# Diploma in Chemical Engineering

## I-SEMESTER

General Time Schedule

Periods Format

| Sl No | 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 | 18CH-101F | Basic English | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 2 | 18CH-102F | Basic Engineering Mathematics | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 3 | 18CH 103F | Basic Physics | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 4 | 18CH-104F | General Engineering Chemistry | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 5 | 18CH-105C | Materials Technology | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 6 | 18CH-106P | Basic Engineering Drawing | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 7 | 18CH-107P | Basic Computer Aided Drafting | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 8 | 18CH-108P | Basic Workshop Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 9 | 18CH-109P-A+B | Basic Science Lab Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 10 | 18CH-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 | | | -- | - |
| | | | 20 | 5 | 17 | 630 | **25** | 200 | 200 | 200 | 400 | 170 | 1000 | 425 |
| 11 | Activities: student performance is to be assessed through Rubrics<br>All the above Marks are in percentage weightage. | | | | | | | | | | | | | |

# Department of Technical Education

## State Board of Technical Education & Training, Telangana

| | |
|---|---|
| **Course Title :Basic English** | **Course Code : 18CH-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<br>Listening: 0<br>Vocabulary:7<br>Reading:9<br>Grammar:12,15 | 20 | Part A 5 Short answer questions<br>Part B 2 Essay questions out of 3 Questions<br>Part C 2 Essay questions out of 3 Questions |
| Mid Sem 2 | Speaking: 2,4,5<br>Listening: 6<br>Vocabulary:8 | 20 | Part A 5 Short answer questions<br>Part B 2 Essay questions out of 4 Questions<br>Part C 2 Essay questions out of 3 Questions |

| | | | |
|---|---|---|---|
| | Reading:10,11<br>Grammar:13,14 | | |
| Slip Test 1 | Speaking: 1,3<br>Listening: 0<br>Vocabulary:7<br>Reading:9<br>Grammar:12,15 | 5 | 2 Essay Questions out of 3 Questions |
| Slip Test 2 | Speaking: 2,4,5<br>Listening: 6<br>Vocabulary:8<br>Reading:10,11<br>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**

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## 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-2 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**

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## 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**

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**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 **: 18CH-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 $\boldsymbol{Sin^2 A = \left(\frac{1-Cos2A}{2}\right)}$ 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

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

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

**UNIT – II**

**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 sinA= (1- cos2A)/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 $\Delta$ABC, 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 $\Delta$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 **:** $\dfrac{9}{(x-1)(x+2)^2}$

**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** | 18CH-103F |
| **Semester** | Semester-I | **Course Group** | Core |
| **Teaching Scheme in Pds/Hrs(L:T:P)** | 30:15:0 Hrs<br>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 Weigh tage | 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<br>Part B-2 Essay questions out of 3 Questions<br>Part C-2 Essay questions out of 3 Questions |
| Mid Sem 2 | 3 and 4 | 20 | Part A-5 Short answer questions<br>Part B-2 Essay questions out of 3 Questions<br>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

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**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**

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**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 $\mathbf{A}=2\mathbf{i}+\mathbf{j}-2\mathbf{k}$ and $\mathbf{B} = 3\mathbf{i}-\mathbf{j}+2\mathbf{k}$ 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 $2 \times 10^5$ 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: 18CH-**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 | R/U/A | 1,2,9 | **10** |

| | | | | |
|---|---|---|---|---|
| | problems and colloids and their applications. | | | |
| 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<br>Part B- 2 Essay questions out of 3 Questions<br>Part C- 2 Essay questions out of 3 Questions |
| Mid Sem 2 | 3 and 4 | 20 | Part A 5 Short answer questions<br>Part B 2 Essay questions out of 3 Questions<br>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<br>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 $25^{o}$ 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: **MATERIALS TECHNOLOGY** | Course Code : 18**CH-105C** |
| Semester : **Semester I** | Course Group : **Core** |
| Teaching Scheme in Hrs(L:T:P) : 3**0:20:37.5** | Credits : **3** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **45Hrs/60Pds** |
| CIE : **60 Marks** | SEE : **40 Marks** |

**Course Content and Blue Print of Marks for SEE**

| Unit | Unit Name | Period | Internal Evaluation | | | Questions to beset for SEE | | | Marks Weightage | Weightage (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | U | A | R | U | A | | |
| 1 | Mechanical Properties o metals and Testing of materials | 12 | 5 | 3 | 3 | 2 | 1 | 1 | 19 | 17 |
| 2 | Structure of metals and alloys | 10 | | | | 2 | 1 | 0 | 9 | 8 |
| 3 | Thermal Equilibrium diagram | 08 | 5 | 3 | 3 | 0 | 0 | 1 | 10 | 9 |
| 4 | Production of Iron and Steel | 09 | | | | 01 | 1 | 1 | 17 | 16 |
| 5 | Plain carbon and alloy steels & Non ferrous metals and alloys | 12 | | | | 3 | 2 | 2 | 36 | 33 |
| 6 | Miscellaneous materials | 09 | | | | 2 | 1 | 1 | 19 | 17 |
| | **Total** | **60Pds** | | | | 10 | 6 | 6 | 110 | 100 |

**Pre requesites**:

This course requires the basic knowledge of Physics, Chemistry, structures of materials at Secondary school level

**Course Objectives:** Give basic knowledge of materials**,** introduce the concept of structure property relations. Lay the ground work for studies in fields such as mechanical behavior of materials, phase and phase diagram, applications of ferrous, non -ferrous and recent materials. Develop intuitive understanding of the subject to present a wealth of real world engineering examples to make students understand how materials are useful in engineering practices.

**Course Outcomes**

| | |
|---|---|
| CO1 : | Demonstrate the mechanical properties of materials and destructive and non destructive testing of materials |

| | |
|---|---|
| CO2 : | Analyze the Structure of materials, basic concepts of crystalline materials like unit cell, FCC,BCC, HCP, and explain Iron carbon equilibrium diagram representing different phases |
| CO3 : | Explain different methods of manufacture of Iron and Steel |
| CO4 : | Discuss the need of alloying steel and non ferrous metals and select the alloys for specific applications |
| CO5 : | Select appropriate materials for specific engineering applications and suggest suitable materials for the modern world |

## COURSE CONTENTS

**UNIT-1: Introduction, Mechanical properties of metals &Testing of materials**

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

Definition of engineering materials, Classification of engineering materials - need and applications, Define the terms strength of materials, stress , strain ,elasticity , tensile and compressive strength, ductility, hardness, toughness, brittleness, impact strength, fatigue and creep strength- various destructive testing methods . Determination of Tensile strength & compressive strength by UTM - Hardness by Brinell & Rockwell testing machines-Impact strength by Izod and Charpy testing machines- various non destructive testing methods.

**UNIT-2: Structure of metals and alloys** **Duration: 10 Periods (L: 6 – T:4)**

Unit cell – space lattice – FCC, BCC, HCP space lattices – formation of grains by dendritic growth – effect of grain size on mechanical properties – factors promoting grain size – Phenomenon of crystallization

**UNIT -3: Thermal equilibrium diagram:** **Duration: 08 Periods (L: 4.8 – T:3.2)**

Cooling curve of pure iron.- Allotropic forms of pure iron, Iron – carbon thermal equilibrium diagram – Peritectic, Eutectic and Eutectoid points in iron carbon Equilibrium diagram.

**UNIT -4: Production of Iron and Steel** **Duration: 09 Periods (L: 5.4– T:3.6)**

Raw materials required for Production of iron- various methods of manufacture of steel and Iron – Production of

Pig Iron by Blast furnace – Production of Steel by Bessemer converter and L-D converter

**UNIT 5: Plain carbon steels and alloy steels & Non ferrous metals and their alloys:**

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

Classification and application of plain carbon steels –Need for alloying the steels – industrial applications of alloy steels- Selection of alloy steels for suitable engineering applications

Importance of various non ferrous metals and alloys of aluminum, copper, nickel, lead, tin, zinc, titanium, zirconium, - properties of aluminum, copper, zinc, tin, lead and their applications –– types of Nickel alloys ( Monel,Hastalloy) and copper alloys(Brasses and Bronzes), their properties and applications.

**UNIT 6: Miscellaneous materials** **Duration: 09 Periods (L: 5.4 – T:3.6)**

Importance of glass - types and applications – properties and applications of Carbon and Graphite - application of polymers – composition, properties, applications of stoneware – applications of asbestos, rubber, Elastomers, Fibre glass, reinforced plastics, Refractories, Ceramics, Composites, Nano- materials. Selection of appropriate materials for specific engineering applications.

**Suggested Learning Resourses/ Reference books**

1. Engineering Chemistry by Jain & Jain
2. Engineering Materials by Pakirappa
3. Engineering Metallurgy by Higgins.
4. Material Science by S.K Hazra Chowdary.
5. Material science and Metallurgy by O.P.Khanna
6.Engineering Materials by Rangawal S.C

**Specific Learning Outcomes**

1.1 Define Engineering Material

1.2 Write the Classification of Engineering Materials

1.3 What is the Need of Engineering Materials and their applications.

1.4 Define stress & strain.

1.5. Define Tensile and compressive strength

1.6 Define Hardness and Toughness

1.7. Define Brittleness

1.8 Define Impact strength

1.9. What are the various destructive methods of testing?

1.10. What are the various methods of non destructive testing?

1.11. Identify various non destructive testings.

1.12. Why testing of materials is required?

1.13. Distinguish between destructive testing and non destructive testing.

1.14 Explain the method of determination of tensile strength and compressive strength by universal testing machine (UTM).

1.15 How do you determine the hardness of the material by Brinell hardness testing machine.

1.16. Explain the method of determination of hardness by Rockwell hardness testing machine.

1.17. Write the determination of impact strength by Izod and Charpy's testing machines.

**2.0**

2.1 Define unit cell.

2.2 Define space lattice

2.3 Draw the structures of F.C.C

2.4 Draw the structures of B.C.C, HCP

2.5 What are the factors that promoting grain size

2.6 Write the phenomenon of crystallization

2.7 What is crystallization?.

2.8 What is the effect of grain size on mechanical properties?

2.9. What is Dendrite?

**3.0**

3.1 Sketch the cooling curve of a pure metal.

3.2 Draw Iron-carbon equilibrium diagram with salient points, phases and critical points

3.3 Draw the iron –carbon thermal equilibrium diagram

3.4 Explain Allotropic forms of pure iron with a line sketch

3.5 What is pearlite?

**4.0**

4.1 What are the main functions of limestone in the charge of blast furnace?

4.2 What are the products of blast furnace?

4.3 What are the main raw materials used for production of iron

4.4 Draw the neat diagram of blast furnace.

4.5 Write the methods of manufacture of iron.

4.6 What is the function of coke in the production of iron

4.7 Write the different methods of manufacture of steel.

4.8 What are the furnaces used for the production of iron?

4.9 Explain the production of Pig iron by using blast furnace with a neat sketch.

4.10 Write the process of making steel in L-D converter and write its advantages

4.11 Explain the process of production of steel by Bessemer converter.

4.12 What are the differences between acidic and basic Bessemer process

4.13 List out different types of cast iron.

4.14 Draw a neat diagram of L-D Converter.

4.15 Draw the neat diagram of blast furnace.

4.16 Explain the production of Pig iron by using blast furnace with a neat sketch.

4.17 Write the advantages of making steel in L-D Converter.

4.18 Write the process of making steel in L-D converter.

**5.0**

5.1 Write the classification of plain carbon steels.

5.2 What are plain carbon steels?

5.3 What is the effect of carbon on properties of steel?

5.4 Write the industrial applications of alloy steels

5.5 What is the purpose of adding alloying elements to steel?

5.6 Give the composition of Monel metal.

5.7 Write the applications of Zinc.

5.8 Write the importance of non ferrous metals

5.9 What are non- ferrous metals? Give Examples

5.10 Write the applications of non –ferrous metals?

5.11 What is the effect of carbon on properties of steel?

5.12 Name any two alloys with examples.

5.13 What is stainless steel? Give its composition

5.14 What are the impurities that effects the properties of steel.

5.15 What is an alloy steel?

5.16 What is stainless steel?

5.17 Write the composition of Gun metal.

5.18 Write the importance of Aluminium.

5.19 What is 18/8 stainless steel?

5.20 What is munz metal? Give its composition?

5.21 What are the different types of copper alloys? Write any one of them with applications.

5.22 Name any two important alloys of nickel and write their properties and applications

**6.0**

6.1 What is glass? Give its composition.

6.2 What type of material is used as lining in glass manufacture?

6.3 Write the applications of polymers?

6.4 Write the applications stoneware.

6.5 What is glass ceramics?

6.6 Write the uses of asbestos

6.7 Write the applications of rubber.

6.8 Define refractory

6.9 Write the applications refractory.

6.10 Write the properties and applications of Graphite.

6.11 Write the properties and applications of carbon.

6.12 Write any two applications of asbestos

6.13 Write the applications of rubber.

6.14 What is Reinforced plastics?

6.15 Write the properties and applications of polymers and elastomers.

6.16 Write the properties and applications of ceramics.

6.17 What are Nano materials and composites?

6.18 Give the applications of Nano materials and composites

**6.19.** Select appropriate materials for specific engineering applications

**Internal evaluation**

| Test | Units | Marks | Pattern |
|---|---|---|---|
| Mid Sem 1 | 1 and 2 | 20 | Part A 5 Short answer questions<br>Part B 2 Essay questions out of 4 Questions |
| Mid Sem 2 | 3 and 4 | 20 | Part A 5 Short answer questions<br>Part B 2 Essay questions out of 4 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 | |

**Sug ges**

**ted Student Activities for Induction Program**

| | Forenoon | Afternoon |
|---|---|---|
| Day1 | Registration | Class work as per Time table<br>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: Other than the class room and laboratory learning following are the suggested student related co curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course

1. Enlist the different types of metals , non metals in Chemical Laboratories
2. Visit nearby metal foundry
3. Prepare the chart for various grades of steel
4. Draw the atomic structure of various metals. Display charts in Classroom/Laboratory and prepare models

5. Draw Iron - carbon equilibrium diagram and display chart in class room
6. Group discussion/Quiz
7. Surprise test

**Suggested Software / E-Learning references:**

i. **https://en.wikipedia.org/wiki/materials-science**
ii. **http://mse.stanford.edu**
iii. **http://ocw.mit.edu/courses/materials-science and engineering**
iv. 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 |

**CO-PO Mapping Matrix**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | Mapped POs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | | | | | | | | |

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | Mapped POs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | | | | | | | | 1,2,3 |
| CO2 | 2 | 3 | | | | | | | | | 1,2 |
| CO3 | 3 | 3 | | | | | | | | | 1,2 |
| CO4 | 2 | 3 | | | | | | | | 3 | 1,2,10 |
| CO5 | 2 | 3 | | | 3 | 2 | | | | | 1,2,5,6 |

| | **COURSE OUTCOME** | **CL** | **Linked PO** | **Teaching Hrs** |
|---|---|---|---|---|
| CO1 | Demonstrate the mechanical properties of materials and destructive and non destructive testing of materials | R/U | 1,2,3 | 12 |
| CO2 | Analyze the Structure of materials, basic concepts of crystalline materials like unit cell, FCC, BCC, HCP, and Explain iron carbon equilibrium diagram with diagram presenting different phases | R/U/A | 1,2 | 18 |
| CO3 | Explain different methods of manufacture of Iron and Steel | R/U | 1,2 | 09 |
| CO4 | Discuss the need of alloying steel and non ferrous metals and select the alloys for specific applications | R/U/A | 1,2,10 | 12 |
| CO5 | Select appropriate materials for specific engineering applications and suggest suitable materials for the modern world | R/U/A | 1,2,5,6 | 09 |
| | | | | |

# MODEL QUESTION PAPER

## BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)

## D.CH – I - SEMESTER EXAMINATION

## 18CH-105C – MATERIALS TECHNOLOGY

**TIME: 1½ HOURS** **MAXIMUM MARKS: 40**

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*PART –A* *MARKS: 5 X 2 = 10*

*NOTE: Answer all questions. Each question carries two marks.*

1. What are Engg materials ? Give Examples.
2. Define Hardness and Brittleness
3. What is the difference between and destructive testing and Non-destructive testing?
4. Define unit cell.
5. Draw the structures of F.C.C

*PART –B* *MARKS:2 X5 = 10*

*NOTE: Answer any Two questions. Each question carries five marks.*

1. Write the Classification of Engineering Materials
2. What is impact strength? Distinguish between IZOD and Charpy impact test?
3. What are the factors that promoting grain size.?

*PART –C* *MARKS:2 X10 = 20*

*NOTE: Answer any Two questions. Each question carries Ten marks.*

1.What is hardness? Determine the hardness of the given sample using Brinell hardness testing machine.
2. Explain briefly about UTM with the help of a neat sketch with stress - strain diagram.
3. What is crystallization? Explain the phenomenon of crystallization

# MODEL QUESTION PAPER

## BOARD DIPLOMA SEMESTER END EXAMINATIONS (C-18)

## D.CH.E – I - SEMESTER EXAMINATION

## 18CH-105C – MATERIALS TECHNOLOGY

**TIME: THREE HOURS** **MAXIMUM MARKS: 80**

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*PART –A* *MARKS: 10 X 2 = 20*

*NOTE: Answer all questions. Each question carries two marks.*

**1.**What are Engg materials**?**

**2.**Define the properties of Hardness and Brittleness.

3.Define unit cell.

4.What is the function of coke in the production of Blast furnace?

5.Draw a neat sketch of L-D converter.

6.What is plain carbon steel?

7.What is an alloy steel?

8.Write the importance of aluminium.

9.What is glass? Give its composition.

*PART –B*

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

1. Write the classification of engineering materials.
2. What the the factors that promoting grain size.
3. Expalin the method of manufacture of steel by acidic bessemer converter

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

4. Write the classification of carbon steels.
5. What are the types of nickel alloys? Write any two of them with composition ?
6. Write the properties and applications of Graphite

*PART –C*

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

| Sl No | Elective | Type | Preferred Semester |
|---|---|---|---|

1. Explain the method of determination of hardness by Rockwell hardness testing machine.
2. Write the formation of grains and effect of grain size on mechanical properties.
3. Sketch the Iron-carbon equilibrium diagram with salient points, phases and critical points.

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

4. Write the various types of copper alloys ?write their properties and applications with composition.
5. Write the properties and applications of polymers and rubber.
6. Write the properties and applications of engg materials which are used in engineering field.

**Suggested Electives for DCHE Program**

| | | | |
|---|---|---|---|
| 1 | **Mathematics –IV** | Service Elective | VI |
| 2 | Applied Chemistry | Program Elective | III |
| 3 | Industrial Chemistry | Program Elective | III |
| 4 | Organic Chemical Technology | Program Elective | IV |
| 5 | Petrochemical Technology | Program Elective | IV |
| 6 | Instrumentation & Process control | Program Elective | V |
| 7 | Environmental pollution control Engg | Program Elective | V |
| 8 | Sugar Technology | Program Elective | V |
| 9 | Plant utilities | Program Elective | V |
| 10 | Energy Technology | Program Elective | VI |
| 11 | Industrial Safety and Plant maintenance | Program Elective | VI |
| 12 | Polymer technology | Program Elective | VI |
| 13 | Fertilizer Technology | Program Elective | VI |
| 14 | MOOCS | Open Elective | VI |

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

| Course Title : | BASIC ENGINEERING DRAWING | Course Code | 18CH-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 involute and cycloid. | **R / U / A** | **1, 2, 3, 4, 9, 10** |
| **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 | **18CH-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<br>• Understands AutoCAD Graphic User<br>• Interface(GUI) and various toolbars |
| **2** | Selecting commands & Working with drawing | • Use prompt history window and scripts<br>• Practice the setting up a drawing<br>• Practice the Entity |
| **3** | a) Viewing drawing | • Use Scroll bar, pan command, and rotating view to move around within drawing<br>• Control visual elements like Fill, Text, Blips and<br>• Line weight |
| | b) Working with coordinates | • Use Two dimensional coordinates and Three<br>• dimensional coordinates<br>• Use right-hand rule<br>• Use filters in two and three dimensions<br>• 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.,<br>• Practice adding of hatch pattern |
| **5** | Getting Drawing information | • Measure the intervals and distance between Entities.<br>• Divide the entities in to segments<br>• 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<br>• Use filters in two and three dimensions<br>• Draw the simple shapes like lines, circles, arcs and complex shapes like polygons, planes etc.,<br>• 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<br>• 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 |

# BASIC WORKSHOP PRACTICE

| Course Title | **Basic Workshop Practice** | Course Code | **18CH-108P** |
|---|---|---|---|
| Semester | I | Course Group | Core |
| Teaching Scheme in Hrs (L: T: P) | 7.5:0.0:30 | Credits | 1.5 |
| Methodology | Lecture + Practice | Total Contact Hours : | 37.5Hrs/45Pds |
| CIE | 60 Marks | SEE | 40 Marks |

**Pre requisites**

This course requires the basic skills of Handling Domestic tools, this course also requires the basic knowledge of basic mathematics at secondary school level.

| **Unit No** | **Unit name** | **Periods** | **Questions for SEE** | **Marks weightage** | **%of Weightage** |
|---|---|---|---|---|---|
| | | | **Handling/Manipulation/ Precision** | | |
| 1 | Fitting shop | 11 | **1** | **80** | **100** |
| 2 | Forging shop | 11 | **1** | | |
| 3 | Carpentry shop | 12 | **1** | | |
| 4 | Sheet metal work | 11 | **1** | | |
| | **Total** | **45** | **4** | **80** | **100** |

Note:

1. **Student can answer any one question out of 4 questions.**
2. **To pass in practical Exam student should acquire 50% marks in both CIE and SEE separately and CIE & SEE put together.**
3. **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**

On completion of course the student should be able to

| | |
|---|---|
| CO1 | Identify and use the tools and equipment in Fitting Shop |
| CO2 | Acquire skill in basic fitting operations |
| CO3 | Identify and use the tools to perform forging operations |
| CO4 | Identify and use the tools to perform Carpentry operations |
| CO5 | Identify and use the tools to perform operations in sheet metal shop |

## COURSE CONTENTS

### FITTING SHOP

1. Marking and chipping on Mild – steel flat 12 mm thick.
2. Cutting with hack saw, M.S. Flats of 6 mm thick.
3. Marking, cutting, drilling, Chamfering

**FORGING SHOP**

1. Conversion of round to square.
2. Conversion of round to Hexagon.

**CARPENTRY SHOP**

1. Cutting of wood with hand saw.
2. Planning of wood.
3. Planning and chiselling of wood.
4. Orientation of wood grain.
5. Preparation of dovetail joint.

**SHEET METAL WORK**

1. Practice on cutting of sheet
2. Formation of joints like grooved joints, locked groove joint
3. Preparation of a rectangular open type tray
4. Preparation of hollow cylinder

**REFERENCE BOOKS**


1. Manufacturing Technology (Vol I ) by P N Rao (Mc Graw Hill)
2. Principles of Foundry Technology by P L Jain (Mc Graw Hill)


**Competencies and Key competencies to be achieved by the student.**

| Title of the Job | Competencies | Key Competencies |
|---|---|---|
| **Fitting shop** | | |
| 1. Marking and Chipping on Mild steel flat of 12 mm thick | • Identify appropriate measuring tool<br>• Handle appropriate marking tool<br>• Handle appropriate chipping tool<br>• Mark the dimensions<br>• Remove the material by chipping from MS flats | • Mark the dimensions<br>• Remove the material by chipping from MS flats |
| 2. Cutting with hack saw of MS flats of 6 mm thick | • Check the raw material for size<br>• Fix the work piece in vice<br>• Mark the work as per given dimensions<br>• Perform dot punching<br>• Load and unload hack saw blade from its frame<br>• Use the hack saw to perform cutting operation | • Load and unload hack saw blade from its frame<br>• cut the work as per marked dimensions using Hack saw |

| Title of the Job | Competencies | Key Competencies |
|---|---|---|
| **Fitting shop** | | |
| 3. Drilling, chamfering and on a MS flat of 2 mm thick | • Check the raw material for size<br>• Apply the chalk on the surface and on all sides of the flat<br>• Layout the dimensions and mark the lines using dot punch<br>• Chamfer the edges through filing<br>• Locate the hole centres using odd leg callipers and centre punching<br>• Identify appropriate drill bit<br>• Load and unload drill bit from the machine | • Load and unload drill bit from the machine<br>• Identify appropriate taps<br>• Tap the hole |

| Title of the Job | Competencies | Key Competencies |
|---|---|---|
| **Forging shop** | | |
| 1. Conversion of Round to Square | • Identify the holding and striking tools<br>• Heat the specimen to the appropriate temperature<br>• Remove the specimen and hold it on the anvil<br>• Hammer the specimen to the required shape | • Heat the specimen to the appropriate temperature<br>• Hammer the specimen to the required shape |
| 2. Conversion of Round to Hexagon | • Identify the holding and striking tools<br>• Heat the specimen to the appropriate temperature<br>• Remove the specimen and hold it on the anvil<br>• Hammer the specimen to the required shape | • Heat the specimen to the appropriate temperature<br>• Hammer the specimen to the required shape |

| Title of the Job | Competencies | Key Competencies |
|---|---|---|
| **Carpentry Shop** | | |
| 1. Cutting of wood with hand saw | • Identify the orientation of grains<br>• Select appropriate saw for cutting in each of the directions viz. across and along the grains<br>• Select appropriate work holding device<br>• Handle appropriate measuring and marking tools(Steel rule, Try square, Marking gauge) | • Identify the orientation of grains<br>• Mark dimensions on work using marking gauge<br>• Perform cutting along and perpendicular the grains using appropriate saw |

| Title of the Job | Competencies | Key Competencies |
|---|---|---|
| **Carpentry Shop** | | |
| | • Mark dimensions on work using Marking gauge<br>• Fix the work in the vice<br>• Perform cutting along the grains using Rip saw<br>• Change the position of work in the vice<br>• Perform cutting perpendicular the grains using cross cut saw | |
| 2. Planning of wood | • Identify the direction for planning wood stock<br>• Select appropriate jack plane<br>• Prepare the jack plane for planning<br>• (Load and unload the blade of a jack plane<br>• Select appropriate work holding device<br>• Perform marking on work using appropriate tool<br>• Fix the work in the vice<br>• Plane the surfaces on all four sides using jack plane | • Identify the direction for planning wood stock<br>• Prepare the jack plane for planning<br>• Plane the surfaces on all four sides using jack plane |
| 3. Chiselling of wood | • Select appropriate chisels and saw<br>• Select appropriate work holding device<br>• Select appropriate measuring and marking tools<br>• Fix the work in the vice<br>• Mark the position of grooves on work using marking gauge<br>• Cut sides of grooves by hand saw<br>• Chip the material using firmer chisel by applying pressure with mallet<br>• Finish the grooves with rasp file | • Select appropriate chisels and saw<br>• Mark the position of grooves on work using marking gauge<br>• Cut sides of grooves by hand saw<br>• Chip the material using firmer chisel by applying pressure with mallet |
| 4. Preparation of a Dove tail joint | • Select the appropriate cutting tools and work holding devices<br>• Plane the wooden pieces on all sides<br>• Mark at an angle of 750 with bevel square<br>• Trim the dovetail by chisel to exact size<br>• Cutt the dovetail groove on second piece<br>• Finish the groove<br>• Assemble the two pieces to prepare | • Trim the dovetail by chisel to exact size<br>• Mark at an angle of $75^0$ with bevel square<br>• Cutt the dovetail groove on second piece<br>• Assemble the two pieces to prepare dovetail halving joint by using mallet |

| Title of the Job | Competencies | Key Competencies |
|---|---|---|
| **Carpentry Shop** | | |
| | dovetail halving joint by using mallet | |

| Title of the Job | Competencies | Key Competency |
|---|---|---|
| **Sheet metal Work** | | |
| 1. Practice on cutting of sheet | • Cut the required sheet from the stock using snip<br>• Mark the dimensions on the sheet using scriber & steel rule<br>• Draw the circular shapes using divider<br>• Perform rough cutting of the curved shapes using chisel and finish cutting using snips<br>• Cut the straight edges using straight snips | • Identify the marking and cutting tools<br>• Cut the sheet of different shapes using appropriate tools |
| 2. Formation of joints like grooved joint, locked groove joint | • Cut the sheet in to two halves<br>• Form the flange on the sheet by folding the sheet along scribed lines using mallet & stakes<br>• Perform bending edges of sheets applying moderate pressure using mallet<br>• Inter lock the bent edges and apply pressure with mallet to make required joint | • Identify the marking and cutting tools<br>• Cut the sheet<br>• Perform bending along the marked lines. |
| 3. Preparation of a rectangular open type tray | • Draw the development of the object to be made<br>• Place the pattern on the sheet<br>• Mark the dimensions using scriber<br>• Shear the required piece from the stock using straight snips<br>• Mark the lines on the sheet to form bends<br>• Strengthen the sides of sheet by singe hem using hatchet stake<br>• Form the sheet in to desired shape using stakes<br>• Seam the corners by inserting laps of the adjacent sides with single hem | • Drawing development of objects<br>• Cut the sheet<br>• Seam the corners by inserting laps of the adjacent sides with single hem |
| 4. Preparation of hollow cylinder | • Draw the development of the object to be made<br>• Place the pattern on the sheet<br>• Mark the dimensions using scriber | • Identify the marking and cutting tools<br>• Drawing development of objects |

| | | |
|---|---|---|
| | • Shear the required piece from the stock using straight snips<br>• Mark the lines on the sheet to form bends<br>• Strengthen the sides of sheet by singe hem on top & bottom side using hatchet stake<br>• Form the flat sheet into cylindrical shape by cylindrical stake and apply pressure using mallet<br>• Prepare single hem on to longitudinal sides in opposite directions<br>• Inter lock the sides and apply pressure to make a strong joint | • Cut the sheet<br>• Inter lock the sides and apply pressure using mallet to make a strong joint |

| Course Outcome (CO) | | Cognizant Level | Linked Program Outcomes (PO) | Teaching periods |
|---|---|---|---|---|
| **CO1** | Identify and use the tools and equipment in Fitting Shop | R/U/A | 1,2,3,4,9,1 | 5 |
| **CO2** | Acquire skill in basic fitting operations | R/U/A | 1,2,3,4,9,10 | 6 |
| **CO3** | Identify and use the tools to perform forging operations | R/U/A | 1,2,3,4,9,10 | 11 |
| **CO4** | Identify and use the tools to perform Carpentry operations | R/U/A | 1,2,3,4,9,10 | 12 |
| **CO5** | Identify and use the tools to perform operations in sheet metal shop | R/U/A | 1,2,3,4,9,10 | 11 |
| R: Remembering, U: Understanding, A: Applying | | | | |

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

| | | | |
|---|---|---|---|
| **Course Title** | **Basic Science Lab Practice (Physics Lab)** | **Course Code** | **18CH-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<br><br>Calipers – Cylinder and sphere | • Find the Least count<br>• Fix the specimen in position<br>• Read the scales<br>• Calculate the volume of given object | • Read the scales<br>• Calculate the volume of given object |
| 2. Hands on practice on Screw gauge – Wire and glass plate | • Find the Least count<br>• Fix the specimen in position<br>• Read the scales<br>• Calculate thickness of glass plate and cross section of wire | • Read the scales<br>• Calculate thickness of given glass plate<br>• Calculate cross section of wire |
| 3. Boyle's law verification – Quill tube | • Note the atmospheric pressure<br>• Fix the quill tube to retort stand<br>• Find the length of air column<br>• Find the pressure of enclosed air<br>• Find and compare the calculated value P x l | • Find the length of air column<br>• Find the pressure of enclosed air<br>• Find the value P x l |

| | | |
|---|---|---|
| 4. Coefficient of viscosity by capillary<br><br>Method - water | • Find the least count of vernier<br>• Fix the capillary tube to aspiratory bottle<br>• Find the mass of collected water<br>• Find the pressure head<br>• Calculate rate of volume of liquid collected<br>• Find the radius of capillary tube<br>• Calculate the viscosity of water using capillary method | • Find the pressure head<br>• Calculate rate of volume of liquid collected<br>• Find the radius of capillary tube<br>• Calculate the viscosity of water |
| 5. Verification of Parallelogram law of forces and Triangle law of forces | • Fix suitable weights<br>• Note the positions of threads on drawing sheet<br>• Find the angle at equilibrium point<br>• Construct parallelogram<br>• Compare the measured diagonal<br>• Construct triangle<br>• Find the length of sides<br>• Compare the ratios | • Find the angle at equilibrium point<br>• Constructing parallelogram<br>• Construct triangle<br>• Compare the ratios of force and length |

** *** **

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

| | |
|---|---|
| Course Title: **Basic Science Lab Practice (Chemistry Lab)** | Course Code: **18CH-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 : **18CH-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.