 x 2 = 10

1. A body is projected into air with velocity of 19.6 m/s and $\theta = 30^0$. Find time of flight.
2. Define angular velocity and time period in case of circular motion.
3. Define cohesive force and adhesive force.
4. Write applications of capillarity.
5. Write how viscosity of gases and liquids changes with temperature.

PART-B

Answer any **TWO** questions. Each question carries five marks. 2 x 5 = 10

6. Define centripetal and centrifugal force. Write expression for angle of banking. (4+1)
7. Derive formula for maximum height and time of ascent in case of oblique projection.
8. Define the terms streamline flow, turbulent flow and Reynold's number.

PART-C

Answer any **TWO** questions. Each question carries ten marks. 2 x 10 = 20

9. (a) Define horizontal range and derive formula for it in case of oblique projection. (6)
   (b) When is range is maximum and derive formula for maximum height? (4)
10. (a) Show that path of oblique projection is a parabola. (6)
    (b) A body is projected into air with velocity 20 m/s at an angle 60^0 . Find its position after 1 second. (4)

11. (a) Derive formula for Young's modulus of a wire. (6)
    (b) A wire of length of 50 cm diameter 2 mm subjected to a force of 10 N. Find its elongation?($Y=2x10^8$) (4)

Semester End Examination marks distribution

	Short Answer	Essay	Marks
Part A	10	0	20
Part B	0	4/6	20
Part C	0	4/6	40
Total	10	8/12	80

18COMMON-103F

BOARD DIPLOMA EXAMINATION, (C-18)

MODEL PAPER

FIRST SEMESTER EXAMINATION

BASIC PHYSICS

Time: 3 Hours] **[Max Marks: 80**

PART-A **10 x 2 = 20**

Instructions: (1) Answer **ALL** questions.
(2) Each question carries **TWO** marks.

1. Define fundamental and derived physical quantities.
2. Define vector and give one example.
3. Define projectile and give one example.
4. State Hooke's law.
5. Define absolute zero and absolute temperature.
6. Define the term internal energy.
7. Define two types of specific heats.
8. Define kinetic energy and give one example.
9. Define renewable and non renewable energy sources.
10. Define potential energy and give one example.

PART-B

GROUP-1 **Answer any TWO questions** **2 x 5 = 10**

11. Derive formula for distance and time taken for a body come to rest on rough horizontal surface.
12. Define scalar product and write any three properties.
13. Derive formula for horizontal range and time taken in case of horizontal projection.

GROUP-2 **Answer any TWO questions** **2 x 5 = 10**

14. Define surface tension. Write formula for surface tension based on capillarity and explain the terms involved in it.
15. Write differences between isothermal and adiabatic processes.
16. Explain simple pendulum based on law of conservation of energy.

PART-C

GROUP-1 **Answer any TWO questions** **2 x 10 = 20**

17. (a) State parallelogram law of vectors and derive expression for resultant vector both in magnitude and direction. (7)

(b) Find the area of triangle formed by two vectors $\mathbf{A}=\mathbf{2}i+\mathbf{j}-2k$ and $B = 3\mathbf{i}-\mathbf{j}+2\mathbf{k}$ as sides. (3)

18. (a) Show that the path of oblique projection is parabola. (7)

(b) An athelete throws a javelline obliquely with a velocity 20 m/s. Find maximum range reached by javelline. (3)

19.(a) Derive ideal gas equation. (6)

(b) A gas of 2 lit at NTP is subjected to a process such that final pressure becomes 38 cm of Hg and temperature 27^0 C. Find its final volume. (4)

GROUP-2 Answer any TWO questions 2 x 10 = 20

20. (a) State first law of thermodynamics. Apply it in case of isothermal and adiabatic processes. (2+4)

(b) At constant pressure of 2×10^5 N/m^2, the volume of a gas changed from 20 cc to 60 cc. Find the work done by the gas. (4)

21. (a) State and prove work-energy theorem. (6)

(b) A bullet of mass 100 gm moving with a velocity 72 kmph on piercing wooden block of thickness 20 cm, final velocity becomes 18 kmph. Find the resistance offered by block. (4)

22. (a) State and prove law of conservation of energy in the case of freely falling body.(7)

(b) A body is falling freely from a height 10 m towards ground. Find its P.E. and K.E. at a position 3 m from ground level. (3)

Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title: **General Engineering Chemistry**	Course Code: 18EI-**104F**
Semester : **Semester I**	Course Group :
Teaching Scheme in Hrs(L:T:P) : 3**0:15:0**	Credits : **3**
Type of course : **Lecture + Assignments**	Total Contact Hours : **60Pds**
CIE : **60 Marks**	SEE : **40 Marks**

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Period	Questions to be set for SEE			Marks Weightage	Weightage (%)
			R (Section A)	U (Section B)	A (Section C)		
1	Fundamentals of Chemistry	10	2M + 2M	5M	5M	14	12.73
2	Solutions and Colloids	10	2M	5M	5M	12	10.9
3	Acids and Bases	10	2M	5M	5M	12	10.9
4	Environmental Studies-I	10	2M + 2M	5M	5M	14	12.73
5	Water Technology	10	2M+2M	5M	20M	29	26.37
6	Electro Chemistry	10	2M+2M	5M	20M	29	26.37
	Total	60	20	30	60	110	100

Prerequisite: Basic knowledge of chemistry in secondary education.

Course Objectives: After studying this course, the student will be able to understand and appreciate the role of Chemistry and environmental studies in different spheres of industries.

Course Outcome: On successful completion of of the course, the students will have ability to attain below Course Outcomes (CO):

CO	Course outcome	CL	Linked PO	Teaching periods
CO1	Explain Bohr's atomic model, the different types of chemical bonding in certain molecules and concept of oxidation, reduction and oxidation number	R/U/A	1,2,9	**10**
CO2	Understand and explain mole, molarity and normality and solve the problems and colloids and their applications.	R/U/A	1,2,9	**10**
CO3	Explain the different theories of acids and bases , concept of pH, buffer solutions and buffer action.	R/U/A	1,2,3,9	**10**
CO4	Compare the renewable and non renewable energy sources, to take measures to protect the biodiversity and also the environment.	R/U/A	1,2,5,6,7,9,10	**10**
CO5	Distinguish the temporary and permanent hardness, apply the different methods of softening of hard water and desalination.	R/U/A	1,2,3,9,10	**10**
CO6	Explain electrolysis and applications of electrolysis, Solve the problems on Faraday's laws of electrolysis	R/U/A	12,3, 4.	**10**
	Total Periods			**60**

Cognitive levels: R = Remember, U= Understand, A = Apply

GENERAL ENGINEERING CHEMISTRY

COURSE CONTENTS

UNIT-I: Fundamentals of Chemistry (10Periods)

Atomic Structure: Introduction – Atomic number – Mass number- Bohr's Atomic theory - Aufbau principle - Hund's rule - Pauli's exclusion Principle- Orbitals, shapes of s, p and d orbitals - Electronic configuration of elements

Chemical Bonding: Introduction – Electronic theory of valency - Types of chemical bonds - Ionic, covalent and co-ordinate covalent bond with examples - Properties of Ionic and Covalent compounds

Oxidation-Reduction: Electronic Concepts of Oxidation-Reduction, Oxidation Number- calculations.

UNIT-II: Solutions and Colloids (10 Periods)

Introduction-Classification of solutions based on physical state- Molecular weights ,Equivalent weights- Expression of concentration – Mole concept, Molarity, Normality, Numerical problems on Mole,molarityand normality - Colloids- Types of colloids- Lyophilic and Lyophobic- Industrial applications of colloids.

UNIT-III: Acids and Bases (10 Periods)

Introduction - theories of acids and bases and limitations - Arrhenius theory-Bronsted -Lowry theory - Lewis acid base theory - Ionic product of water - pH and related numerical problems - Buffer solutions- buffer action - Applications of buffer solution.

UNIT-IV: Environmental Studies-I (10 Periods)

Introduction - environment -scope and importance of environmental studies- important terms - renewable and non renewable energy sources - Concept of ecosystem, producers, consumers and decomposers - Biodiversity, definition and threats to Biodiversity- Forest resources- Over exploitation-Deforestation.

UNIT-V: Water Technology (10 Periods)

Introduction -soft and hard water - causes of hardness – types of hardness -disadvantages of hard water - degree of hardness (ppm) - softening methods - permutit process - ion exchange process - drinking water - municipal treatment of water for drinking purpose - Osmosis, Reverse Osmosis - advantages of Reverse osmosis – Desalination by Electro -dialysis – Defluoridation – Nalgonda technique.

UNIT-VI: Electrochemistry: (10 periods)

Conductors, insulators, electrolytes –Types of electrolytes - Arrhenius theory of electrolytic dissociation - Electrolysis –Electrolysis of fused NaCl and aqueous NaCl – applications of electrolysis - Faraday's laws of electrolysis- numerical problems.

Reference Books :

1. Engineering chemistry – Jain & Jain – Dhanpat Rai Publishing Company.
2. A Text book of Engineering Chemistry – S.S.Dara – S.Chand Publications.
3. Environmental Studies – A.K.De.
4. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press
5. Intermediate Chemistry I and II – Telugu Academy TS

Suggested Learning Outcomes

Upon completion of the course, the student will have ability to

UNIT- I: FUNDAMENTALS OF CHEMISTRY

1.1 Explain the concept of atomic number and mass number
1.2 State the Postulates of Bohr's atomic theory and its limitations
1.3 Explain 1.Aufbau's principle, 2.Hund's rule and 3.Pauli's exclusion principle with examples.

1.4 Define Orbital.
1.5 Draw the shapes of s, p and d Orbitals.
1.6 Distinguish between Orbit and Orbital
1.7 Write the electronic configuration of elements up to atomic number 30
1.8 Define chemical bond.
1.9 Explain the Postulates of Electronic theory of valency.
1.10 Define and explain three types of Chemical bonding viz., Ionic, Covalent, Coordinate Covalent bond with examples.
1.11 Explain bond formation in NaCl and MgO.
1.12 List the Properties of Ionic compounds.
1.13 Explain covalent bond formation in Hydrogen molecule, Oxygen molecule, and Nitrogen Molecules using Lewis dot method.
1.14 List the Properties of Covalent compounds.
1.15 Distinguish between ionic compounds and covalent compounds.
1.16 Electronic concept of Oxidation and Reduction.
1.17 Define Oxidation Number
1.18 Calculate the Oxidation Number.

UNIT-II: SOLUTIONS AND COLLOIDS

2.1 Define the terms 1.Solution, 2.Solute and 3.Solvent.
2.2 Classify solutions based on physical state.
2.3 Calculate Molecular weight and equivalent weights of acids, bases and salts.
2.4 Define mole.
2.5 Explain Mole concept with examples.
2.6 Define Molarity and Normality.
2.7 Solve Numerical problems on Mole, Molarity and Normality.
2.8 Define Colloids .
2.9 Types of colloids- Lyophilic and Lyophobic.
2.10 Industrial applications of colloids.

UNIT-III: ACIDS AND BASES

3.1 Explain Arrhenius theory of Acids and Bases.
3.2 State the limitations of Arrhenius theory of Acids and Bases
3.3 Explain Bronsted - Lowry theory of acids and bases.
3.4 State the limitations of Bronsted - Lowry theory of acids and bases.
3.5 Explain Lewis theory of acids and bases.
3.6 State the limitations of Lewis theory of acids and bases.
3.7 Explain the Ionic product of water.
3.8 Define pH and explain Sorenson scale.
3.9 Solve the Numerical problems on pH (Strong Acids and Bases).
3.10 Define buffer solutions and give examples of acidic and basic buffers.
3.11 State the applications of buffer solutions.
3.12 Explain the buffer action of acidic and basic buffers.

UNIT-IV: ENVIRONMENTAL STUDIES-I

4.1 Define the term environment
4.2 Explain the scope and importance of environmental studies
4.3 Define and understand the following terms
1) Lithosphere, 2) Hydrosphere, 3) Atmosphere, 4) Biosphere, 5) Pollutant, 6) Contaminant 7) Pollution, 8)receptor, 9)sink, 10) particulates, 11) Dissolved oxygen (DO), 12) Threshold limit value (TLV),13).BOD and 14).COD
4.4 Explain the growing energy needs.
4.5 Explain renewable (non-conventional) and non renewable (conventional) energy sources with examples.

4.6 Define an Ecosystem. Understand biotic and abiotic components of ecosystem.
4.7 Define and explain the terms:
1) Producers, 2) Consumers and 3) Decomposers with examples.
4.8 Explain biodiversity and threats to biodiversity.
4.9 Explain the uses of forests and over exploitation of forest resources and deforestation..

UNIT V: WATER TECHNOLOGY

5.1 State the various Sources of water.
5.2 Define the terms soft water and hard water with examples
5.3 Define hardness of water.
5.4 Explain temporary and permanent hardness of water.
5.5 List the usual chemical compounds causing hardness (with Formulae)
5.6 Disadvantages of using hard water in industries.
5.7 Define Degree of hardness, units of hardness in ppm (mg/L) and numerical problems related to hardness.
5.8 Explain the methods of softening of hard water: a) permutit process b).Ion-Exchange process.
5.9 Essential qualities of drinking water.
5.10 Explain municipal treatment of water for drinking purpose.
5.11 Define Osmosis and Reverse Osmosis(RO).
5.12 List the applications and advantages of RO.
5.13 Desalination of sea water by Electro dialysis.
5.14 Defluoridation - Nalgonda Technique.

UNIT VI: ELECTROCHEMISTRY

6.1 Define the terms1. Conductor, 2. Insulator, 3.Electrolyte and 4.Non - electrolyte
6.2 Types of electrolytes.- strong and weak electrolytes with examples.
6.3 Distinguish between metallic conductors and Electrolytic conductors.
6.4 Arrhenius theory of electrolytic dissociation
6.5 Explain electrolysis of fused NaCl and aqueous NaCl
6.6 Applications of Electrolysis- Electroplating-Electrolytic refining of metal (Copper)
6.7 Explain Faraday's laws of electrolysis
6.8 Define Chemical equivalent, Electrochemical equivalent.
6.9 Relationship between chemical equivalent and electrochemical equivalent
6.10 Solve the Numerical problems based on Faraday's laws of electrolysis

Internal evaluation

Test	Units	Marks	Pattern
Mid Sem 1	1 and 2	20	Part A- 5 Short answer questions Part B- 2 Essay questions out of 3 Questions Part C- 2 Essay questions out of 3 Questions
Mid Sem 2	3 and 4	20	Part A 5 Short answer questions Part B 2 Essay questions out of 3 Questions Part C- 2 Essay questions out of 3 Questions
Slip Test 1	1 and 2	5	2 Essay Questions out of 3 Questions
Slip Test 2	3 and 4	5	2 Essay Questions out of 3 Questions
Assignment	1	5	Different group assignments of Higher order Questions that develop problem solving skills and critical thinking should be given
Seminars	1	5	
	Total	60	

Suggested Student Activities for Induction Program:

	Forenoon	Afternoon
Day1	Registration	Class work as per Time table Chemistry Lab practice classes may be conducted
Day2	Rules and Regulations	
Day3	Getting acquainted with Head and faculty	
Day4	Familiarization with Institutional facilities	
Day5	Interaction with Class teacher and Seniors	
Day6	Introducing the mentor	
Day7	Parent –Teacher meeting	

Suggested Student Activities

1.Student visits Library to refer to Text books, reference books and manuals to find their specifications

2.Student inspects the available equipment in the Chemistry Lab to familiarize with them.

3..Quiz

4.Group discussion

5. Seminar

6.Surprise test

E - learning links:

https://iupac.org/
https://www.youtube.com
https://www.khanacademy.org/
www.nptel.ac.in

Mid term Examination marks distribution

	Short answer	Essay	Marks
Part A	5	0	10
Part B	0	2/3	10
Part C	0	2/3	20
Total	5	4/6	40

Model Paper for Mid-I,

BOARD DIPLOMA EXAMINATION, (C-18)
FIRST SEMESTER, 18 COMMON-104F
GENERAL ENGINEERING CHEMISTRY

Time : **1** ½ Hrs Total Marks :40Marks

PART-A

Answer **all** questions, each carries **two** marks 5 X 2 = 10

1. Define mass number.
2. Draw the shapes of s and p orbitals.
3. Define oxidation..
4. Define Normality.
5. Define solute and solvent.

PART-B

Answer any **two** questions, each carries **five** marks 2 X 5 = 10

6. State Aufbau principle and Hund's rule and explain with examples.
7. List any five properties of covalent compounds.
8. Define Mole. Calculate the equivalent weights of HCl, H_2SO_4, Na_2CO_3 and $Al(OH)_3$.

PART-C

Answer any **two** questions, each carries **ten** marks 2 X 10 = 20

9. (a) Write about the anomalous electronic configuration of Cr and Cu.
   (b) Calculate the oxidation number of (i) S in H_2SO_4 (ii) Cr in K_2CrO_4.
10. (a) 10.6 grams of Na_2CO_3 is dissolved in one liter of solution. Calculate its molarity and normality.
    (b) Write any four industrial applications of colloids.
11. Compare the formation of chemical bonds in Sodium chloride and Hydrogen molecules.

Model Paper for Mid-II
BOARD DIPLOMA EXAMINATION, (C-18)

FIRST SEMESTER, 18 COMMON-104F

GENERAL ENGINEERING CHEMISTRY

Time : **1** ½ Hrs Total Marks :40Marks

PART-A

Answer **all** questions, each carries **two** marks 5 X 2 = 10

11. Define Lewis acid and base.
12. What is conjugate acid base pair? Give an example.
13. Define BOD.
14. What is Biodiversity.
15. Write any four forest resources.

PART-B

Answer any **two** questions, each carries **five** marks 2 X 5 = 10

16. Explain Arrhenius theory of acids and bases.
17. Define ionic product of water. What is its value at 25º C.
18. What are producers, consumers and decomposers? Give examples.

PART-C

Answer any **two** questions, each carries **ten** marks 2 X 10 = 20

19. Calculate the pH value of a solution containing 2gms of NaOH in 500 ml of water.
20. (a) Explain renewable and non-renewable energy sources with examples.
    (b) write any four threats to Bio-diversity.
11. (a) What are the applications of buffer solutions.
    (b) What is deforestation? What are its consequences?

Semester End Examination marks distribution

	Short answer	Essay	Marks
Part A	10	0	20
Part B	0	4/6	20
Part C	0	4/6	40
Total	10	8/12	80

SEE

BOARD DIPLOMA EXAMINATION, (C-18)

FIRST SEMESTER, 18 COMMON -104F

(SEMESTER END EXAM)

GENERAL ENGINEERING CHEMISTRY

Time :**3**Hrs Total Marks : 80Marks

PART-A

Answer **all** questions, each carries **two** marks 10 X 2 =20

1. Define atomic mass number.
2. State Hund's rule.
3. Define solute and solvent.
4. Define buffer solution.
5. Define the term environment.
6. Define pollutant.
7. Write the different sources of water.
8. List out the chemicals that cause temporary hardness.
9. Define conductor and insulator.
10. Define electrolyte. Give one example for it

PART-B

GROUP-1 Answer any TWO questions 2 x 5 = 10

11. Write the postulates of Bohr's atomic theory.
12. Classify the solutions based on Physical state.
13. Explain Bronsted – Lowry theory of acids and bases.

GROUP-2 Answer any TWO questions 2 x 5 = 10

14. Compare renewable and non renewable energy sources.
15. Explain any five disadvantages of using hard water in industries.
16. Explain Arrhenius theory of electrolytic dissociation **.**

PART-C

GROUP-1 Answer any TWO questions 2x10=20

17. (a) What type of chemical bond is formed between Na and Cl and explain the bonding.
    (b) Calculate the volume of water to be added to change the molarity of

HCl from 0.1M to 0.001M.

18. (a) Find out the pH and pOH of 0.001M HCl solution.
    (b) Write any five resources of forests.
19. (a) Write any five applications of reverse osmosis.
    (b) Explain the application of electro dialysis in desalination of water.

GROUP-2 Answer any TWO questions 2 x 10= 20

20. (a) Explain the process of softening of hard water by ion exchange method with a neat diagram and chemical equations.
21. (a) Explain the process of electrolysis of fused NaCl.
    (b) Calculate the weight of copper deposited when 2 amperes of current is passed through $CuSO_4$ solution for two hours. (Atomic weight of Cu = 63.5)
22. Explain electroplating process and electrolytic purification of metal.

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	**Basics of Electrical and Electronics Engineering**	Course Code	**18EI-105C**
Semester	**I**	Course Group	**:Core**
Teaching Scheme in Hrs(L:T:P)	**30:15:0**	Credits	: **3**
Methodology	**Lecture + Assignments**	Total Contact Hours :	**:45Hrs/60Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Periods	Questions for SEE			Marks weight age	%Weight age
			R	**U**	**A**		
1.	Fundamentals of Electricity	**8**	**1**	**0**	**1**	**12**	**11**
2	Electrostatics and Electromagnetism	**12**	**1**	**1**	**1**	**17**	**16**
3	Switches, Relays and PCBs	**8**	**2**	**1**	**0**	**9**	**8**
4.	Resistors and Capacitors	**8**	**1**	**1**	**1**	**17**	**15**
5.	Inductors and Transformers	**12**	**3**	**1**	**1**	**21**	**18**
6.	Engineering Applications	**12**	**2**	**2**	**2**	**34**	**32**
	Total	**60**	**10**	**6**	**6**	**110**	**100**

Pre requisites

This course requires the basic knowledge of high school Basic Physics and Mathematics.

Course Outcomes

CO1 :	Distinguish between DC and AC power and its units and relation between the terms.
CO2 :	Compare Electrostatic and Electromagnetic fields and solve simple problems.
CO3 :	Classification and identification of various Switches and Relays, Preparation of PCBs.
CO4 :	Classify Resistors and Capacitors, Select the correct components for a low power, medium and High power application and Use them for a given real time application.
CO5 :	Identify the types of Inductors and Transformers. Interpret their specifications and select the correct value and type for a given application.
CO6 :	Solve simple problems in electrical circuits; suggest correct electronic components required for simple electronic circuits including their specifications.

Course Contents

UNIT 1- Fundamentals of Electricity

Define Current, Voltage, Ampere and Potential Difference. Ohm's Law-Limitations and simple problems. KVL, KCL and simple problems. AC generation- Cycle, Time period, Frequency, Amplitude, Instantaneous value,-different forms of emf equation -Average value, RMS value, Form factor and Peak factor for sine wave. Phase, Phase difference .

DC generation, Primary and Secondary cells, Lead acid batteries and Nickel Iron batteries and their comparison. Maintenance free batteries.

UNIT 2- Electrostatics & Electromagnetism

Electric charge, Electric field, Electric flux, EMF, Electric flux density, Field strength, Coulomb's laws of electrostatics, Lenz's laws, Right hand thumb rule, Laplace law (Biot- savart's Law), Fleming's left hand rule.

Magnetism-Magnetic flux leakage, Magnetic flux leakage coefficient, Relative permeability, absolute permeability, Lifiting power of magnet, MMF, Faraday's laws of electromagnetic induction, Curie point. Field patterns due to straight current carrying conductor, Solenoid and Toroid. Magnetic materials-classifications-properties.

UNIT 3- Switches, Relays and PCBs

Switches

Define switch-types-classification- ISI symbols-applications. Toggle, push button, slider switches-their constructional details, ratings, applications.

Relays

Relay-symbols, classification, specifications, constructional details of electromagnetic relay. Fuse- fuse ratings, connectors- MCBs.

PCBs

PCB-classification, types of laminates, methods of layout preparation-etching, cleaning, drilling, soldering

Unit-4 Resistors and Capacitors

Resistors:

Resistance-Factors effecting resistance- Classification of resistors,-colour coding-Specifications-preferred values of resistors, applications of resistors. PTC, NTC, Effect of temperature on resistance. Derive $R=Ro(1+\alpha t)$. Carbon film, metal film, wire wound resistors- characteristics and applications. Constructional details of carbon and wire wound Potentiometers. Faults in resistors. Equivalent resistance of given resistors when connected in series and parallel

Capacitors:

Capacitance- Factors effecting capacitance-Classification and specifications of Capacitors, Dielectric constant, Dielectric strength. Energy stored in a capacitor. Relation between Q, C, V. Basic properties and applications of Paper, Mica, Ceramic, Glass and Electrolytic capacitors. Variable capacitors and Gang capacitors- applications. Equivalent capacitance of given capacitors when connected in series and parallel

Unit-5 Inductors and Transformers

Inductors

Inductance- Classification - symbols – Specifications. Self-inductance, Mutual-inductance- Factors affecting Self-inductance and Mutual-inductance, Coefficient of coupling. Comparison and applications

of AF and RF chokes. Equivalent inductance of given inductors when connected in series and parallel (aiding and opposing).

Transformers

Define Transformer- Symbols- Classification- Principle of Transformer-constructional details and applications of Transformers. Turns Ratio. Step up and step down transformers.

UNIT 6: Engineering applications

Problems on ohms law, Coulomb's law –KVL, KCL, calculation of instantaneous value, average value form factor, peak factor of sine wave. Comparison -electric and magnetic circuits, problems on faradays laws. Series and parallel combination of resisters, capacitors, inductors (series aiding / opposition and parallel aiding / opposition). Effects of temperature on resistance, Problems on absolute and relative primitivity and their relation. Calculating the values of R & C using colour coding. Problems on self-inductance, Mutual inductance, coefficient of coupling. Determination of fuse ratings, choice of types of fuse per different applications. Selection of Relay for an application, Relay circuit for controlling AC/DC load,Selection of PCBs

Recommended Books

1. Electrical Technology Volume 1 by Bl Theraja

2. Electronic Devices and Circuits by David A. Bell Prentice hall

3. Hand book of components for Electronics by Charles A. Harper McGrahills

Suggested Learning Outcomes

1.0 Distinguish between DC and AC power and its units and relation between the terms.

1.1 Define terms current,voltage ,ampere.potential difference

1.2 Define ohms law and mention its applications and limitations.

1.3 Solve simple problems on ohms law.

1.4 Define KVL and KCL

1.5 Solve simple problems on KVL and KCL.

1.6 Generation of Alternating current.

1.7 different forms of emf equations

1.8 Define Time period , Frequency and Amplitude of a sine wave

1.9 Give the formula for the instantaneous value in terms of maximum value, frequency and time.

1.10 Solve simple problems to calculate Amplitude ,frequency and Time Period

1.11 Define the average value, R.M.S. value, form factor and peak factor for sine wave.

1.12 Explain the terms phase and phase difference.

1.13 Explain the concept of Leading, lagging and in phase with the help of waveforms**.**

1.14 Explain the method of generation of DC current

1.15 Classify cells.

1.16 Define and compare primary and secondary cells.

1.17 Explain the constructional details of of lead acid and nickel iron cells.

1.18 Compare lead acid and nickel iron cells

1.19 Write the importance of maintenance free batteries.

2.0 Compare Electrostatic and Electromagnetic fields and solve simple problems.

2.1 Define the Electric charge, Electric field, Electric flux, EMF, Electric flux density, Field strength,

2.2 State the Coulomb's laws of electrostatics.

2.3 Define the Magnetic field, Magnetic flux, Magnetic flux density, MMF,

2.4 State the Faraday's laws of electromagnetic induction

2.5 State the Lenz's laws, Right hand thumb rule, Laplace law (Biot- savart's Law), Fleming's left hand rule,

2.6 Define Magnetic flux leakage coefficient.

2.7 Draw the field patterns due to

a) Straight current carrying conductor b)Solenoid c) Toroid.

2.8 Classification of Magnetic materials

2.9 Define the above magnetic materials.

2.10 Distinguish between soft and hard magnetic Materials.

2.11 Give 3 examples for each.

2.12 List the important magnetic materials used in the Electrical &Electronic industry.

2.13 List the important properties of Magnetic materials.

3.0 Classification and identification of various Switches and Relays, Preparation of PCBs.

3.1 Define switch

3.2 Classify switches according to poles and throws.

3.3 Sketch the ISI symbols for SPST, SPDT, DPST, DPDT, Multi-pole multi-throw.

3.4 Explain the construction, working and rating of:

a) Toggle Switch

b) Push button Switch

c) Rotary Switch

d) Slider Switch.

3.5 Define a Relay

3.6 Classify different relays based on principle of operation, polarization and applications.

3.7 Mention specification and applications of Relays.

3.8 State the need of a fuse in electronic equipment.

3.9 List different types of Fuses.

3.10 Mention the ratings of Fuses.

3.11 Mention the use of MCB.

3.12 Explain the need of PCB in electronic equipment.

3.13 Classify PCBs.

3.14 List the types of laminates used for PCBs

3.15 Mention the methods of layout preparation of PCB.

3.16 List the methods of transferring lay out on the copper clad sheet.

3.17 Mention the methods of etching, cleaning, drilling of PCB

3.18 List the material used in soldering

3.19 State the standard PCB specification.

4.0 Classify Resistors and Capacitors, Select the correct components for a low power, medium and High power application and Use them for a given real time application.

4.1 Define Resistance.

4.2 Derive the relation $R = (\infty l) / a$.

4.3 Classify Resistors.

4.4 Identify the symbols of Resistors.

4.5 List the specifications of Resistors and state their importance.

4.6 Calculate the Resistance value by using colour code.

4.7 Calculate equivalent resistance when given resistors are connected in series and parallel.

4.8 Simple problems on Series and Parallel connected resistors.

4.9 Compare the features of carbon film, metal film and wire wound resistors .

4.10 Describe the constructional features of carbon and wire wound potentiometers

4.11 Compare the carbon and wire wound potentiometer

4.12 Describe the working of rheostat and mention its application.

4.13 Define temperature coefficient of resistance.

4.14 Derive the relation $Rt = Ro (1+\alpha_t o)$

4.15 Define Positive and Negative temperature coefficient.

4.16 List the common faults in resistors.

4.17 Define Capacitance

4.18 Classify the different types of Capacitors.

4.19 List the specifications of a capacitor and state their importance.

4.20 State the factors affecting the capacitance of a capacitor.

4.21 Define Di-electric constant and Di-electric strength of a material

4.22 State the properties, range and applications of paper, mica, glass, ceramic and electrolytic capacitors.

4.23 Sate the different types of variable capacitors and mention their applications.

4.24 State the losses in capacitors.

4.25 Find the equivalent capacitance of capacitors connected in series and parallel and simple problems.

4.26 List the common faults in capacitors.

5.0 Identify the types of Inductors and Transformers. Interpret their specifications and select the correct value and type for a given application.Define inductance, mutual inductance and coefficient of coupling.

5.1. Define Inductance

5.2. Define Self-inductance and Mutual-inductance.

5.3. Classify inductors.

5.4. State the factors effecting Self-inductance and Mutual-inductance.

5.5. Draw the symbol of iron core, air core and ferrite core inductors.

5.6. Find equivalence inductance when inductors connected in series (aiding and opposing), parallel(aiding and opposing)

5.7. List the specifications of inductors.

5.8. Describe the constructional features and applications of A.F and R.F chokes

5.9. List various core materials used in the construction of inductors.

5.10. List the applications of A.F. and R.F chokes.

5.11. List the common faults in inductors.

5.12. Define Transformer.

5.13. Explain the principle of operation of Transformer.

5.14. Different types of transformers

5.15. Constructional details and working principle of basic Transformer.

6.0 Solve simple problems in electrical circuits; suggest correct electronic components required for simple electronic circuits including their specifications.

6.1 Simple Problems on Ohms law.

6.2 Simple problems on Coulomb's law.

6.3 Simple problems on KVL, KCL.

6.4 Calculation of instantaneous value, average value form factor, peak factor of sine wave.

6.5 Simple problems on Faradays laws.

6.6 Problems on series and parallel combination of resisters, capacitors, inductors (series aiding / opposition and parallel aiding / opposition).

6.7 Problems on Effects of temperature on resistance.

6.8 Problems on absolute and relative permittivity and their relation.

6.9 Calculating the values of R & C using color coding.

6.10 Problems on self-inductance, Mutual inductance, coefficient of coupling.

6.11 Determination of fuse ratings, choice of types of fuse per different applications.

6.12 Selection of Relay for an application.

6.13 Relay circuit for controlling AC/DC load.

6.14 Selection and preparation of PCBs for the given application.

Internal evaluation

Test	Units	Marks	Pattern
Mid Sem 1	1 and 2	20	Part A 5 Short answer questions Part B 2 Questions out of 3 Questions Part C 2 Essay questions out of 3 Questions
Mid Sem 2	3 and 4	20	Part A 5 Short answer questions Part B 2 Questions out of 3 Questions Part C 2 Essay questions out of 3 Questions
Slip Test 1	1 and 2	5	2 Essay Questions out of 3 Questions
Slip Test 2	3 and 4	5	2 Essay Questions out of 3 Questions
Assignment	1	5	Different group assignments of Higher order Questions that develop problem solving skills and critical thinking should be given
Seminars	1	5	
	Total	60	

Suggested Student Activities for Induction Program

	Forenoon	Afternoon
Day1	Registration	Class work as per Time table Drawing and Basic workshop practice classes may be conducted
Day2	Rules and Regulations	
Day3	Getting acquainted with Head and faculty	
Day4	Familiarization with Institutional facilities	
Day5	Interaction with Class teacher and Seniors	
Day6	Introducing the mentor	
Day7	Parent –Teacher meeting	

Suggested Student Activities

1. Student visits Library to refer to Manual of electronic components to find their specifications
2. Student inspects the available equipment in the Lab to identify the components
3. Visit nearby Industry to familiarize with fabrication techniques
4. Analyze the connections in the UPS available in the Institution facility
5. Quiz
6. Group discussion
7. Surprise test

Suggested E-Learning references

1.http://electrical4u.com/

2. www.electronics-tutorials.ws

3. www.nptel.ac.in

Semester End Examination marks distribution

	Short answer	Essay	Marks
Part A	10	0	20
Part B	0	4/6	20
Part C		4/6	40
Total	10	8/12	80

Mid term Examination marks distribution

	Short answer	Essay	Marks
Part A	5	0	10
Part B	0	2/3	10
Part C	0	2/3	20
Total	5	4/6	40

Model Question Paper

BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)

DEIE - I SEMETER EXAMINATION

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (18EI105C)

TIME: 1 ½ Hours **MAXIMUM MARKS: 40**

PART –A

MARKS: 5X2 =10

Instructions: Answer all the questions. Each question carries two marks.

1. Define current and voltage.
2. State Kirchhoff's current law.
3. What is EMF (electro motive force)?
4. State Lenz's law.
5. Define magnetic flux.

PART –B

MARKS: 2X5 =10

Instructions: Answer two questions. Each question carries five marks.

6. State ohm's law and give the limitations.
7. Classify cells.
8. State the faraday's laws of electromagnetic induction.

PART –C

MARKS: 2X10 =20

Instructions: Answer two questions. Each question carries ten marks

9. Explain the construction of lead acid battery.
10. Draw and explain the field patterns due to straight current carrying conductor, Solenoid and Toroid.
11. Give the classification and properties of the magnetic materials.

Model Question Paper

BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)

DEIE - I SEMETER EXAMINATION

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (18EI105C)

TIME: 1 ½ Hours **MAXIMUM MARKS: 40**

PART –A

MARKS: 5X2 =10

Instructions: Answer all the questions. Each question carries two marks.

1. Define switch.
2. Draw the symbol of a SPDT switch.
3. What is capacitance?
4. State the need of a fuse.
5. Draw the symbol of a resistor.

PART –B

MARKS: 2X5 =10

Instructions: Answer two questions. Each question carries five marks.

6. Explain the working of a toggle switch.
7. Classify PCBs.
8. Explain about tapering in resistors.

PART –C

MARKS: 2X10 =20

Instructions: Answer two questions. Each question carries ten marks

9. Explain the screen printing method in PCB preparation.
10. Draw and explain the working of an electromagnetic relay.
11. Explain about the measurement of resistance using colour code.

Model Question Paper

BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)

DEIE - I SEMETER EXAMINATION

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (18EI105C)

TIME: 3ours **MAXIMUM MARKS: 80**

PART –A

MARKS: 10X2 =20

Instructions: Answer all the questions. Each question carries two marks.

1. Define RMS value.
2. State Fleming's left hand rule.
3. What is capacitance?
4. State the need of a MCB.
5. Draw the symbol of a fuse.
6. Draw the symbol of a transformer.
7. Define mutual inductance.
8. Write the EMF equation of a transformer.
9. Calculate the total resistance when 5Ω and 6Ω resistors are connected in series.
10. Give the formula to calculate form factor of a sine wave.

PART –B

GROUP-1 **Answer any TWO questions** **2x5=10**

11. List the effects of magnetic flux leakage.
12. Classify relays.
13. Explain the constructional details of wire wound potentiometers and give its applications.

GROUP-2 **Answer any TWO questions** **2x5=10**

14. Explain the principle of operation of Transformer.
15. Explain the effect of temperature on resistance?
16. List the factors in selection of a relay.

PART –C

GROUP-1 Answer any TWO questions 2x10=20

17. Explain the Construction of Nickel Iron Battery and give its applications.
18. Give the classification and properties of the magnetic materials.
19. Explain about the measurement of resistance using colour code.

GROUP-2 Answer any TWO questions 2x10=20

20. Explain the constructional details and working of a transformer.
21. A sinusoidal alternating current is represented by i=30sin30t. Find
    a) Maximum value
    b) Current when t=0.002sec passing through zero in positive direction.
    c) RMS value of current.
22. Find the capacitance of a capacitor if the area of the plates is $10mm^2$, didtance between the plates is 2mm and permittivity is 1.5

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Distinguish between DC and AC power and its units and relation between the terms.	R/U	1,2,10	**8**
CO2	Compare Electrostatic and Electromagnetic fields and solve simple problems.	R/U	1,2,5,6,7	**12**
CO3	Classification and identification of various Switches and Relays, Preparation of PCBs.	R/U/A	1,2,4,5	**8**
CO4	Classify Resistors and Capacitors, Select the correct components for a low power, medium and High power application and Use them for a given real time application.	R/U/A	1,2,5,7	**8**
CO5	Identify the types of Inductors and Transformers. Interpret their specifications and select the correct value and type for a given application.	R/U/A	1,2,4,5	**12**
CO6	Solve simple problems in electrical circuits; suggest correct electronic components required for simple electronic circuits including their specifications.	R/U/A	1,2,3,7	**12**
	Total			**60**

ELECTIVES SUGGESTED FOR EIE:

Sl No	Elective	Type	Preferred Semester
1	**Mathematics –IV**	Service Elective	VI
2	Electrical Networks and Machines	Program Elective	III
3	Professional Ethics and Indian Constitution	Open Elective	III
4	Control Systems	Program Elective	IV
5	Computer Networks	Program Elective	IV
6	Communication Engineering	Program Elective	IV
7	Green Energies	Open Elective	IV
8	Analytical and Biomedical Instrumentation	Program Elective	V
9	Cyber Security	Open Elective	V
10	Industrial Electronics and Drives	Program Elective	VI
11	PLC and SCADA	Program Elective	VI
12	Instrumentation in Process Industries	Program Elective	VI
13	GIS and Disaster Management	Open Elective	VI

Department of Technical Education
State Board of Technical Education &Training (TS)

Course Title :	**BASIC ENGINEERING DRAWING**	**Course Code**	**18EI-106P**
Semester	**I**	**Course Group**	**Core**
Teaching Scheme in Hrs (L :P)	**18.5 : 19.0**	**Credits**	**1.5**
Methodology	**Lecture + practice**	**Total Contact Hours:**	**37.5Hrs /45Pds**
CIE	**60 Marks**	**SEE**	**40 Marks**

***This Course is Common to all Programs of Diploma in Engineering Offered by State Board of Technical Education –Telangana State**.*

This Course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation.

Prerequisites: Enthusiasm to learn this course and requires basic knowledge of Mathematics.

Course Content and Blue Print of Marks for SEE

Unit No	**Unit Name**	**Periods**	**Questions to be set for SEE**					**Marks Weightage**	**Weightage (%)**
			R	**U**		**A**			
				SQ	**EQ**	**SQ**	**EQ**		
1	Importance of Engineering Drawing and Instruments	03	--	--	--	--	--	--	--
2	Free hand lettering & Numbering	03	--	1	--	--	--	5	**5**
3	Dimensioning Practice	06	--	1	--	--	1	15	**13**
4	Geometrical constructions	12	--	2	--	--	2.5	35	**32**
5	Projection of points, Lines, Planes	06	--	2	--	--	1	20	**18**
6	Orthographic Projections	15	--	2	--	--	2.5	35	**32**

	Total	**45**		**8**	**--**	**--**	**7**	**110**	**100**

R: Remembering, U: Understanding, A: Applying, SQ: Short Questions, EQ: Essay Questions

SEE Question Paper Pattern:

Maximum Marks: 80, Time: 3 Hours

Part A (Short answer questions):

Consists**8** Short Questions, students have to attempt **6** Questions and Each Question Carries **5** Marks.**(6 X 5 = 30 M)**

Part B (Essay type answer questions):

Consists**7**Essay type Questions, students have to attempt **5** Questions and Each Question Carries **10** Marks.**(5 X 10 = 50 M)**

Note:

1. To pass exam student should acquire 50% marks in both CIE and SEE separately and CIE & SEE put together
2. If the students acquire less than 50% in CIE, accordingly the students have to acquire more than 50% in SEE to get overall 50 % to pass.

Course Outcomes (CO)

Upon successful completion of the course, the students will be able to attain the following Course Outcomes (CO):

Course Outcome	
CO1	Acquire the knowledge on Importance of Engineering drawing and instruments.
CO2	Practice free hand Lettering in different styles.
CO3	Acquire the knowledge on different styles of dimensioning systems.

CO3	Appreciate the usage of engineering curves for tracing the paths and surface profile of the machine components such as gear profile from involute and cycloid.
CO3	Realize the concept of projection and attain visualization projection of points, Lines and Planes. The student will also be able to draw the views related to projection of Points, Lines and Planes.
CO4	Realize the concept of orthographic projections and student will be able to draw orthographic views of an object from its pictorial drawing.

Course Contents

NOTE

1. **B.I.S Specification should invariably be followed in all the topics.**
2. **A - 3 Size Drawing Sheets are to be used for all Drawing Practice Exercises.**

1.0 The importance of Engineering Drawing and Engineering Instruments

Explanation of the scope and objectives of the subject of Engineering Drawing Its importance as a graphic communication -Need for preparing drawing as per standards – (SP-46 –1988) – Mention B.I.S - Role of drawing in -engineering education – Link between Engineering drawing and other subjects of study.

Engineering drawing Instruments

Classifications: Basic Tools, tools for drawing straight lines, tools for curved lines, tools for measuring distances and special tools like mini drafter & drafting machine – Mentioning of names under each classification and their brief description - Scales: Recommended scales reduced & enlarged - Lines: Types of lines, selection of line thickness - Selection of Pencils -Sheet Sizes: A0, A1, A2, A3, A4, A5, Layout of drawing sheets in respect of A0, A1, A3 sizes, Sizes of the Title block and its contents, Care and maintenance of Drawing Sheet,

Drawing plate: La out of sheet – as per SP-46-1988 to a suitable scale.

2.0 Free hand lettering & numbering

Importance of lettering – Types of lettering -Guide Lines for Lettering

Practicing of letters & numbers of given sizes (7mm, 10mm and 14mm)

Advantages of single stroke or simple style of lettering - Use of lettering stencils

3.0 Dimensioning practice

Purpose of engineering drawing, Need of B.I.S code in dimensioning - Shape description of an Engineering object - Definition of dimensioning size description - Location of features, surface finish, fully dimensioned Drawing - Notations or tools of dimensioning, dimension line, extension line, leader line, arrows, symbols, number and notes, rules to be observed in the use of above tools - Placing dimensions: Aligned system and unidirectional system (SP-46-1988) - Arrangement of dimensions - Chain, parallel, combined progressive and dimensioning by co-ordinate methods - Rules for

dimensioning standard - features: Circles (holes) arcs, angles, tapers, chamfers, and dimension of narrow spaces.

4.0 Geometric Construction

Division of a line: to divide a straight line into given number of equal parts internally examples in engineering application. Construction of tangent lines: to draw tangent lines touching circles internally and externally.

Construction of tangent arcs

a) To draw tangent arc of given radius to touch two lines inclined at given angle (acute, right and obtuse angles).
b) Tangent arc of given radius touching a circle or an arc and a given line.
c) Tangent arcs of radius 'R', touching two given circles internally and externally.

Construction of polygon: construction of any regular polygon of given side length using general method.

Conical Curves: Explanation of Ellipse, Parabola, Hyperbola, as sections of a double cone and a loci of a moving point, Eccentricity of above curves – Their Engg. application viz. Projectiles, reflectors, P-V Diagram of a hyperbolic process.

Construction of any conic section of given eccentricity by general method.

Construction of ellipse by concentric circles method.

Construction of parabola by rectangle method.

Construction of rectangular hyperbola.

General Curves: Involute, Cycloid and Helix, explanations as locus of a moving point, their engineering application, viz, Gear tooth profile, screw threads, springs etc. - their construction

5.0 Projection of points, lines and planes

Projecting a point on two planes of projection -Projecting a point on three planes of projection -Projection of straight line.

a) Parallel to both the planes.
b) Perpendicular to one of the planes.
c) Inclined to one plane and parallel to other planes.

Projection of regular planes.

a) Plane perpendicular to HP and parallel to VP and vice versa.
b) Plane perpendicular to HP and inclined to VP and vice versa.

6.0 Orthographic Projections

Meaning of orthographic projection -Using a viewing box and a model – Number of views obtained on the six faces of the box - Legible sketches of 3 views for describing object -Concept of front view, top view, and side view for sketching these views of engg objects - Explanation of first angle projection. – Positioning of three views in First angle projection - Projection of points as a means of locating the corners of the surfaces of an object – Use of miter line in drawing a third view when other two views are given - Method of representing hidden lines -Selection of minimum number of views to describe full object.

Reference Books

Engineering Drawing by Kapil dev – (Asian Publisher)

Engineering Drawing by Basant Agarwal & C.M Agarwal - (McGraw-hill)
Engineering Drawing by N.D.Bhatt. (Charotar Publishing House Pvt. Ltd.)
A Textbook on Engineering Drawing by P. Kannaiah, K. L. Narayana, K. Venkata Reddy
NPTEL Videos of Engineering Dwawing.

Suggested Specific Learning Outcomes

Upon completion of the subject the student shall be able to -

1.0 Understand the basic concepts of engineering drawing (03 Hours)

1.1 State the importance of drawing as an engineering communication medium
1.2 State the necessity of B.I.S. Code of practice for Engineering Drawing.
1.3 Explain the linkages between Engineering drawing and other subjects of study in diploma course.

Use of Engineering Drawing Instruments

1. 4 Select the correct instruments and draw lines of different orientation.
1.5 Select the correct instruments and draw small and large Circles.
1.6 Select the correct instruments for measuring distances on the drawing.
1.7 Use correct grade of pencil for different types of lines, thickness and given function.
1.8 Select and use appropriate scales for a given application.
1.9 Identify different drawing sheet sizes as per I.S. and Standard Lay- outs.
1.10 Prepare Title block as per B.I.S. Specifications.

2.0 Write Free Hand Lettering and Numbers (03 Hours)

2.1 Write titles using sloping lettering and numerals of 7mm, 10mm and 14mm height
2.2 Write titles using vertical lettering and numerals of 7mm, 10mm and 14mm height
2.3 Select suitable sizes of lettering for different layouts and applications
2.4 Practice the use of lettering stencils.

3.0 Understand Dimensioning Practice (06 Hours)

3.1 Define “Dimensioning.
3.2 State the need of dimensioning of drawing according to accepted standard.
3.3 Identify notations of Dimensioning used in dimensioned drawing.
3.4 Identify the system of placement of dimensions in the given dimensioned drawing.
3.5 Dimension a given drawing using standard notations and desired system of dimensioning.

3.6 Dimensioning standard features applying necessary rules.
3.7 Arrange dimensions in a desired method given in a drawing.
3.8 Identify the departures if any made in the given dimensioned drawing with reference to SP-46-1988, and dimension the same correctly.

4.0 Apply Principles of Geometric Constructions (12 Hours)

4.1 Divide a given line into desired number of equal parts internally.
4.2 Draw tangent lines and arcs.
4.3 Use General method to construct any polygon.
4.4 Explain the importance of conics.
4.5 Construct conics (ellipse, parabola and hyperbola) by general method.
4.6 Construct ellipse by concentric circles method.
4.7 Construct parabola by rectangle method.
4.8 Construct rectangular hyperbola from the given data.
4.9 Construct involute from the given data.
4.10 Construct cycloid and helix from the given data.
4.11 State the applications of the above constructions in engineering practice.

5.0 Apply Principles of Projection of points, lines and planes (06 Hours)

5.1 Visualize the objects
5.2 Explain the I-angle and III-angle projections
5.3 Practice the I-angle projections
5.4 Draw the projection of a point with respect to reference planes (HP&VP)
5.5 Draw the projections of straight lines with respect to two reference Planes (up to lines parallel to one plane and inclined to other plane)
5.6 Draw the projections of planes (up to planes perpendicular to one plane and inclined to other plane)

6.0 Apply principles of orthographic projection (15 Hours)

6.1 Explain the principles of orthographic projection with simple sketches.
6.2 Draw the orthographic view of an object from its pictorial drawing.
6.3 Draw the minimum number of views needed to represent complete engineering component.

CIE Question Paper Pattern and Syllabus

Unit No	Unit Name Hours	Questions to be set for SEE					Marks Weightage	Weightage (%)
		R	U		A			
			SQ	EQ	SQ	EQ		
First Mid Examination								
1, 2, 3	Free hand lettering, Numbering &Dimensioning Practice	--	2	--	--	1	20	36
4	Geometric constructions (i.e. up to construction of Polygon)	--	3	--	--	2	35	64

	Total		**5**			**3**	**55**	**100**
Second Mid Examination								
4	Geometric constructions (i.e. up to construction of general curves)	--	3	--	--	2	35	64
5	Projection of points, Lines, Planes	--	2	--	--	1	20	36
	Total		**5**	**--**	**--**	**3**	**55**	**100**

R: Remembering, U: Understanding, A: Applying, SQ: Short Questions, EQ: Essay Questions

CIE Question Paper Pattern:

Maximum Marks: 40, Time: 3 Hours

Part A:

Consists **5** Short questions, students have to attempt **4** questions and each question carries **5** Marks.**(4 / 5 X 5 = 20 Marks)**

Part B:

Consists **3** Essay type questions, students have to attempt **2** questions and each question carries **10** Marks.**(2 / 3 X 10 = 20 Marks)**

Note: Students have to get 50% of the total (i.e. 20 Marks).

Course Outcome		**Cognizant Level**	**Linked Program Objectives (PO)**
CO1	Acquire the knowledge on Importance of Engineering drawing and instruments.	**R**	**1, 2, 3, 4, 9, 10**
CO2	Practice free hand Lettering in different styles.	**R / U**	**1, 2, 3, 4, 9, 10**
CO3	Acquire the knowledge on different styles of dimensioning systems.	**R / U**	**1, 2, 3, 4, 9, 10**
CO3	Appreciate the usage of engineering curves for tracing the paths and surface profile of the machine components such as gear profile from	**R / U / A**	**1, 2, 3, 4, 9, 10**

	involute and cycloid.		
CO3	Realize the concept of projection and attain visualization projection of points, Lines and Planes. The student will also be able to draw the views related to projection of Points, Lines and Planes.	**R / U / A**	**1, 2, 3, 4, 9, 10**
CO4	Realize the concept of orthographic projections and student will be able to draw orthographic views of an object from its pictorial drawing.	**R / U / A**	**1, 2, 3, 4, 9, 10**

Course-PO Attainment Matrix

Course Name	**Program Outcomes (PO)**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Basic Engineering Drawing	3	3	3	2	--	--	--	--	3	3
Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed										

Department of Technical Education
State Board of Technical Education &Training (TS)

Course Title :	**BASIC COMPUTER AIDED DRAFTING**	Course Code	**18EI-107P**
Semester	**I**	Course Group	**:Core**
Teaching Scheme in Hrs (L:T:P)	**7.5:0:30**	Credits	: 1.5
Methodology	**Lecture + Practice**	Total Contact Hours	**37.5Hrs/45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions for SEE			Marks weightage	%Weightage
			R	U	A		
1.	Interpret and Draw , Modify basic 2D geometric shapes	**15**		**2**		**20**	**25**
2	Add dimensions and text to 2D drawings	**9**		**2**		**20**	**25**
3	Create Isometric drawings	**6**					
4.	Create Drawings with different views	**15**			**2**	**40**	**50**
	Total	**45**		**4**	**2**	**80**	**100**

Pre requisites : basics of computer operation

This course requires the Basic Computer Skills and Practice concepts of engineering drawing

Course Outcomes

CO1	Importance and advantages of CAD. Set drawing area and draw geometric shapes and modify as per requirement
CO2	Add text with required font and size and also dimension by various methods
CO3	Generate isometric model and draw circle on three iso planes
CO4	Create 2D drawings with front, side view with all above features

Course Content

UNIT -1 **Duration: 15 periods (T:2.5 + P:10hrs)**

1.1 The Computer Aided Drafting and its software

Definition of Computer Aided Drafting, the Advantages and importance of CAD software LIKE Auto CAD, Intelli Cad, ProG CAD etc., the features of Graphic Work station, CAD Environment: Screen, Various tool bars and menus.

1.2 Selection of commands

Commands using toolbars, menus, command bar. Repeating a command, Nesting a command and modifying a command. Use of prompt history window and scripts, mouse shortcuts. Creating the drawing. Opening existing and, saving of drawing, setting up a drawing. Setting and changing the grid and snapping alignment, and the Entity snaps.

1.3 Use of viewing tools of CAD & Use of coordinate systems of the drawing

Use of mouse, Scroll bar to move around within drawing, changing of magnification of drawing. Displaying of multiple views, the use of controlling visual elements like Line weight.

Two dimensional coordinates such as Absolute, Cartesian, Relative Cartesian and Polar coordinates and direct method of drawing line.

1.4 Creating simple and complex entities

Drawing of lines, circles, arcs, ellipses, elliptical arcs, rays and infinite lines. Creating and editing of point entities. Drawing of shapes like rectangles, polygons, polylines, Splines, donuts, and adding of hatch pattern

1.5 Use the Modifying tools to modify the properties of entities

Entity selection and de selection methods, the Deletion of entities. Copying of entities within a drawing, between drawings, parallel copies, Mirroring entities and arraying entities. The Rearranging of entities by Moving, Rotating and Reordering. The Resizing of entities by Stretching, Scaling, Extending, Trimming, and editing the length. The Braking and joining of entities. Editing of polylines: The Exploding of entities, the Chamfering and Filleting of entities

1.6 Use the drawing information retrieving tools Measure, Divide, Calculate and Display

Measuring the intervals on entities, dividing the entities in to segments. Calculation of areas of defined by points, closed entities, and combined entities, calculate the distance and angle between the entities. Displaying the information about the entities and drawing status.

UNIT -2 **Duration: 9 periods (T:1.5 + P:6hrs)**

2.1 Use the Text tool to create and formatting the various types of text Fonts and its styles

The creating, naming and modifying the text fonts, the Creation of line text, paragraph text, setting of line text style and its alignment. The Setting of Paragraph text style and its alignment, and modifying the text.

2.2 Use Dimensioning concepts to create dimensions, Edit dimensions, Control dimension styles & variables and Adding geometric tolerances

The creating of linear, Angular, Diametral, Radial, Ordinate dimensions. The creating leaders and annotations, making dimensions oblique, Editing the dimension text, controlling of dimension arrows and format. The Controlling of line settings and dimension text, the Controlling of dimension units, and dimension tolerance.

UNIT -3 **Duration: 06 periods (T : 1 + P: 4hrs)**

3 Isometric Views

Setting of isometric grid – change of iso planes, drawing straight line and circle

Create Isometric views of simple objects

.UNIT -4 **Duration: 15 periods (T:2.5 + P:10hrs)**

2D Drawings

Using appropriate commands creation of 2D drawings of standard components

Recommended Books

1. Auto cad by George Omura
2. 4MCAD User Guide- IntelliCAD Technology Consortium

Key competence to be achieved by students / Suggested Learning Outcomes

S.No	Experiment Title	Key components
1	Introduction to CAD	• Open / close AutoCAD program • Understands AutoCAD Graphic User • Interface(GUI) and various toolbars
2	Selecting commands & Working with drawing	• Use prompt history window and scripts • Practice the setting up a drawing • Practice the Entity
3	a) Viewing drawing	• Use Scroll bar, pan command, and rotating view to move around within drawing • Control visual elements like Fill, Text, Blips and • Line weight
	b) Working with coordinates	• Use Two dimensional coordinates and Three • dimensional coordinates • Use right-hand rule • Use filters in two and three dimensions • Define user coordinate system
4	Creating simple and complex entities	• Draw the simple shapes like lines, circles, arcs and complex shapes like polygons, planes etc., • Practice adding of hatch pattern
5	Getting Drawing information	• Measure the intervals and distance between Entities. • Divide the entities in to segments • Calculate the areas defined by points, of closed entities, and Combined entities
6	Use the Text tool to create various types of text fonts and its styles	• Calculate the areas defined by points, of closed entities, and Combined entities • Use filters in two and three dimensions • Draw the simple shapes like lines, circles, arcs and complex shapes like polygons, planes etc., • Practice the adding of hatch pattern
7	Dimensioning drawing	• Practice the Controlling of dimension properties like arrow types, size, dim line adjustment, dim offset, text size , primary and secondary units and format • Practice the Controlling of dimension units, and dimension tolerance
8	Isometric Views	Use Iso snap command to create Isometric views
9	2D Drawings	Use proper 2D commands to create 2D drawings

Suggested Learning Outcomes

1 Upon completion of the course the student shall be able to Understand about the Computer Aided Drafting and its software

1.1 Define Computer Aided Drafting
1.2 List the Advantages of CAD and also various CAD software's
1.3 Explain the importance of CAD software
1.4 Explain the features of Graphic Work station
1.5 Explain CAD Screen, Various tool bars and menus
1.6 Explain the benefits of Templates

2 Use appropriate selection commands

2.1. Practice commands using toolbars, menus, command bar
2.2. Practice repeating a command, Nesting a command and modifying a command
2.3. Use prompt history window and scripts
2.4. Practice mouse shortcuts
2.5. Practice the Creating the drawing, saving the drawing with .drawing extension and Opening Existing drawing
2.6. Practice the setting up a drawing with drawing limits and drawing units.
2.7. Practice the setting and changing the grid and snapping alignment
2.8. Practice the Entity snaps

3 Use viewing tools of CAD & Use coordinate systems of the drawing

3.1. Practice the use of Scroll bar, pan command and rotating view to move around within drawing
3.2. Practice the changing of magnification of drawing
3.3. Practice how the coordinate system work and it is displayed
3.4 Practice the Find tool to determine the coordinates of a point
3.5. Practice the Two dimensional coordinates such as Absolute Cartesian, Relative Cartesian, Polar coordinates and direct method to draw a line.
3.6. Explain importance and use of Osnap / Esnap points.
3.7. Practice to draw with other drawing commands like circle, polygon and other.

4 Create the simple and complex entities

4.1. Draw the lines, circles, arcs, ellipses, elliptical arcs, rays and infinite lines and shapes like Rectangles, Polygons, Polylines, Splines, donuts
4.2. Practice the adding of hatch with required pattern and adjusting line angle and line space.

5 Use the modifying tools to modify the properties of entities

5.1. Practice the various methods of entity selection like window, cross window, fence, last and previous methods and deselection method
5.2. Practice the Deletion, breaking and trimming of entities
5.3. Practice the Copying of entities within a drawing, between drawings
5.4. Practice the Chamfering and Filleting of entities
5.5. Practice the making of parallel copies, Mirroring entities and Arraying entities
5.6. Practice the Rearranging of entities by Moving, Rotating and Reordering
5.7. Practice the Resizing of entities by Stretching, Scaling, and Extending.
5.8. Practice the Editing of polylines: Opening, Closing, Curving, Decurving, Joining, Changing width and editing vertices

5.9. Practice the Exploding of entities

6. Use the drawing information retrieving tools Measure, Divide, Calculate, Display, and Track

6.1. Divide the entities in to required number of segments
6.2. Calculate the areas defined by points, of closed entities, and combined entities
6.3. Calculate the distance between the entities
6.4. Calculate the angle between the entities
6.5. Display the information about the entities and drawing status
6.6. Track time spent working on a drawing

7. Use the Text tool to create and formatting the various types of text fonts and its styles

7.1. Practice the creating, naming and modifying the text fonts
7.2. Practice the Creation of line text, paragraph text
7.3. Practice the Setting of line text style and its alignment
7.4. Practice the Setting of Paragraph text style and its alignment
7.5. Practice the Changing of line text and Paragraph text
7.6. Practice the use of alternate text editor

8 Use Dimensioning concepts to create dimensions, Edit dimensions, Control dimension styles & variables and Adding geometric tolerances

8.1. Practice the creating of linear, Angular, Diametral, Radial, Ordinate dimensions
8.2. Practice the creating leaders and annotations
8.3. Practice the making dimensions oblique,
8.4. Edit the dimension text
8.5. Practice the Controlling of dimension properties like arrow types, size, dim line adjustment, dim offset, text size: primary and secondary units and format
8.6. Practice the Controlling of dimension units, and dimension tolerance

9 Create 2D Drawings

Create 2D drawings of standard mechanical components

Course Outcomes		CL	Linked PO	Teaching Hours
CO1	Importance and advantages of CAD. Set drawing area and draw geometric shapes and modify as per requirement	U/A	1,2,3,9,10	15
CO2	Add text with required font and size and also dimension by various methods	U/A	1,2,3,9,10	9
CO3	Generate isometric model and draw circle on three iso planes	U/A	1,2,3,9,10	6
CO4	Create 2D drawings with front, side view with all above features	A	1,2,3,10	15

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	**Basics of Electrical and Electronics Engineering Lab Practice**	Course Code	**18EI-108P**
Semester	**I**	Course Group	**:Core**
Teaching Scheme in Hrs(L:T:P)	**7.5:0:37.5**	Credits	: **3**
Methodology	**Lecture + Practicals**	Total Contact Hours :	**:45 periods**
CIE	**60 Marks**	SEE	**40 Marks**

Course Content and Blue Print of Marks for SEE

Unit No	**Unit name**	**Periods**	**Questions for SEE**			**Marks weightage**	**%Weightage**
			Handling	Manipulation	Precision		
1.	Analog and digital multimeter	05	**4**	**0**	**0**		
2	AC Fundamentals Analysis	08	**3**	**3**	**3**		
3	Ohm's law, KVL, KCL analysis	08	**2**	**2**	**3**		
4	Electronic Switches and relays	08	**3**	**2**	**2**		
5.	Electronic Components	08	**2**	**0**	**2**		
6.	Soldering Practice and Preparation of PCBs	08	**4**	**2**	**5**		
	Total	**45**	**16**	**9**	**15**		

Pre requisites

This course requires the basic knowledge of high school science and Mathematics.

Course Outcomes

CO1 :	Able to handle Analog and Digital Multimeter.
CO2 :	Identify and measure the various parameters of AC signal.
CO3 :	Distinguish and interpret and verify Ohm's law and Kirchoff's laws in electrical circuits.
CO4 :	Identify different Switches, Relays, Fuses, MCBs.
CO5 :	Identify and distinguish Various R, L, C Components and calculate their values.
CO6 :	Attain knowledge on soldering and PCB preparation.

Course Contents

I. Analog and Digital Multimeter. (Able to handle Analog and Digital Multimeter.)

1. Identify electronic equipment and draw their circuit symbols.
2. To handle and use analog and digital multimeter.
   a) Identify the range selector and terminals (Analog and Digital).
   b) Keep the Multimeter in mA mode and measure the current through a given resistor.
   c) Connect batteries in series and parallel and observe the output voltage.

II. AC Fundamentals Analysis. (Identify and measure the various parameters of AC signal.)

3. Calculate the values of Instantaneous value, Average value, and Maximum value for the given values. (manually)
4. Calculate the values of Form factor, Peak factor and RMS value for the given values. (manually)

III. Ohm's law, KVL, KCL analysis. (Distinguish and interpret and verify Ohm's law and Kirchhoff's laws in electrical circuits.)

5. Identify the resistance value by Ohms Law.
6. Rig up a circuit to verify ohm's law.
7. Rig up a circuit to verify Kirchhoff's Voltage law.
8. Rig up a circuit to verify Kirchhoff's current law.

IV. Electronic Switches and relays. (Identify different Switches, Relays, Fuses, MCBs)

9. Identify different switches and their terminals.
10. Connect any switches in parallel and series combination.
11. Connect small loads (bulbs, motors etc.) to the switch and observe their operation.
12. Identify various relays, fuses and MCBs.
13. Observe the operation of relays, fuses and MCBs connecting to loads.

V. Electronic Components. (Identify and distinguish Various R, L, C Components and calculate their values)

14. Identify different Resistors, Capacitors and Inductors.
15. Measure the value of the resistance by using (i) Analog and Digital Multi-meter and (ii) By Colour coding.
16. Using Analog Multimeter measures the value of the given 5 resistors & verify by colour code.
17. Measure the value of the given 5 inductors using LCR Meter.
18. Identify the capacitance & Inductance values of the given components by LCR Meter.
19. By using a suitable meter, measure the value of the given 5 capacitors.

VI. Soldering Practice and Preparation of PCBs. (Attain knowledge on soldering and PCB preparation)

20. Identify various soldering equipment.
21. Practice soldering.
22. Practice desoldering using desoldering wick and desoldering pump.
23. Identify and fix/solder different components.

Recommended Books

1. Electrical Technology Volume 1	by BL.Theraja	
2. Electronic Devices and Circuits	by David A.Bell	Prentice hall
3. Hand book of components for Electronics	by Charles A. Harper	McGrahills

Suggested Student Activities

1. Do Market survey on List of Electronic components available in the market and collect the following information like name of the electronic component,specifications, Price etc.

The student should submit a handwritten report.Documents have to be maintained as a record.

2. Take Quiz tests / assignments in Semiconductor device experiments.Documentshave to be maintained as a record.
3. Do power point presentations on Electronic components, Ohm's laws, Kirchoff's laws, Coloumb's laws, and Faraday's laws.Documents have to be maintained as a record.

Suggested E-Learning references

1.http://electrical4u.com/

2. www.electronics-tutorials.ws

3. www.nptel.ac.in

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Able to handle Analog and Digital Multimeter.	R/U	1,3,10	
CO2	Identify and measure the various parameters of AC signal.	R/U/A	1,2,10	
CO3	Distinguish and interpret and verify Ohm's law and Kirchoff's laws in electrical circuits.	R/U/A	1,2,3,7,10	
CO4	Identify different Switches, Relays, Fuses, MCBs.	R/U	1,3,4,8,10	
CO5	Identify and distinguish Various R, L, C Components and calculate their values.	R/U/A	1,2,3,4,7, 8,10	
CO6	Attain knowledge on soldering and PCB preparation.	R/U/A	1,2,3,4,5, 8,10	
	Total			

State Board of Technical Education and Training, Telangana
Semester End Examination Model Question paper

DEIE I semester practical Examination

Corse Code:18EI-107 **Duration:3 hours**

Course Name: Basics of Electrical and Electronics Engineering Lab Practice **Max.Marks:40**

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the circuit diagram for illustration; choose appropriate values when not mentioned in the question

1. Identify electronic equipment and draw their circuit symbols.
2. To handle and use analog and digital multimeter.
   d) Identify the range selector and terminals (Analog and Digital).
   e) Keep the Multimeter in mA mode and measure the current through a 10kΩ given resistor.
   f) Connect batteries in series and parallel and observe the output voltage.
3. Calculate the values of Instantaneous value, Average value, and Maximum value for the given values. (manually)
4. Calculate the values of Form factor, Peak factor and RMS value for the given values. (manually)
5. Identify the resistance value by Ohms Law.
6. Rig up a circuit to verify ohm's law.
7. Rig up a circuit to verify Kirchhoff's Voltage law.
8. Rig up a circuit to verify Kirchhoff's current law.
9. Connect any switches in parallel and series combination.
10. Connect small loads (bulbs, motors etc.) to the switch and observe their operation.
11. Measure the value of the resistance by using (i) Analog and Digital Multi-meter and (ii) By Colour coding.
12. Using Analog Multimeter measures the value of the given 5 resistors & verify by colour code.
13. Measure the value of the given 5 inductors using LCR Meter.
14. Identify the capacitance & Inductance values of the given components by LCR Meter.

15. By using a suitable meter, measure the value of the given 5 capacitors.
16. Practice soldering.
17. Practice desoldering using desoldering wick and desoldering pump.
18. Identify and fix/solder different components.

Department of Technical Education
State Board of Technical Education & Training (TS)

Course Title	**Basic Science Lab Practice (Physics Lab)**	**Course Code**	**18EI-109P(A)**
Semester	**I**	**Course Group**	**Core**
Teaching Scheme in Pds/Hrs(L:T:P)	**0:1:2 periods**	**Credits**	**1.5/2**
Type of course	**Tutorial & practical**	**Total Contact Hrs**	**22.5Pds**
CIE	**30 Marks**	**SEE**	**20 Marks**

Pre requisites: Knowledge of basic concepts of basic High school science, basic mathematics

Course objectives: To provide practical knowledge about the basics of Physics instrumentation and calculations/measurements.

Tutorial: 0.83 Hrs/Experiment:

1. Introduction Physics practical and its importance, safety precautions in maintenance of equipment in the laboratory.
2. Maintenance of apparatus and equipment.
3. Follow of Do's and Don'ts.
4. Maintenance of data in manual and record book.
5. Write the procedure of the experiment before the commencement of each experiment.
6. Strictly following of instructions given from time to time by the lecturer-in-charge.
7. Demonstration of each experiment by the lecturer in charge.

Conduct of an experiment: 3periods/experiment.

Course outcomes:

On successful completion of the course, the student will have ability to:

1. use Vernier caliper to determine the volumes of objects like cylinder and sphere.
2: use Screw gauge to determine thickness /diameter of small objects like glass plate and wire.
3: prove Boyle's law employing Quill tube.
4: determine the viscosity of liquid using capillary method.
5: verify the parallelogram law and triangle law of forces.

References:

1. Basic Applied Physics – R.K. Gaur
2. Laboratory manual for class XI and XII - NCERT

PHYSICS PRACTICALS

List of experiments

Semester I

1. Vernier caliper- determine the volumes of a cylinder and sphere.
2. Screw gauge - determine thickness of a glass plate and cross section of a wire.
3. Boyle's law - verification using Quill tube.
4. Coefficient of viscosity of liquid - using capillary method.
5. Parallelogram law and Triangle law of forces – verification.

Course Delivery:

The course will be delivered through lectures, class room interaction, group discussions, graded exercises, demonstration and practice.

Conduction of experiments: 2 periods/Experiment.

Student must perform experiment individually under the supervision of the lecturer-in charge.

On successful completion of the course, the student will have the ability to attain below Course outcomes (CO):

Course Outcomes		CL	Linked experiments	Linked POs	Teaching Hours
CO 1	Hands on practice on Vernier Calipers	U/A		1,2,3,8,9	L:P::1:2
CO 2	Hands on practice on Screw gauge	U/A		1,2,3,8,9	L:P::1:2
CO 3	Boyle's law verification	U/A		1,2,3,8,9	L:P::1:2
CO 4	Coefficient of Viscosity by capillary method	U/A		1,2,3,8,9	L:P::1:2

CO 5	Verification of Parallelogram law of forces and Triangle law of forces	U/A		1,2,3,8,9	L:P::1:2
CO 6	Related the answers to the oral questions		Covered in all COs		

Cognitive levels: R=Remember, U=Understand, A=Apply

Scheme of Valuation of SEE		
S.No	Particulars	Marks
1.	Identification of apparatus/equipment/etc	01
2.	Writing procedure	04
3.	Conducting of experiment	10
4.	Results	01
5.	Viva-voce	04
	Total	20

Suggested learning outcomes

Name of the Experiment	Competencies	Key competencies
1. Hands on practice on Vernier Calipers – Cylinder and sphere	• Find the Least count • Fix the specimen in position • Read the scales • Calculate the volume of given object	• Read the scales • Calculate the volume of given object
2. Hands on practice on Screw gauge – Wire and glass plate	• Find the Least count • Fix the specimen in position • Read the scales • Calculate thickness of glass plate and cross section of wire	• Read the scales • Calculate thickness of given glass plate • Calculate cross section of wire

3. Boyle's law verification – Quill tube	• Note the atmospheric pressure • Fix the quill tube to retort stand • Find the length of air column • Find the pressure of enclosed air • Find and compare the calculated value P x l	• Find the length of air column • Find the pressure of enclosed air • Find the value P x l
4. Coefficient of viscosity by capillary Method - water	• Find the least count of vernier • Fix the capillary tube to aspiratory bottle • Find the mass of collected water • Find the pressure head • Calculate rate of volume of liquid collected • Find the radius of capillary tube • Calculate the viscosity of water using capillary method	• Find the pressure head • Calculate rate of volume of liquid collected • Find the radius of capillary tube • Calculate the viscosity of water
5. Verification of Parallelogram law of forces and Triangle law of forces	• Fix suitable weights • Note the positions of threads on drawing sheet • Find the angle at equilibrium point • Construct parallelogram • Compare the measured diagonal • Construct triangle • Find the length of sides • Compare the ratios	• Find the angle at equilibrium point • Constructing parallelogram • Construct triangle • Compare the ratios of force and length

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Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title: **Basic Science Lab Practice (Chemistry Lab)**	Course Code: **18EI-109(B)**
Semester: **I**	Core/Elective:
Teaching Scheme(L:P): **1:2** periods	Credits: **1.5/2**
Type of Course: **Lecture & practical**	Total Contact Hours: 22.5 periods
CIE: **30 Marks**	SEE: **20 Marks**

Prerequisite:
Knowledge of basic concepts of chemistry of secondary education.

Course Objectives:
To provide practical knowledge about the basics of preparation of chemical solutions and volumetric analysis of chemical compounds.

Course Outcomes:

On successful completion of the course, the student will have ability to attain CO:

Course Outcome		**CL**	**Linked PO**	**Teaching Hours**
CO1	Prepare the standard solution.	**U/A**	1,2,3,8	L:P ::1:2
CO2	Estimate the amount of the chemical substance in the given sample of solutions(HCl, NaOH & H_2SO_4).	**U/A**	1,2,3,8	L:P ::3:6
CO3	Determination of hardness of water in the given sample.	**U/A**	1,2,3,8	L:P ::1:2
CO4	Relate the answers to the oral questions	**U/A**		

U = Understand, A = Application

Course Delivery:

The course will be delivered through lectures, classroom interaction, group discussion, demonstration and practicals.

Conduction of experiments: Lecture 1 period + Experiment 2 periods..

Student must conduct experiment individually under the supervision of the staff-in-charge.

Tutorial:

1. Introduction of chemistry practical and its importance, safety precautions in maintenance of cleanliness and orderliness of chemicals in the laboratory.
2. Maintenance of apparatus and equipment.
3. Follow of DO's and Don'ts.
4. Maintenance of data in record book.
5. Write the procedure of the experiment before the commencement of each experiment.
6. Strict following of instructions given from time to time by the staff-in- charge.
7. Demonstration of each experiment by the staff in charge.

Course content

Volumetric Analysis: (22.5 Hrs)

Volumetric analysis by Titrimetric Method:-

Volumetric Analysis -Titration – Standard Solutions- Concentration of solutions- Indicators- acid base indicators- selection of indicators-endpoint of titration-Neutralization.

List of experiments:

1. Preparation of 0.05M sodium carbonate solution.
2. Estimation of hydrochloric acid present in 250 ml of solution by using Standard sodium carbonate solution.
3. Estimation of sodium hydroxide present in 250ml of solution by using standard hydrochloric acid solution.
4. Estimation of sulphuric acid present in 250ml of solution by using standard sodium hydroxide solution.
5. Determination of total hardness of water sample by 0.02N EDTA solution.

Suggested Learning Outcomes

Upon completion of the course, the student will have ability to

1. Prepare standard sodium carbonate solution.
2. Estimate hydrochloric acid present given volume of solution by using standard sodium carbonate solution.
3. Estimate sodium hydroxide present in the given volume of solution by using standard hydrochloric acid solution.
4. Estimate sulphuric acid present in the given volume of solution by using standard sodium hydroxide solution.

5. Determine the total hardness of water sample by using 0.02N EDTA solution.

Reference Books:

1. Vogel's Inorganic Qualitative and Quantitative Analysis.
2. Practical chemistry by O.P.Pande & others.
3. Qualitative and quantitative analysis by Alex.

Scheme of Valuation for MID I & II and SEE		
Sl. No.	**Particulars**	**Marks**
1	Identification of apparatus/equipment/chemical compounds/tools/etc.	2
2	Writing Procedure	5
3	Conducting of experiment	4
4	Observation and Results	6
5	Viva-voice	3
Total		20

COMPUTER FUNDAMENTALS LAB PRACTICE

Course Title : **COMPUTER FUNDAMENTALS LAB PRACTICE**	Course Code : **18EI-110P**
Semester : **I**	Course Group : **Core**
Teaching Scheme in Hrs (L:T:P) :**7.5:0:37.5**	Credits : **3**
Type of course **: Tutorial + Practicals**	Total Contact Hours : **45 Pds**
CIE : **60 Marks**	SEE : **40 Marks**

Prerequisites

Knowledge of English comprehension , Basic Computer operation and IO devices.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Identify hardware and software components and work with DOS OS	**R,U, A**	**1,2,3,4,8,9,10**	**5**
CO2	Operate the computer system with Windows OS	**R,U, A**	**1,2,3,4,8,9,10**	**15**
CO3	Access the internet	**R,U, A**	**1,2,3,4,8,9,10**	**5**
CO4	Draft the documents using word processing software	**R,U, A**	**1,2,3,4,8,9,10**	**20**
		Total Sessions		**45**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course Contents

COMPUTER BASICS

1. Identify the various components of a Computer system
2. Differentiate between hardware and software
3. State the configuration of a computer system
4. Practice on DOS Internal and External commands.
5. Create and use Batch Files.
6. Know the usage of Editors.

WINDOWS Operating System

7. Exercise on creation of text Files using Notepad, WordPad

8. Exercise on creation of .jpeg, .bmp files using MS Paint
9. Exercise how to use calculator
10. Exercise on creation of folders and organizing files in different folders
11. Exercise on use of Recycle Bin, My Computer and My Documents
12. Exercise on creation of shortcut to files and folders (in other folders) on Desktop
13. Exercise on arranging of icons – name wise, size, type, Modified
14. Exercise on searching, accessing and organizing files / folders
15. Change resolution, colour, appearance, screen server options of Display, date and time

INTERNET

16. Importance of web browser software
17. Structure of URL
18. Create an E-mail account
19. Send & Receive an E-mail
20. Browse the Internet using various search engines

WORD Processing Software

21. Open MS-word and Identify the components on the screen
22. Create a document using MS-word and save it.
23. Create a table using MS-Word and save it.
24. Apply formulas in table & sort the table
25. Convert text into table & table into text.
26. Insertion of new rows and columns in the existing table and changing background colour in Table
27. Merge and split cells in a Table
28. Change the font of a text
29. Exercise with Headers and Footers, paragraph tool bar
30. Insert objects into the document like pictures, shapes, charts, and word-art.
31. Printing a document , page setting, different views of a document
32. Import & export files to & from Word.
33. Create a letter and send to multiple users using mail merge tool of MS-word
34. Create a Simple Newsletter with minimum three columns. Insert a Clip Art in the Newsletter.
35. Create a Resume for a Job Application.
36. Create the Cover Page of a Project Report (use Word Art, insert Picture Image).
37. Prepare the class time table of your class.

Resources:

1. Computer Fundamentals Concepts, Systems, Application, D.P.Nagapal, S.Chand Publication, RP-2014, ISBN: 81-219-2388-3
2. http://www.tutorialsforopenoffice.org/
3. http://www.libreoffice.org/get-help/documentation/

Software Tool

Any open source tool or equivalent proprietary tools

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Bloom's Category	%
1	Remembrance	20
2	Understanding	20
3	Application	60

Mapping Course Outcomes with Program Outcomes:
(Course Outcome linkage to Cognitive Level)

Course Outcome		Experiment Linked	Linked PO	CL	Lab Sessions
CO1	Identify hardware and software components and work with DOS OS	**1,2,3,4,5,6**	**1,2,3,4,8,9,10**	**R, U, A**	**5**
CO2	Operate the computer system with Windows OS	**7,8,9,10,11,12,13, 14,15**	**1,2,3,4,8,9,10**	**R, U, A**	**15**
CO3	Access the internet	**16,17,18,19,20**	**1,2,3,4,8,9,10**	**R,U, A**	**5**
CO4	Draft the documents using word processing software	**21,22,23,24,25,26, 27,28,29,30,31,32, 33,34,35,36,37**	**1,2,3,4,8,9,10**	**U, A**	**20**

U-Understanding; A-application/ Analysis; App-Application

Student Activity

1. Observe newspaper pattern of printing.
2. Submit a report of one page
3. Collection of data

Internal Assesment

Activity	Marks
Writing the experiment, record evaluation	30
Execution of the given experiment	20
Viva-voce	10
Total	60

Model Question Bank

1. Identify Physical components of a Computer System.
2. Demonstrate Internal and External DOS Commands and differentiate between them.
3. Create and Rename the file using DOS Commands.
4. Create a directory and copy a file inside the directory using DOS Commands.
5. Demonstrate the basic formatting features in Text Editors.
6. Create two file in a folder and place the shortcut of these files on the desktop.
7. Demonstrate how search engine may be used in browsing Internet.
8. Create an E-mail account
9. Create and Send an E-mail with a picture attachment.
10. Demonstrate how documents can be downloaded using Internet.
11. Using Word Processor Application create a Simple Newsletter with minimum of three columns. Insert a Clip art in the newsletter.
12. Using Word Processor Application create a Resume for a Job application.
13. Using Word Processor Application create the cover page of a Project Report (use Word Art, insert Picture Image).
14. Prepare the class time table for your class using Word Processor Application.