# Diploma in Electronics & Communication Engineering

**II Semester**

## TEACHING AND EXAMINATION SCHEME

| | Course Code | Course Name | Teaching Scheme | | | | | Examination Scheme | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Instruction periods per week | | | Total Periods per semester | Credits | Continuous internal evaluation | | | Semester end examination | | | |
| | | | L | T | P | | | Mid Sem1 | Mid Sem2 | Internal Evaluation | Max marks Min marks | | Total Marks | Min marks for passing including internal |
| 1 | 18EC-201F | Communicative English | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 2 | 18EC-202F | Engineering Mathematics | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 3 | 18EC-203F | Applied Physics | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 4 | 18EC-204F | Engineering Chemistry &Environmental studies | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 5 | 18EC-205C | Semiconductor Devices | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | 14 | 100 | 35 |
| 6 | 18EC-206P | Advanced Engineering Drawing | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 7 | 18EC-207P | Advanced Computer Aided Drafting | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 8 | 18EC-208P | Semiconductor devices Lab Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 9 | 18EC-209P-A+B | Applied Science Lab Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 10 | 18EC-210P | IT Lab Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | 20 | 100 | 50 |
| 11 | | **Skill Upgradation** | 0 | 0 | 7 | 105 | 2.5 | 0 | 0 | **Rubrics** | | | -- | - |
| | | **TOTAL** | **20** | **05** | **17** | **630** | **25** | **200** | **200** | **200** | **400** | **170** | **1000** | **425** |

**Note:** For Activities student performance is to be assessed through Rubrics.

**Pass criteria:** The minimum marks required for passing in any of courses are given below

1. Cumulative 35% (Mid sem 1 + Mid sem 2+ Tutorials+ End examination) and minimum marks in end examination is 35% (i.e.14marks).
2. If the cumulative of CIE is less than 35% (i.e.21 marks out of 60) more than 14 marks are required in SEE to get overall 35%.

# Department of Technical Education
# State Board of Technical Education & Training, Telangana

| | |
|---|---|
| **Course Title : Advanced English** | **Course Code : 18EC-201F** |
| **Semester : II** | **Course Group : Foundation** |
| **Teaching Scheme in Periods (L:T:P:) : 36:24:0** | **Credits : 3** |
| **Methodology : Communicative Language Teaching + Assignments** | **Total Contact Hours : 60 periods** |
| **CIE : 60 Marks** | **SEE : 40 Marks** |

**Prerequisites:** Basic knowledge of English Language

**COURSE OUTCOMES**

| | |
|---|---|
| | At the end of the course the students will have the ability to: |
| 201.1 | learn homonyms and one word substitutes and use them in professional interaction |
| 201.2 | listen for specific purpose and use appropriate prepositions. |
| 201.3 | acquire values through stories and reports |
| 201.4 | write resumes, reports and make notes |
| 201.5 | work in pairs and groups confidently |
| 201.6 | analyse errors and make communication flawless |

## CO-PO Matrix

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | Mapping POs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 201.1 | 2 | 2 | 2 | -- | 1 | -- | -- | 3 | 3 | 3 | 1,2,3,5,8,9,10 |
| 201.2 | 2 | 2 | 1 | 2 | -- | -- | -- | 3 | 3 | 3 | 1,2,3,4,8,9,10 |
| 201.3 | 2 | 2 | -- | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 1,2,4,5,6,7,8,9,10 |
| 201.4 | 2 | 2 | 2 | 2 | 1 | -- | 2 | 3 | 3 | 3 | 1,2,3,4,5,7,8,9,10 |
| 201.5 | 2 | 2 | 2 | -- | 1 | -- | 2 | 3 | 3 | 3 | 1,2,3,57,8,9,10 |
| 201.6 | 2 | 2 | -- | -- | -- | -- | -- | 3 | 3 | 3 | 1,2,8,9,10 |

## COURSE CONTENTS

**UNIT – 1 SPEAKING** **Duration: 10 Periods**

1. Expressing Obligation
2. Fixing and Cancelling Appointments
3. Extending and Accepting Invitations
4. Giving Instructions
5. Asking for and Giving Directions

**UNIT - 2: LISTENING** **Duration: 6 Periods**

6. The Here and Now!

**UNIT –3: VOCABULARY** **Duration: 6 Periods**

7. How to Learn a New Word
8. Synonyms, Antonyms and One word Substitutes

**UNIT -4: GRAMMAR** **Duration: 12 Periods**

9. Reported Speech
10. Error Analysis - I
11. Error Analysis - II
12. Error Analysis - III

**UNIT - 5: READING** **Duration: 6 Periods**

13. An Environmental challenge
14. The Will to Succeed
15. Waiting for Mr. Clean

**UNIT- 6: WRITING** **Duration: 20 Periods**

16. Data Interpretation- I
17. Data Interpretation- II
18. Data Interpretation- III
19. Writing a Resume
20. Writing a Cover Letter
21. Note Making
22. Writing a Report

**Specific Learning Outcomes:**

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

- express obligation, fix and cancel appointments, extend –accept and decline invitations.
- give instructions and directions
- identify and use prepositions
- learn homonyms and use one word substitutes
- read and understand main ideas and answer the questions
- understand and write reported speech

- identify and correct common errors
- interpret data
- learn to prepare cover letter and resume
- make notes and write reports

## Internal evaluation

| Test | Units | Marks | Pattern |
|---|---|---|---|
| Mid Sem 1 | Speaking<br>Listening | 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 | Vocabulary<br>Grammar | 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 |
| Slip Test 1 | Speaking<br>Listening | 5 | 2 Essay Questions out of 3 Questions |
| Slip Test 2 | Vocabulary<br>Grammar | 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
- Group Discussions
- Student Presentations
- Seminars
- Talk about a movie/review
- Talk about a book
- Narrating a story
- Chain stories
- JAM on topics like environment, pollution, ethics, morals, responsibilities of citizens
- Speak about incidents/events/memories/dreams/role model
- Interview with famous personalities
- Cricket commentary

- Reading for main ideas
- Reading for specific details
- Summarizing
- Picture description
- Writing a recipe
- Surprise test
- Compare and contrast two people/pictures/news items/ideas etc
- Surveys
- Filling forms
- e-mail etiquette

## 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. Keep Talking by Friederike Klippel
5. More Grammar Games by Mario Rinvolucri and Paul Davis
6. Essential English Grammar by Raymond Murphy
7. Spoken English-A Self Learning Guide to Conversation Practice by V Sasi Kumar


**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

**DISTRIBUTION OF QUESTIONS/MARKS FOR SEMESTER MID/END EXAMINATION**

| Module | Unit Name | No. of Periods | NUMBER OF QUESTIONS TO BE CONSIDERED | | | | | | MARKS WEIGHTAGE | | | | UNIT WISE WEIGHTAGE | (MS+EE) WEIGHTAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | | U | | A | | | | | | | |
| | | | MID | END | MID | END | MID | END | MS-I | MS-II | MS-III | END EXAM | | |
| PART-A | Speaking | 10 | 3 | 1 | 2 | 1 | 2 | 1 | 36 | - | - | 17 | 53 | 74 |
| | Listening | 6 | 2 | 1 | 1 | 0 | 1 | 0 | 19 | - | - | 02 | 21 | |
| PART-B | Vocabulary | 6 | 2 | 1 | 1 | 0 | 1 | 0 | - | 19 | - | 02 | 26 | 74 |
| | Grammar | 12 | 3 | 1 | 2 | 1 | 2 | 1 | - | 36 | - | 17 | 48 | |
| PART-C | Reading | 6 | 3 | 1 | 0 | 0 | 1 | 0 | - | - | 16 | 2 | 18 | 72 |
| | Writing | 20 | 2 | 0 | 3 | 1 | 2 | 1 | - | - | 39 | 15 | 54 | |
| **TOTAL** | | **60** | **15** | **05** | **9** | **3** | **9** | **3** | **55** | **55** | **55** | **55** | **220** | **220** |
| | | | | | | | | | | | **110** | | | |

| LEGEND | R: Remembering |
|---|---|
| | U: Understanding |
| | A: Applying |

## Semester End Examination Marks Distribution

| | Short answer | Essay | Marks |
|---|---|---|---|
| **Part A** | 10 | 0 | 20 |
| **Part B** | | | |
| **Group 1** | 0 | 2/3 | 10 |
| **Group 2** | 0 | 2/3 | 10 |
| **Part C** | | | |
| **Group 1** | 0 | 2/3 | 20 |
| **Group 2** | 0 | 2/3 | 20 |
| **Total** | 10 | 8/12 | 80 |

## 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 |

**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 |

**State Board of Technical Education, Telangana State**
**Model Paper- 18EC201F (Advanced English)**
**Mid Sem-I**

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

**PART – A** **5 X 2 = 10**

***Instructions:***

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

1. Write two sentences, one with 'must' and another with 'have to', to express obligations.
2. Fill the blanks with suitable prepositions.
   a) He came home _____ a car.
   b) Kiran mixed coffee _____ a spoon.
3. How do you invite your neighbor to attend a seminar on global warming?
4. Fix an appointment with the dentist at 5.30 p.m.
5. Fill the blanks with the suitable prepositions given below:

| Among, between, by, with, from, at, for |
|---|

   a) She distributed sweets _____ her two brothers.
   b) Mohan died _____ cancer.

**PART- B** **2 X 5 = 10**

***Instructions:***

*i. Answer any two questions.*
*ii. Each question carries five marks.*

6. Write a dialogue between you and the receptions about the cancellation of an appointment you have with the doctor.
7. Give directions to your friend to reach to the park from your house.
8. Write a paragraph describing your polytechnic using at least five prepositions.

**PART- C** **2 X 10 = 20**

***Instructions:***

*i. Answer any two questions.*
*ii. Each question carries ten marks.*

**9.** Fill the blanks with the suitable prepositions.
   a) He looked ____ me.
   b) Listen _____ my instructions carefully.
   c) Geetha suffered _____ fever.
   d) Bhagya threw a stone _____ the well.
   e) Prathap kept a ladder _____ the wall.
   f) We played cricket _____ five hours.
   g) My books were stolen _____ Kiran.

h) We will go to library _____ 15th of this month.
i) Shailaja has been reading a novel _____ 10.00 a.m.
j) We bought this television _____ 2014.

10. Give instructions on how to send an e-mail to your friend.
11. a). Fix an appointment with your M.L.A. next Sunday at 4.00 p.m. to discuss the problems in your village.

    b). Cancel the same appointment as you are going to leave for Adilabad on some urgent personal work.

**State Board of Technical Education, Telangana State**
**Model Paper- 18EC201F (Advanced English)**
**Mid Sem-II**

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

## PART – A 5 X 2 = 10

***Instructions:***

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

1. Write one word substitutes for the following expressions.
   a) A place where books are available to be borrowed and for reference.
   b) That which cannot be heard.
2. Write the synonyms of the following words:
   a. Rich
   b. Happy
3. Change the following into indirect speech.
   a. Vinod said, "I have gone to Bhadrachalam yesterday."
   b. Gopal said to Mamatha, "I will play cricket tomorrow."
4. Change the following onto direct speech.
   a. David said to Madhavi, " Give me your calculator now."
   b. Jayanth said to Fathima, " Where are you going?"
5. Correct the words given in italics in the following sentences.
   a. Lalitha *go* to Nanded tomorrow.
   b. Adarsh sat *besides* Vikas.

## PART-B 2 X 5 =10 marks

***Instructions****:*

*1. Answer any two questions.*

*2. Each question carries 5 marks.*

6. How should a new word be learnt?
7. Correct the following sentences.
   a. It is very hot to go outside.
   b. Shiva works hardly.
   c. She is more cleverer than Bhaskar.
   d. Vidya is senior than Indira.
   e. Praveen is angry on his sister.
8. Change the following into indirect speech.
   a. She said to him, "When will you go to temple?"
   b. Radhika said to her brother, "Will you pay the examination fee tomorrow?"
   c. Vasu said, " I do not eat non-vegetarian food."
   d. Rafi said to Mathews, "Show me your record."
   e. Pramod said to Sandhya, " My brother will bring fruits tomorrow from Karimnagar."

## PART-C 2 X 10 =20 marks

***Instructions****:*

*1. Answer any two questions.*

*2. Each question carries ten marks.*

9. Mention any five ways of learning a new word.
10. Change the following dialogue into a paragraph.

Ajay: Hai Sudha! How are you?
Sudha" I am fine. How are you?
Ajay: I am fine too. Where are you going now?
Sudha: I am going to market.
Ajay: What do you want to buy there?
Sudha: I want to buy fruits and vegetables.
Ajay: Do you know the mobile number of Suresh?
Sudha: No. I don't have his mobile number. Why do you need his number?
Ajay: I want to invite him for my sister's birthday.

11. Correct the following sentences.
    a. Every student has to bring their textbook tomorrow.
    b. She is having a house.
    c. We are living in this house for the last ten years.
    d. This machine works perfectly.
    e. He is the taller student in my class.
    f. Music classes begin from 27$^{th}$ July.
    g. She is weak and she can run fast.
    h. The door was painted by a small brush.
    i. Where your brother is studying?
    j. He awaited for the bus here yesterday.

**State Board of Technical Education, Telangana State**

**C18-Semester End Examination (SEE)**

**Model Paper- 18Common201F (Advanced English)**

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

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## PART – A

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

*i. Answer all the following questions.*

*ii. Each question carries two marks.*

1. Fill the blanks with the suitable expressions of obligation:
    a) We _____wear helmet while riding a two wheeler.
    b) A student _____ be in time to college.
2. Fill the blanks with suitable prepositions:
    a) He went to polytechnic ____ a bicycle.
    b) They have been waiting _____ a bus since 8.00 a.m.
3. Write the antonyms of the following words:
    a) Legal
    b) Honest
4. Change the following sentences into direct speech:
    a. He said that he had a beautiful house.
    b. The visitors thanked the guide.
5. What do you write about the following ones in your resume?
    a. Your skills
    b. Your work experience
6. What do you write about the following ones in your resume?
    a. Your interests and activities
    b. Your educational qualifications
7. Read the following paragraph and answer the questions given in questions no. 7 and 8.

Subhas Chandra Bose was born in a Bengali Kayasth family on January 23, 1897 in Cuttack (Odiya Baazar), Orissa, to Janakinath Bose, and Prabhavati Devi. He was the ninth child of 14. 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. From there 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 resigned the appointment on the premise that the best way to end a government is to withdraw from it. At the time, 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.

**Answer the following questions.**

a. Where was Subhas Chandra Bose born?
b. Who were his parents?

8. Answer the following questions
    a. Why was Bose expelled from Presidency College?
    b. Why was he sent to Mandalay?
9. Read the following paragraph and answer the questions given in questions no. 9 and 10.

Dr. Rajendra Prasad, son of Mahadev Sahai, was born in Zeradei village, in the Siwan district of Bihar, on 3 December 1884. He was the youngest in a large family, & was close to his mother and eldest brother. He was known as "Rajen" to his family and friends. His father, Mahadev Sahay, was a scholar of both the Persian and Sanskrit languages, while his mother, Kamleshwari Devi, was a religious woman. Zeradei's population was diverse, with both Muslims and Hindus living in relative harmony.

When Rajendra Prasad was five years old, his parents put him under a Mawlawi, an accomplished Muslim scholar, to learn the Persian language, followed by Hindi and arithmetic. After the completion of traditional elementary education, Rajendra Prasad was sent to the Chhapra District School. At the age of 12, Rajendra Prasad was married to Rajavanshi Devi. He, along with his elder brother Mahendra Prasad, then went on to study at T.K. Ghosh's Academy in Patna.

Since childhood, Rajendra Prasad was a brilliant student. He placed first in the entrance examination to the University of Calcutta and was awarded Rs.30 per month as a scholarship. In 1902, Rajendra Prasad joined the Presidency College. He was initially a

student of science and his teachers included Jagadish Chandra Bose and Prafulla Chandra Roy. Later he decided to focus on the arts. Prasad lived with his brother in the Eden Hindu Hostel

Answer the following questions:

a. Where was Rajendra Prasad born?

b. What was he known as?

10. Answer the following questions.
    a. Where did he learn the Persian language?
    b. Where was he awarded Rs. 30 per month as a scholarship?

**PART- B** **4 X 5 = 20**

**Group 1** **2 X 5 = 10**

***Instructions:*** ***1. A*****nswer any two of the following questions.**

**2. Each question carries five marks.**

11. Write instructions on how to prepare tea.
12. Write a cover letter to the Managing Director, Vijaya Cement Works, Godavarikhani as you wish to apply for the post of Assistant Executive Engineer.
13. Correct the following sentences.
    a. They congratulated Aravind for his success.
    b. Though Anand is poor, but he is honest.
    c. I wish I have a laptop.
    d. Nafeesa and me are playing shuttle badminton.
    e. Hari is having a car.

**Group 2** **2 X 5 = 10**

***Instructions:*** ***1. A*****nswer any two of the following questions.**

**2. Each question carries five marks.**

14. Write a report on the industry you have visited last week.
15. Observe the following table and write a paragraph analyzing the information given in it.

Table showing the number of students admitted in different courses in Private Engineering colleges in the past four years.

| Year | ECE | EEE | Mechanical | Civil | CSE |
|---|---|---|---|---|---|
| 2017 | 54065 | 36255 | 21600 | 34000 | 13436 |
| 2016 | 49008 | 36255 | 20900 | 29000 | 22687 |
| 2015 | 45032 | 36255 | 20600 | 14500 | 32008 |
| 2014 | 38060 | 36254 | 20300 | 14500 | 38065 |

16. Observe the following flow chart and write a paragraph describing the steps involved in creating an e-mail.

Click Internet Explorer icon

↓

Click create an account

↓

Click sign up

↓

Create your user name

↓

Create a password

↓

Give your mobile number and alternate e-mail id

↓

Enter verification code

↓

Accept to the terms and conditions

**PART-C** **4 X10 = 40**

**Group 1** **2 X 10 = 20**

***Instructions:*** ***1.*** **Answer any two of the following questions.**

**2. Each question carries ten marks.**

17. Write a resume to apply for the post of AEE in the Department of Tribal Welfare, Government of Telangana.
18. Write instructions for the following:
    a. Opening an account in a bank.
    b. Taking a bus pass for six months
19. Correct the following sentences.
    a. One of my friend met me yesterday.
    b. Anitha is going to park everyday at 6.00 p.m.

c. Myself went to Hyderabad last month.
d. If you read well, you get the first rank.
e. There was many students in the hall.
f. Prasad wants to quickly write the examination.
g. We ran fastly to catch the bus.
h. Pallavi prefers milk than coffee.
i. When did Kamala went to Hyderabad?
j. Harika returned back my book.

**Group 2** **2 X 10 = 20**

***Instructions:*** ***1.*** **Answer any two of the following questions.**

**2. Each question carries ten marks.**

20. Write a report to your Principal on the industrial visit by you to BHEL, Patancheruvu, Hyderabad.
21. Read the following paragraph and make notes:

In1920, the Congress meeting was held at Nagpur under the leadership of Gandhiji. It was attended by 15000 delegates and the Congress Constitution was amended and resolutions were taken to fight Swaraj by nonviolent methods and undo the injustice done to Punjab and Turkey.

This movement was called Non-Cooperation Movement. Renunciation of honorary titles like 'Sir' given by British, boycott of legislatures, schools and colleges, courts, tendering resignation to government jobs nonpayment of taxes to government were the important programmes of this movement. Gandhi returned his Kaiser-i-Hind title in August, 1920. There were strikes, hartals and burning of foreign goods all over the country. Many Indian were killed in firings and many other were jailed.

In Kerala, a rebellion broke out by Mophlah peasants and it was suppressed brutally. Though Gandhiji warned the people many times not to resort to violent methods, on 5$^{th}$ February, 1922 in Chauri-Chaura in Uttar Pradesh people resorted to violence. When policemen opened fire on peaceful demonstrations, the angry people set ablaze the police station and 22 policemen were killed. Gandhiji stopped the movement because it lost its nonviolent nature. On 10$^{th}$ March, 1922 Gandhiji was arrested fir six years.

22. 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 (Odiya Baazar), Orissa, to Janakinath Bose, and Prabhavati Devi. He was the ninth child of 14. 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. From there 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 resigned the appointment on the premise that the best way to end a government is to withdraw from it. At the time, 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**:

i. When and where was Subhas Chandra Bose?
ii. Who was his mentor?
iii. How did Subhas Chandra Bose participate in National Movement after coming back to India?
iv. Why didn’t he join civil Services?
v. What is the synonym of ‘aggressive’?

**Department of Technical Education - TELANGANA**

**State Board of Technical Education and Training – HYDERABAD**

| | |
|---|---|
| Course Title **: ENGINEERING MATHEMATICS** | Course Code **: 18EC-202F** |
| SEMESTER : **II** | 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 : 6**0 Marks** | SEE : **40 Marks** |
| Programme : **Common to all Engineering Diploma Programmes** | |

**Pre requisites**

This course requires the basic knowledge of Algebra, Trigonometry in Mathematics at Secondary school level and Basic Engineering Mathematics at Diploma 1st Semester level

**Course Outcomes: COs**

At the end of the course, the student will have the ability to:

| | |
|---|---|
| CO 1 | Formulate the equations of Straight Line , Circle and Conic Sections |
| CO 2 | Evaluate the Limits of different Functions |
| CO 3 | Determine the Derivatives of Various Functions |
| CO 4 | Find the Successive Derivatives and Partial Derivatives of Functions |
| CO 5 | Use Differentiation in Geometrical and Physical Applications |
| CO 6 | Find Maxima and Minima. |

## Course Contents:

### Co-ordinate geometry

### Unit – I

**Duration: 10 Periods (L: 6.0 – T:4.0)**

1. **Straight lines:** Write the different forms of a straight line – point slope form, two point form, intercept form, normal form and general form - Find distance of a point from a line, acute angle between two lines, intersection of two non-parallel lines and distance between two parallel lines - perpendicular distance from a point to a line - Solve simple problems on the above forms

2. **Circle:** Define locus of a point, circle and its equation. Find equation of the Circle given (i) Centre and radius, (ii) two ends of a diameter (iii) Centre and a point on the circumference (iv) three non collinear points and (v) Centre and tangent equation - general equation of a circle - finding Centre, radius - tangent, normal to circle at a point on it - simple problems.

### Unit – II

**Duration: 8 Periods (L: 4.8 – T:3.2)**

3.**Conic Sections:** Define a conic section, focus, directrix, eccentricity, axes and latus rectum – Find equation of a conic when focus directrix and eccentricity are given. Properties of parabola, ellipse and hyperbola - standard forms with Vertex (Centre) at the Origin and Axis (Axes) along Co – Ordinate Axes only – Simple Problems.

### Differential Calculus

## Unit-III

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

4. **Functions & Limits :** Concept of Limit- Definition- Properties of Limits and Standard Limits ( without proof ) - $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to 0}\frac{\tan x}{x}$, $\lim_{x\to 0}\frac{a^x-1}{x}$, $\lim_{x\to 0}\frac{e^x-1}{x}$, $\lim_{x\to 0}(1+x)^{\frac{1}{x}}$, $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$ - Simple Problems . Evaluate the limits of the type $\lim_{x\to l}\frac{a x^2+b x+c}{\alpha x^2+\beta x+\gamma}$ and $\lim_{x\to\infty}\frac{f(x)}{g(x)}$

5. **Differentiation – I :** Concept of derivative - definition from first principle as $\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ - different notations - derivatives of elementary functions like $x^n$ , $a^x$, $e^x$, log x, sin x, cos x, tanx, Secx, Cosecx and Cotx. Derivatives of sum, product, quotient, scalar multiplication of functions - problems. Derivative of function of a function (Chain rule) with illustrative examples such as

(i) $\sqrt{t^2+\frac{2}{t}}$ **(ii)** $x^2\sin 2x$ **(iii)** $\frac{x}{\sqrt{x^2+1}}$ **(iv)** $\log\left(\sin(\cos x)\right)$.

## Unit – IV

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

6. **Differentiation – II:** Derivatives of inverse trigonometric functions, derivative of a function with respect to another function, derivative of parametric functions, derivative of hyperbolic, implicit functions, logarithmic differentiation – problems in each case. Higher order derivatives - examples – functions of several variables – partial differentiation, Euler's theorem-simple problems.

## Applications of Derivatives:

## Unit – V

**Duration: 8 Periods (L: 4.8 – T:3.2)**

7. **Geometrical Applications: Geometrical** meaning of the derivative, equations of Tangent and normal to a curve at any point on the curve. Lengths of tangent, normal, sub tangent and subnormal to the curve at any point on it. Angle between two intersecting curves - problems.

## Unit – VI

**Duration: 10 Periods (L: 6 – T:4)**

8. **Physical Applications: Physical** applications of the derivative – Explain the derivative as a rate of change in distance-time relations to find the velocity and acceleration of a moving particle with examples. Explain the derivative as a rate measure in the problems where the quantities like volumes, areas vary with respect to time- illustrative examples– Simple Problems.
9. **Maxima & Minima: Applications** of the derivative to find the extreme values – Increasing and decreasing functions, finding the maxima and minima of simple functions - problems leading to applications of maxima and minima.

# References


1. Co - Ordinate Geometry – by S.L. Loney
2. Thomas Calculus, Pearson Addison – Wesley Publications
3. Calculus – I by Shanti Narayan and Manicavachagam Pillai, S.V Publications.
4. NCERT Mathematics Text Books Of Class XI, XII.
5. 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

**Coordinate Geometry**

## Unit – I

**1.0 Solve the problems on Straight lines**

1.1 Write the different forms of a straight line – point slope form, two point form, intercept form, normal form and general form

1.2 Solve simple problems on the above forms

1.3 Find distance of a point from a line, acute angle between two lines, intersection of two non-parallel lines and distance between two parallel lines.

**2.0 Solve the problems on Circles**

2.1 Define locus of a point, circle and its equation.

2.2 Find the equation of a circle given

- (i) Centre and radius
- (ii) Two ends of a diameter
- (iii) Centre and a point on the circumference
- (iv) Three non collinear points
- (v) Centre and tangent

2.3 Write the general equation of a circle and find the centre and radius.

2.4 Write the equation of tangent and normal at a point on the circle.

2.5 Solve the problems to find the equations of tangent and normal.

## Unit – II

**3.0 Appreciate the properties of Conics in engineering applications**

3.1 Define a conic section.

3.2 Understand the terms focus, directrix, eccentricity, axes and latus rectum of a conic with illustrations.

3.3 Find the equation of a conic when focus, directrix and eccentricity are given

3.4 Describe the properties of Parabola, Ellipse and Hyperbola

3.5 Solve problems in simple cases of Parabola, Ellipse and Hyperbola.

**Differential Calculus**

## UNIT - III

**4.0 Use the concepts of Limit for solving the problems**

4.1 Understand the concept of limit and meaning of $\lim_{x \to a} f(x) = l$ and state the properties of limits.

4.2 Mention the Standard limits $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to 0}\frac{\tan x}{x}$, $\lim_{x\to 0}\frac{a^x-1}{x}$, $\lim_{x\to 0}\frac{e^x-1}{x}$, $\lim_{x\to 0}(1+x)^{\frac{1}{x}}$, $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$ (All without proof).

4.3 Solve the problems using the above standard limits

4.4 Evaluate the limits of the type $\lim_{x\to l}\frac{a x^2+b x+c}{\alpha x^2+\beta x+\gamma}$ and $\lim_{x\to\infty}\frac{f(x)}{g(x)}$

**5.0 Appreciate Differentiation and its meaning in engineering situations**

5.1 State the concept of derivative of a function y = f(x) – definition, first principle as $\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ and also provide standard notations to denote the derivative of a function.

5.2 State the significance of derivative in scientific and engineering applications.

5.3 Find the derivatives of elementary functions like $x^n$ , $a^x$, $e^x$, log x, sin x, cos x, tanx, Secx, Cosecx and Cot x using the first principles.

5.4 Find the derivatives of simple functions from the first principle.

5.5 State the rules of differentiation of sum, difference, scalar multiplication, product and quotient of functions with illustrative and simple examples.

5.6 Understand the method of differentiation of a function of a function (Chain rule) with illustrative examples such as

(i) $\sqrt{t^2+\frac{2}{t}}$ **(ii)** $x^2\sin 2x$ **(iii)** $\frac{x}{\sqrt{x^2+1}}$ **(iv)** $\log\left(\sin(\cos x)\right)$.

## Unit – IV

**6.0 Appreciate Differentiation and its meaning in engineering situations**

6.1 Find the derivatives of Inverse Trigonometric functions and examples.

6.2 Understand the method of differentiation of a function with respect to another function and also differentiation of parametric functions with examples.

6.3 Find the derivatives of hyperbolic functions.

6.4 Explain the procedures for finding the derivatives of implicit function with examples.

6.5 Explain the need of taking logarithms for differentiating some functions with examples like $[f(x)]^{g(x)}$.

6.6 Explain the concept of finding the higher order derivatives of second and third order with examples.

6.7 Explain the concept of functions of several variables, partial derivatives and difference between the ordinary and partial derivatives with simple examples.

6.8 Explain the definition of Homogenous function of degree n

6.9 Explain Euler's theorem for homogeneous functions with applications to simple problems.

## Applications of Differentiation

**UNIT - V**

**7.0 Understand the Geometrical Applications of Derivatives**

7.1 State the geometrical meaning of the derivative as the slope of the tangent to the curve y=f(x) at any point on the curve.

7.2 Explain the concept of derivative to find the slope of tangent and to find the equation of tangent and normal to the curve y=f(x) at any point on it.

7.3 Find the lengths of tangent, normal, sub-tangent and sub normal at any point on the curve y=f(x) .

7.4 Explain the concept of angle between two curves and procedure for finding the angle between two given curves with illustrative examples.

## Unit – VI

**8.0 Understand the Physical Applications of Derivatives**

8.1 Explain the derivative as a rate of change in distance-time relations to find the velocity and acceleration of a moving particle with examples.

8.2 Explain the derivative as a rate measurer in the problems where the quantities like volumes, areas vary with respect to time- illustrative examples.

**9.0 Use Derivatives to find extreme values of functions**

9.1 Define the concept of increasing and decreasing functions.

9.2 Explain the conditions to find points where the given function is increasing or decreasing with illustrative examples.

9.3 Explain the procedure to find the extreme values (maxima or minima) of a function of single variable - simple problems yielding maxima and minima.

9.4 Solve problems on maxima and minima in applications like finding areas, volumes, etc.

**Suggested Student Activities**

1. Student visits Library to refer Standard Books on Mathematics and collect related material.
2. Quiz
3. Group discussion
4. Surprise tests
5. Seminars
6. Home assignments.

**Course Content and Blue Print of Marks for SEE – 202F**

| UNIT No. | UNIT NAME | Periods | Questions for SEE | | | Marks weightage | Weightage % |
|---|---|---|---|---|---|---|---|
| | | | R | U | A | | |
| I | Straight lines | 4 | 1 | | | 2 | 8 |
| | Circles | 6 | 1 | 1 | | 7 | |
| II | Conic Sections | 8 | | 1 | | 10 | 9 |
| III | Functions & Limits | 6 | 1 | | | 2 | 8 |
| | Differentiation – I | 6 | 1 | 1 | | 7 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| IV | Differentiation – II | 12 | | 1 | | 10 | 9 |
| V | Geometrical Applications | 8 | 3 | | 1+2 | 31 (6+5+20) | 28.5 |
| VI | Physical Applications | 5 | 2 | | 2+1 | 24 (4+5+5+10) | 37.5 |
| | Maxima & Minima | 5 | 1 | | 1+1 | 17 (2+5+10) | |
| | Total | 60 | 10 | 4 | 8 | 110 | 100 |

**R – Remembering: 20 M U – Understanding : 30 M A -- Application : 60 M**

**DISTRIBUTION OF QUESTIONS/MARKS FOR SEMESTER MID/END EXAMINATION – 202F**

| Module | Unit No. | No. of Periods | NUMBER OF QUESTIONS TO BE CONSIDERED | | | | | | MARKS WEIGHTAGE | | | | UNIT WISE WEIGHTAGE | (MS+EE) WEIGHTAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | | U | | A | | | | | | | |
| | | | MID | END | MID | END | MID | END | MS-I | MS-II | MS-III | END EXAM | | |
| PART-A | I | 10 | 3 | 2 | 2 | 1 | 2 | 0 | 36 | - | - | 9 | 45 | 74 |
| | II | 8 | 2 | 0 | 1 | 0 | 1 | 1 | 19 | - | - | 10 | 29 | |
| PART-B | III | 12 | 3 | 2 | 1 | 1 | 1 | 0 | - | 21 | - | 9 | 30 | 74 |
| | IV | 12 | 2 | 0 | 2 | 0 | 2 | 1 | - | 34 | - | 10 | 44 | |
| PART-C | V | 8 | 2 | 1 | 1 | 0 | 1 | 1 | - | - | 19 | 12 | 31 | 72 |
| | VI | 10 | 3 | 0 | 2 | 1 | 2 | 0 | - | - | 36 | 5 | 41 | |
| **TOTAL** | | **60** | **15** | **5** | **9** | **3** | **9** | **3** | **55** | **55** | **55** | **55** | **220** | **220** |
| | | | | | | | | | | | **110** | | | |

| | |
|---|---|
| LEGEND | **R**: Remembering |
| | **U**: Understanding |
| | **A**: Applying |

**Question Paper Blue Print for SEE**

Course: ENGINEERING MATHEMATICS CODE: 18COMMON202F

| UNIT No./NAME | | No. of Hours | PART – A 2 Marks | PART – B 5 Marks | PART– C 10 Marks | Marks weightage | Weightage (%) |
|---|---|---|---|---|---|---|---|
| I | a).Straight Lines | 04 | 01 | ---- | ---- | 02 | 8 |
| | b).Circles | 06 | 01 | 01 | ---- | 07 | |
| II | Conic Sections | 08 | ---- | ---- | 01 | 10 | 9 |
| III | a).Functions & Limits | 06 | 01 | ---- | ---- | 02 | 8 |
| | b). Differentiation – I (up to Chain rule) | 06 | 01 | 01 | ---- | 07 | |
| IV | Differentiation – II | 12 | ---- | ---- | 01 | 10 | 9 |
| V | Geometrical Applications | 08 | 03 | 01 | 02 | 31 | 28.5 |
| VI | a).Physical Applications | 05 | 02 | 02 | 01 | 24 | 37.5 |
| | b).Maxima and Minima | 05 | 01 | 01 | 01 | 17 | |
| TOTAL | | 60 | 10 | 06 | 06 | 110 | 100 |
| Questions to be Answered | | | 10 | 04 | 04 | 80 | |

Code: C18Common202F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATIONS, MODEL PAPER, II SEMESTER
ENGINEERING MATHEMATICS

TIME: 3 Hours Max. Marks: 80

PART – A Marks: 10 X 2 = 20

*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 slope of the curve $y = x^2 + 2x - 1$ at (1, 2)
2. Write the formula to find the equation of Normal to a given curve at a point $(x_1, y_1)$
3. Write the condition for orthogonality of two intersecting curves?
4. Find the velocity of a particle when $S = t^2 + 3t - 4$ at t = 1sec .
5. Find the acceleration of the particle when $S = t^2 - 6t + 8$ (t is in sec.) at the instant where the velocity is zero.
6. Define increasing and decreasing functions.
7. Find the distance between parallel lines $2x + 3y + 5 = 0$ and $2x + 3y + 9 = 0$
8. Find the centre of the circle $x^2 + y^2 - 6x + 4y - 12 = 0$.
9. Evaluate $\lim_{x \to 0} \frac{2x^3 - 3x^2 + 1}{9x^2 + 8x + 7}$
10. Differentiate $x^3 + \sin x$ w.r.t. x

PART – B

## Group -1

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.*

11. Find the equations of the tangent and normal to the curve $y = x^2 + 2x - 1$ at (1,2)
12. The volume of spherical balloon is increasing at a rate of 40 cu.cm/sec. Find the rate of increase of its surface area and radius at the instant when its radius is 10 cms.
13. Find the Maximum and Minimum values of $4x^3 - 3x^2 - 18x + 12$

## Group -2

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.*

14. Find the equation of the Circle passing through the points (0, 0), (a,0) and (0, b).
15. Find $\frac{dy}{dx}$ , If $y = \sin(x^2 + 2x + 1)^3$
16. A Circular metal plate expands by heat so that its radius is increasing at the rate of 0.02 cm per second. At what rate its area is increasing when the radius is 20 cm?

PART – C

## Group-1

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.*

17. Show that the curves $y^2 = 4ax$ and $xy = c^2$ cut each other orthogonally if $c^4 = 32a^4$
18. An inverted cone has a depth of 10 cm., base radius is 4 cm , water is poured in to the

cone at the rate of 1 cc/sec . Find the rate at which the level of water is increasing when the height of the water level is 6 cm .

19 A rectangular sheet of metal of dimensions 8cm X 5 cm , equal squares are cut off from the corners and the flaps are then folded up to form an open rectangular box . Find the side of the square cut off so that the box may be of greater capacity. What is the maximum capacity of the box so made.

## Group-2

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.*

20. Find the Centre, Vertices, Eccentricity, Foci, Lengths of axes, Length of Latus Rectum, and equations of Directrices of the Hyperbola $\frac{x^2}{25} - \frac{y^2}{16} = 1$

21 a) Find the derivative of logSinx w.r.t Cotx

b) Find $\frac{\partial^2 z}{\partial x^2}$ & $\frac{\partial^2 z}{\partial y^2}$, *if* $z = x^3 + y^3 - 3axy$

22. a) Find the angle between the curves $y = x^2$ , $y = 4 - x^2$

b) Find the lengths of the tangent, normal, sub-tangent and sub-normal for the curve $y = x^3 - 3x^2 - 8x - 2$ at (3, 4)

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Code: C18-Common-202F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS
MID SEM –I, MODEL PAPER, II SEMESTER
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 distance between parallel lines 2x + 3y + 5 =0 and 2x + 3y + 9 = 0
2. Find the slope of the straight line 3x + 4y + 9 = 0
3. Find the radius of the circle $x^2 + y^2 - 6x + 4y - 12 = 0$.
4. Find the focus and length of latus rectum of the parabola $y^2 = 8x$
5. Find the Length of major and minor axes of the Ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$

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. Find the point of intersection of the lines x – 3y + 6 = 0 and 2x + 3y – 10 = 0 .
7. Find the equation of the Circle passing through the points (0, 0), (1,0) and (0,2)
8. Find the equation of the Parabola with focus at (2 , -3 ) and whose directrix is 3x – 4y + 16 = 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.*

9a) Find the angle between the lines 2x – y + 3 = 0 and x +y – 2 = 0

b) Find the equation of the straight line passing through the point ( 2 , -5 ) and perpendicular to the line 7x + 2y – 1 = 0 .

10 Find the equations of the Tangent and Normal to the Circle $x^2 + y^2 - 6x - 3y - 2 = 0$ at ( 2 , -2 )

11. Find the Centre, Vertices, Eccentricity, Foci, Lengths of axes, Length of Latus Rectum, and equations of Directrices of the Hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$

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Code: C18-Common-202F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

BOARD DIPLOMA EXAMINATIONS

MID SEM –II, MODEL PAPER, II SEMESTER

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. Evaluate $\underset{x\to 0}{Lt}\dfrac{2x^3-3x^2+1}{9x^2+8x+7}$
2. Evaluate $\lim\limits_{x\to 2}\dfrac{x^3-8}{x-2}$
3. Differentiate $x^3$ + Tanx w.r.t. x
4. Find $\dfrac{d^2y}{dx^2}$, $if\ y = x^3+4x^2-8x+2$
5. Find $\dfrac{\partial u}{\partial x}$ $if\ U = x^3+y^3+3axy$

## 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. Evaluate ; $\lim\limits_{n\to\infty}\left(\frac{1+2+3+\cdots.+n}{n^2}\right)$
7. If y = $Cosx^{tanx}$ , find $\dfrac{dy}{dx}$
8. Find $\frac{dy}{dx}$ $if\ x = at^2, y = 2at$ .

## 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. Find $\dfrac{dy}{dx}$ , If y = $log\frac{1+x^2}{1-x^2}$
10. If $y = Sin(logx)$, $prove\ that\ x^2y_2 + xy_1 + y = 0.$
11. If $U = Sin^{-1}\left(\frac{x^2+y^2}{x+y}\right)$ $then\ prove\ that\ x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = tanu$

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**CO / PO - MAPPING**

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

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**Department of Technical Education**

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

| | | | |
|---|---|---|---|
| **Course Title** | Applied Physics | **Course Code** | 18EC-203F |
| **Semester** | II | **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 |

**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 | Apply knowledge of waves and sound in engineering problems. | PO1,PO2 | 10 |
| CO 2 | Apply knowledge of Simple Harmonic Motion to solve engineering problems | PO1, PO2 | 10 |
| CO 3 | Use modern instruments in engineering | PO1, PO2,PO3, PO4 | 10 |
| CO 4 | Use various magnetic materials in engineering equipments | PO1, PO2,PO3 | 10 |
| CO 5 | Use various electrical measuring instruments as tools in engineering | PO1, PO2,PO3, PO4 | 10 |
| CO 6 | Apply Electronics principles in engineering problems | PO1, PO2,PO3, PO4 | 10 |

# APPLIED PHYSICS
## Course Contents

**1. UNIT – 1 WAVES AND SOUND Duration: 10 periods (L:6.0 – T: 4.0)**

Wave motion – definition and characteristics – audible range – infrasonic and ultrasonic – longitudinal and transverse waves – examples – Relation between wavelength, frequency and velocity of a wave – derivation –stationary waves- beats - applications of beats - Doppler effect – list of applications – ultrasound and radar in medicine and engineering as special emphasis - echo –definition - applications - relation between time of echo and distance of obstacle –derivation- Reverberation and time of reverberation - Sabine's formula - Free and forced vibrations - Resonance - Conditions of good auditorium - noise pollution – definition – effects and methods to minimize noise pollution - problems

**2. UNIT – 2 SIMPLE HARMONIC MOTION Duration: 10 periods (L:6.0 – T: 4.0)**

Periodic motion - Simple Harmonic Motion (SHM)– definition - examples - Conditions for SHM – Projection of circular motion on any diameter of a circle is SHM - Expressions for Displacement, Velocity and Acceleration of a particle executing SHM – derivations - Time period, frequency, amplitude and phase of particle in SHM - Ideal simple pendulum – time period of simple pendulum – derivation - laws of simple pendulum -Seconds pendulum - problems.

**3. UNIT – 3 MODERN PHYSICS Duration: 10 periods (L:6.0 – T: 4.0)**

Photo electric effect - Einstein's photo electric equation – Work function and threshold frequency - laws of photo electric effect - applications of photo electric effect – photo cell - concept of Refraction of light - critical angle and total internal reflection - principle of Optical fiber - Applications of optical fiber – LASER – definition and characteristics – principle of LASER - spontaneous and stimulated emission-population inversion-examples of LASER – Uses.

**4. UNIT-4 MAGNETISM Duration: 10 periods (L:6.0 – T: 4.0)**

Magnetic field - magnetic lines of force -properties - Uniform and Non-uniform magnetic field – Magnetic length, pole strength – magnetic induction field strength- definition - Coulomb's inverse square law of magnetism - expression for moment of couple on a bar magnet placed in a uniform magnetic field – derivation - expression for magnetic induction field strength at a point on the axial line of a bar magnet -derivation- Dia, Para and Ferro magnetic materials – examples - related problems.

**5. UNIT-5 ELECTRICITY AND MEASURING INSTRUMENTS Duration: 10 periods (L:6.0 – T: 4.0)**

Ohm's law –Ohmic and non ohmic conductors – examples - Temperature dependence of resistance – coefficients of resistance with examples - Specific resistance – units – conductance- moving coil galvanometer - conversion of galvanometer into ammeter and voltmeter with diagram (qualitatively) – Kirchhoff's current and voltage laws in electricity – Expression for balancing condition of Wheatstone's bridge – derivation – Meter bridge –

working with neat diagram –Superconductivity-definition-superconductors-definition and examples-applications- related problems.

## 6. UNIT – 6 ELECTRONICS Duration: 10 periods (L:6.0 – T: 4.0)

Solids – definition – energy bands in solids- valence band, conduction band and forbidden band – Energy band diagram of conductors, insulators and semiconductors – concept of Fermi level - Intrinsic semiconductors - examples - Concept of holes in semiconductors - Doping - Extrinsic semiconductor - P-type and N-type semiconductors - PN Junction diode – Forward Bias and Reverse Bias - Applications of PN diode - Diode as rectifier – principle – principle of Light Emitting Diode and solar cell.

**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.**


**Specific learning outcomes:**

**Upon completion of the course the student shall be able to**

### 1. know the concept of Waves and Sound

1.1 Define wave. Explain the characteristics of wave (frequency, wavelength, amplitude)
1.2 Explain audibility range of sound.
1.3 Define infrasonic and ultrasonic sounds.
1.4 Define longitudinal and transverse wave motion. Write examples for each. Distinguish between them.
1.5 Derive the relation between wavelength, frequency and velocity of wave ($v = n\lambda$)
1.6 Define stationary waves.
1.7 Explain the phenomenon of beats. List the applications of beats.
1.8 Explain Doppler Effect. List the applications of Doppler Effect.
1.9 Application of Doppler Effect in medicine and engineering - ultrasound and radar.
1.10 Define echo. List the applications of echo.
1.11 Derive the relation between time of echo and distance of obstacle.
1.12 Explain Reverberation and time of reverberation.
1.13 Write Sabine's formula and explain the terms.
1.14 Define free and forced vibrations.
1.15 Define resonance with examples.
1.16 State the conditions of a good auditorium.
1.17 Define noise pollution.
1.18 List the effects and methods to minimize noise pollution.
1.19 Solve related numerical problems.

### 2. know the concept of Simple Harmonic Motion

2.1 Define periodic motion
2.2 Define Simple Harmonic Motion (SHM)

2.3 List the examples of SHM.
2.4 State the conditions of simple harmonic motion
2.5 Projection of circular motion on any diameter of a circle is SHM.
2.6 Derive the expressions for Displacement, Velocity and Acceleration of a particle executing SHM.
2.7 Define the terms time period, frequency, amplitude and phase of particle in SHM
2.8 Define Ideal simple pendulum and derive the expression for time period of simple pendulum.
2.9 State the laws of simple pendulum.
2.10 Define seconds pendulum.
2.11 Solve related numerical problems.

**3. know the concept of Modern Physics**

3.1 Explain Photo electric effect.
3.2 State Einstein's photo electric equation.
3.3 Define terms work function and threshold frequency.
3.4 State laws of photo electric effect.
3.5 List the applications of photo electric effect.
3.6 Define critical angle.
3.7 Define Total internal reflection.
3.8 State conditions for Total internal reflection
3.9 What is Optical fiber? and explain working principle of optical fiber
3.10 List the applications of optical fiber.
3.11 Explain the principle of LASER.
3.12 Define spontaneous and stimulated emission.
3.13 Define population inversion.
3.14 List the examples of LASER.
3.15 List the uses of LASER.

**4 know the concept of Magnetism**

4.1 Define magnetic field.
4.2 Define magnetic lines of force.
4.3 State the properties of magnetic lines of force.
4.4 Define Uniform and Non-uniform magnetic field.
4.5 Define the terms magnetic length and pole strength of a bar magnet.
4.6 Define magnetic induction field strength.
4.7 State and explain Coulomb's inverse square law of magnetism.
4.8 Derive the expression for moment of couple on a bar magnet placed in a uniform magnetic field.
4.9 Derive the formula for magnetic induction field strength at a point on the axial line of a bar magnet.
4.10 Define Dia, Para and Ferro magnetic materials with examples.
4.11 Solve related numerical problems.

**5 know the concept of Electricity and measuring instruments**

5.1 State Ohm's law – Define ohmic and non ohmic conductors with examples
5.2 Explain temperature dependence of resistance – types of temperature coefficients with examples
5.3 Define specific resistance. Write its units.

5.4 Define conductance.
5.5 Write the formulae for effective resistance in series and parallel combination of resistors.
5.6 State and explain Kirchhoff's current and voltage laws in electricity.
5.7 Explain moving coil galvanometer.
5.8 How a galvanometer is converted to ammeter and voltmeter?
5.9 Derive an expression for balancing condition of Wheatstone's bridge with legible sketch.
5.10 Explain briefly Meter Bridge with neat diagram.
5.11 Define superconductivity.
5.12 Define superconductor. Give examples.
5.13 List the applications of superconductors.
5.14 Solve related numerical problems.

**6 know the concepts of Electronics and applications**

6.1 Define solid.
6.2 Define valence band, conduction band and forbidden band.
6.3 Explain conductors, insulators and semiconductors on the basis of energy band diagram.
6.4 Explain the concept of Fermi level.
6.5 Define intrinsic semiconductors.
6.6 List the examples for intrinsic semiconductors.
6.7 Explain the concept of hole in semiconductors.
6.8 Define doping
6.9 Define extrinsic semiconductors.
6.10 Explain P-type and N-type semiconductors.
6.11 Explain PN Junction Diode (formation only).
6.12 Explain forward and reverse bias of PN diode (biasing and flow of majority and minority carriers with diagram only)
6.13 List applications of PN Diode.
6.14 Explain the principle of diode as a rectifier.
6.15 Explain working principle of Light Emitting Diode (LED)
6.16 Explain the working principle of solar cell.

**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

**DISTRIBUTION OF QUESTIONS/MARKS FOR SEMESTER MID/END EXAMINATION**

| MODULE | UNIT NO | UNIT NAME | Periods | NUMBER OF QUESTIONS TO BE CONSIDERED | | | | | | | | | | UNIT WISE WEIGHTAGE | (MS+EE) WEIGHTAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | | U | | A | | MARKS WEIGHTAGE | | | | | |
| | | | | MID | END | MID | END | MID | END | MS-I | MS-II | MS-III | END EXAM | | |
| PART-A | 1 | WAVES AND SOUND | 10 | 3 | 1 | 2 | 1 | 1 | 0 | 26 | _ | _ | 7 | 33 | 74 |
| | 2 | SIMPLE HARMONIC MOTION | 10 | 2 | 1 | 1 | 0 | 2 | 1 | 29 | _ | _ | 12 | 41 | |
| PART-B | 3 | MODERN PHYSICS | 10 | 2 | 1 | 1 | 0 | 2 | 1 | _ | 29 | _ | 12 | 41 | 74 |
| | 4 | MAGNETISM | 10 | 3 | 1 | 2 | 1 | 1 | 0 | _ | 26 | _ | 7 | 33 | |
| PART-C | 5 | ELECTRICITY AND MEASURING INSTRUMENTS | 10 | 3 | 0 | 2 | 0 | 1 | 1 | _ | _ | 26 | 10 | 36 | 72 |
| | 6 | ELECTRONICS | 10 | 2 | 1 | 1 | 1 | 2 | 0 | _ | _ | 29 | 7 | 36 | |
| | | TOTAL | 60 | 15 | 5 | 9 | 3 | 9 | 3 | 55 | 55 | 55 | 55 | 220 | 220 |
| | | | | | | | | | | | | 110 | | | |

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

**MODEL QUESTION PAPER (MID SEM-I)**
**BOARD DIPLOMA EXAMINATION, (C-18)**
**SECOND SEMESTER, 18 COMMON-203F**
**APPLIED 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. Write Sabine's formula and explain terms in it.
2. An observer listens echo from a distant hill in 10 sec. If velocity of sound in air is 340 m/s find distance between observer and hill.
3. Define transverse and longitudinal wave motion.
4. Define SHM and give examples.
5. Find length of seconds pendulum.

**PART-B**

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

6. Define noise pollution and write methods to reduce noise pollution.
7. Define Doppler effect and write its application.
8. Write conditions for SHM.

**PART-C**

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

9 (a) Define beats and write its applications. (5)

(b) Write conditions for good auditorium. (5)

10 (a) Derive formula for velocity and acceleration in case of SHM. (6)

(b) A body under SHM is represented by y = 10 Sin(6t) in meter. Find its maximum velocity and maximum acceleration. (4)

11 (a) Define ideal simple pendulum. Find expression for time period in case of simple pendulum. (7)

(b) State laws of simple pendulum. (3)

**MODEL QUESTION PAPER (MID SEM-II)**
**BOARD DIPLOMA EXAMINATION, (C-18)**
**SECOND SEMESTER, 18 COMMON-203F**
**APPLIED 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 photo electric effect.
2. Define threshold frequency.
3. Define magnetic length of a bar magnet.
4. Find the magnetic moment of a bar magnet of length 20 cm and pole strength is 5 A-m.
5. Write any two properties of bar magnet.

**PART-B**

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

6. Write Einstein's photo electric equation and explain the terms in it.
7. What conditions are required for total internal reflection to take place.
8. State and explain Couloumb's inverse square law.

**PART-C**

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

9 (a). State the laws photo electric effect. (6)

(b). Write the applications of photo electric effect. (4)

10(a). Discuss the expression for moment of a couple on a bar magnet placed in a uniform magnetic field. (6)

(b). A bar magnet of length 20 cm and pole strength 5 A-m makes an angle $30^0$ with a uniform magnetic field of induction 100 tesla. Find the moment of couple on it. (4)

11(a). Derive the expression for magnetic induction field strength at a point on the axial line. (7)

(b). Calculate the magnetic induction due to a short bar magnet of magnetic moment 0.5 A $m^2$ at a distance of 20 cm on the axial line from the mid point of magnet. (3)

**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-203F**

**BOARD DIPLOMA EXAMINATION, (C-18)**
**MODEL PAPER**
**SECOND SEMESTER EXAMINATION**
**APPLIED PHYSICS**

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

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

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

1. Define terms reverberation and reverberation time.
2. Define terms time period and frequency in case of SHM.
3. Write Einstein Photo electric equation. Explain terms involved in it.
4. Define uniform magnetic field and non uniform magnetic field.
5. Define ohmic and non ohmic conductors.
6. Define specific resistivity.
7. Define super conductors and give examples.
8. Define conduction band and valence band.
9. Define intrinsic and extrinsic semi conductors.
10. Write applications of PN Diode.

**PART-B**

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

11. Define echo. Derive formula for minimum distance to listen echo. (1+4)
12. Define noise pollution. Write four bad effects of noise pollution. (1+4)
13. Derive expression for couple acting on a bar magnet placed inside a uniform magnetic field. (5)

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

14. Explain conversion of galvanometer into ammeter and voltmeter with the help of diagrams. (2+3)
15. Draw energy band diagrams for conductors, insulators and semi conductors.
16. Explain the working of solar cell.

**PART-C**

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

17 (a) Derive expression for time period in case of simple pendulum. (7)
(b) Find the length of seconds pendulum on the surface of moon (g on the moon = 1/6 th of g on the earth) (3)

18 (a) Define Dia, para and ferro magnetic materials. (3)
(b) Derive formula for magnetic induction field strength at a point on the axial line of bar magnet. (7)

19 (a) State and explain Kirchhoff's law. (6)
(b) Two wires of same material are having lengths in the ratio 2:3 and radii 1:2. Find the ratio of their resistances. (4)

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

20 (a) Derive an expression for balancing condition of Wheatstone's bridge. (7)

(b) Three currents 1 mA, 3 mA and x mA are flowing towards a junction and two currents 2 mA and 3 mA are flowing away from the junction. Find the value of x. (3)

21 (a) What is doping? Explain formation of P-type and N-type semi conductors. (7)

(b) Explain principle of diode as rectifier. (3)

22 (a) What is PN diode? Draw diagrams for forward and reverse bias. (6)

(b) Explain the working principle of Light Emitting Diode (LED) (4)

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

| | |
|---|---|
| Course Title: **Engineering Chemistry and Environmental Studies** | Course Code : 18EC-**204F** |
| Semester : **Semester II** | Course Group : |
| Teaching Scheme in hours (L:T:P) : 3**0:15:00** | Credits : **3** |
| Type of course : **Lecture + Assignments** | Total Contact Hours : **60 periods** |
| CIE : **60 Marks** | SEE : **40 Marks** |

## 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 the course, the students will have ability to attain below Course Outcomes (CO):

| CO | Course outcome | CL | Linked PO | Teaching periods |
|---|---|---|---|---|
| CO1 | Understand and explain the different metallurgical processes, alloys and applications of alloys | R/U/A | 1,2,9,10 | **10** |
| CO2 | Understand and explain corrosion and preventive methods of corrosion | R/U/A | 1,2,9,10 | **10** |
| CO3 | List out the different methods of preparation and industrial uses of plastics, rubber and fibers. vulcanization of rubber and its applications | R/U/A | 1,2,5,6,7, 10 | **12** |
| CO4 | Classify the fuels and explain basic terms of fuel, outline the composition and industrial use of gaseous fuels | R/U/A | 1,2,10 | **8** |
| CO5 | Under stand and Explain Galvanic cell, emf of cell - electro chemical series-Applications of Galvanic cells, batteries and cells and distinguish the Galvanic and electrolytic cell | R/U/A | 1,2,5 | **12** |
| CO6 | Explain the causes, effects and controlling methods of air and water pollutions. | R/U/A | 1,2,5,7 | **8** |
| | Total Periods | | | 60 |

Legends: R = Remember, U= Understand, A = Apply

# ENGINEERING CHEMISTRY AND ENVIRONMENTAL STUDIES

## COURSE CONTENTS

**UNIT - I: Metallurgy: (10 periods)**

Characteristics of Metals - distinguish between Metals and Non Metals- Ore, Gangue, Flux, Slag - Concentration of Ore -Froth floatation - Methods of Extraction of crude Metal - Roasting, Calcination, Smelting – Alloys-purpose of making alloys - Composition of Brass, German silver, Nichrome, Stainless steel and Duralumin

**UNIT – II: Corrosion**: **(10 periods)**

Introduction - factors influencing the rate of corrosion - electrochemical theory of corrosion - composition, stress and concentration cells- rusting of iron and its mechanism - prevention of corrosion - coating methods, Paints-constituents and characteristics of paints -cathodic protection.

**UNIT – III: Polymers: (12 periods)**

Introduction - polymerization - types of polymerization - addition, condensation with examples - plastics - types of plastics - advantages of plastics over traditional materials - Disadvantages of using plastics - preparation and uses of the following plastics: 1. Polythene 2. PVC 3. Teflon 4. Polystyrene 5. Urea formaldehyde 6. Bakelite - Rubber - Elastomers –Preparartion of Butyl rubber, Buna-s, Neoprene rubber and their uses-Fibres-Preparation and uses of fibres-Nylon 6,6-Polyester.

**UNIT – IV: Fuels: (8 periods)**

Definition and classification of fuels- characteristics of good fuel - Calorific value-HCV and LCV-Calculation of oxygen required for combustion of methane and ethane - composition and uses of gaseous fuels- a) water gas b) producer gas, c) natural gas, d) coal gas, e) Bio gas and f) acetylene.

**UNIT – V: Electro Motive Force (12 periods)**

Galvanic cell – standard electrode potential – electro chemical series -emf of cell- Batteries-Types of batteries-Fuel cells.

**UNIT – VI: ENVIRONMENTAL STUDIES-II : ( 8 periods)**

Introduction- classification of air pollutants based on origin and states of matter-Air pollution - causes- Effects - control methods - Water pollution - causes - effects - control measures.

**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


## Specific Learning Outcomes:

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

**UNIT – I: METALLURGY**

1.1. List the Characteristics of Metals.
1.2. Distinguish between Metals and Non Metals
1.3. Define the terms 1.Mineral, 2.Ore, 3. Gangue, 4. Flux and 5.Slag
1.4. Describe Froth Floatation method of concentration of ore.
1.5. Describe the methods involved in extraction of crude metal- Roasting, Calcination and Smelting.
1.6. Define an Alloy
1.7. Explain the purpose of making of alloys
1.8. Write the Composition of the following alloys:1.Brass, 2.German silver, 3.Nichrome 4. Stainless steel, 5. Duralumin
1.9. List the uses of following Alloys: Brass, German silver, Nichrome, Stainless steel, Duralumin

**UNIT – II: CORROSION**

2.1. Define the term corrosion
2.2. Explain the Factors influencing the rate of corrosion
2.3. Explain the concept of electrochemical theory of corrosion
2.4. Describe the formation of a) composition cell, b) stress cell c) concentration cell
2.5. Define rust and explain the mechanism of rusting of iron with chemical reactions.
2.6. Explain the methods of prevention of corrosion:
   a) Protective Coatings i) Metallic coatings (Anodic and cathodic coatings) ii) Inorganic coatings iii) Organic coatings, paint, constituent of paint and characteristics of good paint.
   b) Cathodic protection (Sacrificial anode process and Impressed - voltage process).

**UNIT – III: POLYMERS**

3.1. Explain the concept of polymerization
3.2. Describe the methods of polymerization a) addition polymerization b) condensation polymerization with examples.

3.3. Define the term plastic
3.4. List the Characteristics of plastics.
3.5. State the advantages of plastics over traditional materials
3.6. State the disadvantages of using plastics.
3.7. Types of plastics with examples.
3.8. Distinguish between thermoplastics and thermosetting plastics
3.9. Explain the methods of preparation and uses of the following plastics:
1. Polythene, 2. PVC, 3.Teflon, 4. Polystyrene 5. Urea formaldehyde 6. Bakelite (only flow chart for Bakelite i.e. without chemical equations).
3.10. Define the term natural rubber
3.11. Explain preparation of natural rubber
3.12. State the structural formula of Natural rubber
3.13. List the Characteristics of natural rubber
3.14. Explain the process of Vulcanization
3.15. List the Characteristics of Vulcanized rubber
3.16. Define the term Elastomer
3.17. Describe the preparation and uses of the following synthetic rubbers a) Butyl rubber, b) Buna-s and c) Neoprene rubber.
3.18. Define fibre.
3.19. Explain the preparation and uses of fibres –Nylon 6,6 and Polyester

**UNIT – IV: FUELS**

4.1. Define the term fuel
4.2. Classify the fuels based on physical state - solid, liquid and gaseous fuels with examples.
4.3. Classify the fuels based on occurrence- primary and secondary fuels with examples.
4.4. List the characteristics of a good fuel
4.5. Advantages of gaseous fuels
4.6. Define Calorific value- HCV and LCV.
4.7. Calculate the oxygen required for the combustion of Methane and Ethane fuel gases.
4.8. State the composition and uses of the following gaseous fuels:
a) water gas, b) producer gas, c) natural gas, d) coal gas, e) Bio gas and f) acetylene

**UNIT – V: Electro Motive Force**

5.1. Define Galvanic cell
5.2. Explain the construction and working of Galvanic cell
5.3. Distinguish between electrolytic cell and galvanic cell
5.4. Explain standard electrode potential
5.5. Explain standard hydrogen electrode
5.6. Define electrochemical series and explain its significance.
5.7. Define and explain emf of a cell.
5.8. Solve the numerical problems on emf of cell
5.9. Explain Batteries (Cells) and types of batteries with examples –working and applications of Dry cell (Leclanche cell), Lead storage battery, Ni-Cd cell
5.10. Explain working and advantages of Fuel cell (Hydrogen - Oxygen Fuel Cell)

**UNIT – VI: ENVIRONMENTAL STUDIES-II**

6.1. Define air pollution
6.2. Classify the air pollutants- based on origin and states of matter
6.3. Explain the causes of air pollution
6.4. Explain the effects of air pollution on human beings, plants and animals
6.5. Explain the green house effect - ozone layer depletion and acid rain
6.6. Explain the methods of control of air pollution
6.7. Define water pollution
6.8. Explain the causes of water pollution
6.9. Explain the effects of water pollution on living and non living things
6.10. Explain the methods of control of water pollution.

## 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 , Group discussion |
| 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**

# DISTRIBUTION OF QUESTIONS/MARKS FOR SEMESTER-MID/END EXAMINATION OF SEMESTER - II

| MODULE | UNIT NUMBER | NAME OF THE UNIT | No. OF PERIODS | NUMBER OF QUESTIONS TO BE CONSIDERED | | | | | | | | | | UNIT WISE WEIGHTAGE | MID+END EXAM WEIGHTAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | | U | | A | | MARKS WEIGHTAGE | | | | | |
| | | | | MID | END | MID | END | MID | END | MS-I | MS-II | MS-III | END EXAM | | |
| PART-A | I | Metallurgy | 10 | 3 | 1 | 1 | 1 | 1.5 | 0.5 | 26 | | | 12 | 38 | 74 |
| | II | Corrosion | 10 | 2 | 1 | 2 | 0 | 1.5 | 0.5 | 29 | | | 7 | 36 | |
| PART-B | III | Polymers | 12 | 3 | 1 | 2 | 1 | 1.5 | 0.5 | | 29 | | 12 | 43 | 74 |
| | IV | Fuels | 8 | 2 | 1 | 1 | 0 | 1.5 | 0.5 | | 26 | | 7 | 31 | |
| PART-C | V | Electro Motive Force | 12 | 2 | 1 | 1 | 1 | 2 | 0 | | | 29 | 7 | 36 | 72 |
| | VI | Environmental Studies-II | 8 | 3 | 0 | 2 | 0 | 1 | 1 | | | 26 | 10 | 36 | |
| TOTAL | | | 60 | 15 | 5 | 9 | 3 | 9 | 3 | 55 | 55 | 55 | 55 | 220 | 220 |
| | | | | | | | | | | | | 110 | | | |

| LEGEND | |
|---|---|
| | R: Remembering |
| | U: understanding |
| | A: Applying |

**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:**

**Model Paper for Mid-I**

**BOARD DIPLOMA EXAMINATION, (C-18)**

**SECOND SEMESTER, 18 COMMON-204F**

**CHEMISTRY AND ENVIRONMENTAL STUDIES-I**

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

**PART-A**

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

1. Define the terms Mineral and Ore.
2. What is Roasting of Ore? Give example.
3. Define Corrosion.
4. Define alloy.
5. What is paint.

**PART-B**

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

6. Explain the purpose of making alloys.
7. Mention any five factors influencing the rate of corrosion.
8. Explain the mechanism of rusting.

**PART-C**

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

9. (a) Explain froth-floatation process of concentration of ore.
   (b) Write any five differences between metals and non-metals.
10. (a) Explain the process of calcination and smelting.
    (b) Explain the composition and concentration cells formed during corrosion.
11. (a) Differentiate anodic and cathodic coatings.
    (b) Explain the sacrificial anode method of protecting metal from corrosion.

**Model Paper for Mid-II**
**BOARD DIPLOMA EXAMINATION, (C-18)**
**SECOND SEMESTER, 18 COMMON-204F**
**CHEMISTRY AND ENVIRONMENTAL STUDIES-I**

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

**PART-A**

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

1. Define polymerization.
2. Write any two characteristics of plastic.
3. What are fibres.
4. Define fuel. Give two examples.
5. What is the calorific value of a fuel?

**PART-B**

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

6. What any five differences between thermoplastics and thermosetting plastics.
7. Write any five characteristics of natural rubber.
8. What are primary and secondary fuels? Give examples.

**PART-C**

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

9. (a) Write the preparation method and uses of PVC and Tefflon.
   (b) Write about vulcanization of natural rubber.
10. (a) Write the preparation methods and uses of buna-s and neoprene.
    (b) Write any five advantages of gaseous fuel.
11. (a) Write the composition and uses of water gas and producer gas.
    (b) Calculate the volume of oxygen required at STP for complete combustion of one mole of ethane.

## Semester End Examination marks distribution

| | Short answer | Essay | Marks |
|---|---|---|---|
| Part A | 10 | 0 | 20 |
| Part B | 0 | | |
| GROUP – I | | 2/3 | 10 |
| GROUP - II | | 2/3 | 10 |
| Part C | 0 | | |
| GROUP – I | | 2/3 | 20 |
| GROUP - II | | 2/3 | 20 |
| Total | 10 | 8/12 | 80 |

**Model Paper for SEE**
**BOARD DIPLOMA EXAMINATION, (C-18)**
**SECOND SEMESTER, 18 COMMON -204F**
**( SEMESTER END EXAM)**
**CHEMISTRY AND ENVIRONMENTAL STUDIES-II**

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

**PART-A**

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

1. Write any four characteristics of metals.
2. Define corrosion.
3. Define addition polymerization.
4. Define calorific value.
5. Define galvanic cell.
6. Define emf.
7. Define standard electrode potential.
8. Define global warming.
9. Define primary pollutant. Give example.
10. Define water pollution.

**PART-B**

**Group - I**

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

11. Distinguish electrolytic cells from galvanic cells.
12. Write any five effects of air pollution on human beings.
13. Write a brief note on depletion of ozone layer.

**Group - II**

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

14. Write about roasting and calcination.
15. Write any five advantages of plastics.
16. Explain the construction of standard hydrogen electrode.

**PART-C**

**GROUP - I**

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

17. (a) Explain the significance of electro chemical series .
    (b) Calculate the emf of the following cell if the standard reduction potentials of Zn and Cu are -0.76 V and +0.34 V respectively.
    $Zn \mid Zn^{2+} \parallel Cu^{2+} \mid Cu$
18. (a) Explain about the working and applications of Ni-Cd cell.
    (b) Explain about the working of Hydrogen- Oxygen fuel cell and its advantages.
19. (a) Write a brief note on acid rain.
    (b). Write about the role of Cottrell electrostatic precipitator and Zoning of industries in controlling air pollution.

**GROUP - I**

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

20. (a) Explain the process of concentration of sulphide ore by froth flotation process.
    (b) Explain the impressed voltage method of protecting metal from corrosion.
21. (a) Write the preparation method and uses of nylon 6,6 and polyester.
    (b) Calculate the volume of oxygen required at STP for complete combustion of one mole of methane.
22. (a) Write any four effects of water pollution.
    (b) Explain any three methods of controlling water pollution.

# SEMICONDUCTOR DEVICES

| | | | |
|---|---|---|---|
| Course Title : | **Semiconductor Devices** | Course Code | 18**EC-205C** |
| Semester | **II** | Course Group | **Core** |
| Teaching Scheme in Hrs(L:T:P) | **36:24:0** | Credits | **3** |
| Methodology | **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 | Periods | Questions for SEE | | | Marks weightage | %Weightage |
|---|---|---|---|---|---|---|---|
| | | | **R** | **U** | **A** | | |
| **1.** | **Semiconductor diodes** | **10** | **1** | **1** | **0** | **7** | **6** |
| **2.** | **Transistors** | **10** | **1** | **0** | **1** | **12** | **11** |
| **3.** | **Transistor biasing** | **10** | **1** | **1** | **0** | **7** | **6** |
| **4.** | **JFET and MOSFET** | **10** | **1** | **0** | **1** | **12** | **11** |
| **5.** | **DC power supplies** | **12** | **2** | **2** | **3** | **44** | **40** |
| **6.** | **Engineering applications** | **08** | **4** | **2** | **1** | **28** | **26** |
| | Total | **60** | **10** | **6** | **6** | **110** | **100** |

**Pre requisites**

This course requires the basic knowledge of Basic Physics and Mathematics at Secondary school level , and about Electronic Components,AC and DC voltages and Currents

**Course Outcomes**

Upon completion of the course, the student should be able to

| **Course Outcome** | |
|---|---|
| CO1 | Explain the different types of Semiconductor Diodes and their Specifications |
| CO2 | Analyze the transistor operation under different configurations and application of Transistor as an Amplifier |
| CO3 | Determine the need for Stable operating point and reason for wide use of CE amplifier and discuss Various Bias Stabilization techniques |
| CO4 | Explain the Constructional features and operation of different types of FET |
| CO5 | Select the type of Rectifier and Filter required for a given Power supply application |
| CO6 | Solve simple problems and develop circuits using Semiconductor Devices for simple Electronic circuit applications |

**Course Contents**

**UNIT1-Semiconductordiodes:Duration: 10 periods**

Electrical properties of semiconductor materials-energy level diagrams of conductor, semiconductor and Insulator-Formation of P-Type and N-Type materials and their properties-Drift and diffusion current-Formation and behaviour of PN junction diode.-Forward and Reverse bias characteristics,.

Special purpose diodes – .Zener diode- Characteristics-zener breakdown and avalanche breakdown LEDs, Varactor diodes

**UNIT2 –Transistors** **Duration: 10 periods**

Formation and properties of PNP and NPN Transistor-Transistor configurations-input and output characteristics- α, β and γ factors-Comparison of CB,CE,CC configurations- Transistor as an amplifier.

**UNIT -3 :Transistor Biasing** **Duration: 10 periods**

Basic amplifier concept using BJT-CE mode.- reason for wide use of CE amplifier .concept of DC and AC load line- selection of operating point on DC load line with waveforms.-factors affecting the Q-point-thermal runaway- need for proper biasing in amplifier circuits.-types of biasing circuits- stabilization in amplifier circuits- various stability factors (S, Sβ, SVBE)-expression for stability factor in CE configuration- fixed bias circuit and derive its stability factor.

**Unit 4- JFET&MOSFET** **Duration:10 periods**

Compare JFET and BJT-List the merits of JFET over BJT- principle of operation of n-channel JFET – drain characteristics of JFET- pinch-off voltage of JFET- mutual characteristics of JFET-Important parameters of JFET –JFET classification –Construction and principle of –operation of depletion type n-channel MOSFET.-Explain the construction and principle of operation of enhancement type n-channel MOSFET. - JFET and MOSFET Comparison - Principle of operation of CMOSFET.

**UNIT -5: DC Power supplies** **Duration: 8 periods**

DC power supply- Half wave, Full wave and Bridge rectifiers-RMS value, Average value, Ripple factor, Voltage regulation. Filters – RC,CRC and CLC. Zener regulator – series and shunt IC regulators and specifications of RPS-Inverter

**UNIT- 6:Engineering applications** **Duration: 12 periods**

Specifications - Commonly used Diode Numbers- Use of a PN junction diode for applications like: protection against polarity reversal, power control of soldering Irons, Dimming of incandescent lamps, Temperature sensing-

Selection of Transistor based on the β Beta of the Transistor-Numbers of commonly used Transistors Significance of the number marked on the Transistor case-Transistor Packages and Pin Configuration-

Design of Self Bias circuit

Important specifications of JFET –Drift problem in FET

Calculation of voltage regulation, Ripple factor of DC Power Supply-Design of a Zener regulator circuit for given Line and Load voltages,Powerratings.Design of RPS using 78XX series IC Regulator

**References**

**RECOMMENDED BOOKS**


1. Basic Electrical Engineering Volume 1 by PS Dhogal , TMH
2. Electronic devices and applications by B. Somanathan Nair, PHI.
3. Understanding Electronics Components by Filipovic D. Miomir. Mikroe online Edition


**REFERENCE BOOKS**


1. Electronic Devices and Circuits by David A.Bell Prentice hall
2. Hand book of components for Electronics by Charles A. Harper McGrahills
3. Printed circuit Boards Design &Technology by Walter C. Boshart TMH


**Learning Outcomes:**

**1.0 Understand the working of Semiconductor Diodes.**

1.1 State the electrical properties of solid Semiconductor materials.

1.2 Sketch energy level diagrams for conductors, Semiconductors, Insulators.

1.3 Distinguish between Intrinsic and extrinsic Semiconductors.

1.4 Describe the formation of P type and N type materials and sketch the energy band diagrams.

1.5 Explain Majority and Minority carriers in P and N Type materials.

1.6 Distinguish between Drift and Diffusion current.

1.7 Explain the formation of PN junction diode.

1.8 Describe the working of PN junction Diode with various biasing voltages.

1.9 Explain the forward/Reverse Bias Voltage characteristics of diode.

1.10 Interpret the manufacturer specifications of a given diode from data sheet.

1.11 Describe the formation and working of Zener diode.

1.12 Explain the characteristics of Zener diode.

1.13 Distinguish between Zener breakdown and Avalanche breakdown.

**2.0 Understand the working of Transistor**

2.1 Know the formation of Transistor.

2.2 Draw the symbol of Transistor.

2.3 Explain the working of PNP and NPN Transistors.

2.4 Draw the different Transistor configurations.

2.5 Know cut off, saturation and active regions.

2.6 Sketch the input/output characteristics of CB,CC and CE configurations.

2.7 Define alpha, beta and gamma Factors.

2.8 Relate alpha, beta and gamma Factors.

2.9 Write collector current expression in CB,CC and CE modes of Transistors in terms of $\alpha$, $\beta$, $I_B$, $I_C$ ,$I_{CBO}$ ,$I_{CEO}$ .

2.10 Compare the performance Characteresitics of CE,CB and CC Configurations

2.11 Describe the working of Transistor as an amplifier (CB configuration).

**3.0 Understand the Transistor biasing and Stabilization techniques**

3.1 Explain the reason for wide use of CE amplifier.

3.2 Explain the concept of DC and AC load line.

3.3 Explain the selection of operating point on DC load line with waveforms.

3.4 List the factors affecting the Q-point.

3.5 Explain thermal runaway

3.6 State the need for proper biasing in amplifier circuits.

3.7 List the types of biasing circuits.

3.8 Define stabilization in amplifier circuits.

3.9 Define the various stability factors (S, S$\beta$, SVBE)

3.10 Derive an expression for stability factor in CE configuration.

3.11 Explain the fixed bias circuit and derive its stability factor.

3.12 Explain the collector to base resistor method of biasing and derive its stability factor.

3.13 Explain the self bias circuit and derive its stability factor.

3.14 Draw a practical CE amplifier and explain the function of each component

**4.0.Understand the working of FETs and MOSFETs.**

4.1 Explain the construction and principle of operation of n-channel JFET.

4.2 Draw and explain the drain characteristics of JFET.

4.3 Define pinch-off voltage in JFET.

4.4 Classify the different types of FETs.

4.5 Draw and explain the mutual characteristics of JFET.

4.6 Define the parameters of JFET and obtain the relation among them.

4.7 List the important specifications of JFET and BJT.

4.8 List the merits of JFET over BJT.

4.9 List the applications of JFET and BJT.

4.10 Explain the construction and principle of operation of depletion type n-channel MOSFET.

4.11 Explain the construction and principle of operation of enhancement type n-channel MOSFET.

4.12 Compare JFET and MOSFET.

4.13 Explain the principle of operation of CMOSFET.

**5.0 Understand the working of DC Power Supplies.**

5.1.Explain the necessity of D.C. power supply for Electronic circuits

5.2. Describe the working of HW, FW and Bridge section circuits with wave forms.

5.3.Give the equations for RMS value, average DC value; ripple factor and efficiency for the above circuits.

5.4.Define Voltage Regulation.

5.5.Explain the need for a filter circuit in power supplies.

5.6.Explain the operation of a rectifier circuit using Capacitor filter

5.7.Give the reasons for connecting a Bleeder Resistor across capacitor

5.8.Draw the input/output waveform of Rectifier with RC Filter Circuit

5.9.Mention the factors effecting the output ripple in RC

5.10. Draw the circuit of CRC Filter

5.11. Explain the function of components and working of CRC Filter

5.12. Give the reasons for popularity of RC filter circuits

5.13. Explain the working of CLC filters Circuit

5.14. Draw the input and output waveforms

5.15. Mention the demerits of CLC filters

5.16. List the applications where CLC filters are used

5.17. State the need for a regulated power supply

5.18. List important specifications of Regulated power supply

5.19. Draw the circuit of a simple Zener regulated DC Power supply.

5.20. Explain the working of Zener regulated power supply

5.21. Determine the Resistance value and wattage of Series Resistor , zener diode for a given Input voltage ,load voltage and load current

**6.0 Engineering Applications**

6.1 Interpret Data sheets and Commonly used Diode Numbers

6.2 Explain the use of a PN junction diode for applications like: protection against polarity reversal, power control of soldering Irons, Dimming of incandescent lamps, Temperature sensing

6.3 Calculate the value of β Beta of the Transistor for an Amplifier application with required voltage gain

6.4 Select the correct transistor for given circuit specifications

6.5 Explain the Significance of the number marked on the Transistor case-

6.6 Explain different Transistor Packages and describe their Pin Configuration

6.7 Design a Self Bias circuit for Given Stabilisation

6.8 InterpretImportant specifications of JFET –Drift problem in FET

6.9 Calculate of voltage regulation, Ripple factor of DC Power Supply for given Input Voltage

6.10Design a Zener regulator circuit for given Line and Load voltages,Power ratings.

6.11 Design an RPS using 78XX series IC Regulator

**Internal Evaluation**

| Test | Units | Marks | Pattern |
|---|---|---|---|
| **Mid Sem 1** | **1 ,2** | **20 (A-1x5=5,B-2.5x2=5, C-5x2=10)** | **Part A 5 Short answer questions Part B 2 Essay questions out of 3 Questions Part C 2 Essay questions out of 3 Questions** |
| **Mid Sem 2** | **3,4** | **20 (A-1x5=5, B-2.5x2=5, C-5x2=10)** | **Part A 5 Short answer questions Part B 2 Essay questions out of 3 Questions Part C 2 Essay questions out of 3 Questions** |
| **Slip Test 1** | **1 ,2,3** | **5** | **2 Essay Questions out of 3 Questions** |
| **Slip Test 2** | **4,5,6** | **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 to Manual of Electronic Semiconductor Devices to find their specifications

2.Student inspects the available equipment in the Lab to identify the Diodes,Transistors and FETs

3.Visitnearby Industry to familiarize with fabrication techniques of Semiconductor Devices

4.Analyze the Power supply Unit in the Institution facility

5.Quiz

6.Group discussion

7.Surprise test

**Suggested E-Learning references**

1.http://electrical4u.com/

2. www.electronics-tutorials.ws

3. www.nptel.ac.in

**DISTRIBUTION OF QUESTIONS/MARKS FOR SEMESTER MID/END EXAMINATION**

| Module | Unit No. | No. of Periods | NUMBER OF QUESTIONS TO BE CONSIDERED | | | | | | MARKS WEIGHTAGE | | | | UNIT WISE WEIGHTAGE | (MS+EE) WEIGHTAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | | U | | A | | | | | | | |
| | | | MID | END | MID | END | MID | END | MS-I | MS-II | MS-III | END EXAM | | |
| PART-A | I | 10 | 2 | 1 | 1 | 1 | 2 | 0 | 29 | 0 | 0 | 7 | 36 | 74 |
| | II | 10 | 3 | 1 | 2 | 0 | 1 | 1 | 26 | 0 | 0 | 12 | 38 | |
| PART-B | III | 10 | 2 | 1 | 1 | 1 | 2 | 0 | 0 | 29 | 0 | 7 | 36 | 74 |
| | IV | 10 | 3 | 1 | 2 | 0 | 1 | 1 | 0 | 26 | 0 | 12 | 38 | |
| PART-C | V | 12 | 2 | 0 | 2 | 0 | 2 | 1 | 0 | 0 | 34 | 10 | 44 | 72 |
| | VI | 8 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 21 | 7 | 28 | |
| TOTAL | | 60 | 15 | 5 | 9 | 3 | 9 | 3 | 55 | 55 | 55 | 55 | 220 | 220 |
| | | | | | | | | | | | 110 | | | |

| LEGEND | |
|---|---|
| | **R**: Remembering |
| | **U**: Understanding |
| | **A**: Applying |

| Course Outcome | | CL | Linked PO | Teaching Hours |
|---|---|---|---|---|
| CO1 | Explain the different types of Semiconductor Diodes and their Specifications | R/U | 1,2,10 | 10 |
| CO2 | Analyze the transistor operation under different configurations and application of Transistor as an Amplifier | R/U/A | 1,2,5,6,7 | 10 |
| CO3 | Determine the need for Stable operating point and reason for wide use of CE amplifier and discuss Various Bias Stabilization techniques | R/U/A | 1,2,9 | 10 |
| CO4 | Explain the Constructional features and operation of different types of FET | R/U/A | 1,2,5,7 | 10 |
| CO5 | Select the type of Rectifier and Filter required for a given Power supply application | R/U/A | 1,2,5 | 8 |
| CO6 | Solve simple problems and develop circuits using Semiconductor Devices for simple Electronic circuit applications | R/U/A | 1,2,3,7 | 12 |

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD**

# C18EC-205C SEMICONDUCTOR DEVCES

**II SEMESTER MID SEMESTER – I MODEL PAPER**

**Time: 1 1/2 hour** **Max. Marks:40**

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## PART-A

**Answer <u>All</u> questions. Each carries 2 marks.** **5X2=10 Marks**

1. State any 2 electrical properties of solid semiconductor materials.
2. Write any 2 differences between zener breakdown and avalanche breakdown.
3. Draw the symbols of PNP and NPN transistors.
4. Define alpha and beta of a transistor.
5. Write the collector current expression in CE mode.

## PART-B

**Answer any <u>TWO</u> questions out of Three questions. Each carries 5marks.** **2X5=10Marks**

6. Explain the majority and minority carriers in P and N type materials.
7. Compare the performance characteristics of CB, CE and CC configurations..
8. Explain the working of PNP transistor.

## PART-C

**Answer any <u>TWO</u> questions out of Three questions. Each carries 10 marks.** **2X10=20Marks**

9. Explain the working of PN junction diode with various biasing voltages.
10. Explain the formation and working of Zener diode.
11. Explain the working of transistor as an amplifier in CB configuration.

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD**

# C18EC-205 C SEMICONDUCTOR DEVCES

**II SEMESTER MID SEMESTER – II MODEL PAPER**

**Time: 1 1/2 hour** **Max. Marks:40**

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## PART-A

**Answer <u>All</u> questions. Each carries 2 marks.** **5X2=10 Marks**

1. List any 2 factors affecting the Q point.
2. Define stability factor S.
3. Define pinch –off voltage in JFET.
4. List any 2 specifications of BJT.
5. List any 2 merits of JFET over BJT.

## PART-B

**Answer any <u>TWO</u> questions out of Three questions. Each carries 5marks.** **2X5=10Marks**

6. Explain thermal run away in a transistor..
7. Draw and explain the drain characteristics of JFET.
8. Define the parameters of JFET.

## PART-C

**Answer any <u>TWO</u> questions out of Three questions. Each carries 10 marks.** **2X10=20Marks**

9. Explain the selection of operating point on DC load line with waveforms.
10. Explain the self bias circuit and derive its stability factor.
11. Explain the construction and working principle of enhancement type N channel MOSFET.

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD**
**SEMESTER END EXAMINATION MODEL QUESTION PAPER**
**C18EC-205C SEMICONDUCTOR DEVCES**

**Time: 3 hour** **Max. Marks:80**

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**PART-A**

**Answer All questions. Each carries 2 marks.** **10X2=20 Marks**

1. List any 2 differences between intrinsic and extrinsic semiconductors.
2. Draw the symbols of NPN and PNP transistors.
3. List any 2 types of biasing circuits.
4. List any 2 applications of JFET.
5. List any 2 IC numbers of diodes.
6. Write the RMS value of HWR and FWR.
7. Give the reasons for connecting a bleeder resistor across capacitor.
8. State the need for regulated power supply.
9. Write the standard values of alpha and beta of a transistor.
10. List any 2 different transistor packages.

**PART-B**

**Answer any two questions.** **4X5=20Marks**

1. Explain the formation of PN junction diode.
2. Explain the concept of DC load line.
3. Explain the significance of number marked on a transistor.

**Answer any two questions.** **4X5=20Marks**

4. Explain the working HWR with waveforms.
5. Explain the working of CLC filter circuit.
6. Calculate the value of beta of a transistor for an amplifier with a voltage gain of 60.

**PART-C**

**Answer any two questions** **2X10=20Marks**

7. Explain the working of PNP and NPN transistor.
8. Explain the construction and principle of operation of depletion type n-channel MOSFET.
9. Explain the working of bridge rectifier circuit with waveforms.

**Answer any two questions** **2X10=20Marks**

10. Draw the circuit of a simple zener regulated power supply and explain its operation.
11. Explain the operation of a rectifier circuit using capacitor filter with necessary digrams.
12. Design an RPS using 7805 series IC regulator.

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

| Course Title : | Advanced Engineering Drawing | Course Code | 18EC-206P |
|---|---|---|---|
| Semester | II | 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 Level Offered by State Board of Technical Education – Telangana State**

**Prerequisites**: Knowledge of Basic Engineering Drawing and Clear visualization and sound pictorial intelligence to learn this course.

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.

## Course Content and Blue Print of Marks for SEE

| Unit No | Unit Name | Hours | Questions to be set for SEE | | | | | Marks Weightage | Weightage (%) |
|---|---|---|---|---|---|---|---|---|---|
| | | | R | U | | A | | | |
| | | | | SQ | EQ | SQ | EQ | | |
| 1 | Projection Solids | 09 | -- | 2 | -- | -- | 1 | 20 | 18 |
| 2 | Sectional Views | 06 | | 1 | -- | | 1 | 15 | 14 |
| 3 | Auxiliary views | 06 | -- | 1 | -- | -- | 1 | 15 | 14 |
| 4 | Pictorial drawing | 15 | -- | 2 | -- | -- | 2 | 30 | 27 |
| 5 | Development of surfaces | 09 | -- | 2 | -- | -- | 2 | 30 | 27 |
| | Total | 45 | | 40 | -- | -- | 70 | 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 in practical 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** | Apply the principles of Projection of solids also draw the projections of solids. |
| **CO2** | Appreciate the need of Sectional views also draw the sectional views and true sections of the engineering components. |
| **CO3** | Escalate the need of auxiliary views and draw the auxiliary views of the given engineering components. |
| **CO4** | Gainthe knowledge of Isometric views of engineering components also draw the isometric views of given components. |
| **CO5** | Grasp the knowledge and draw the development of surfaces of different engineering components |

## Course Contents

**1.0 Projection of solids (09 Hours)**

Projection of regular solids
(a) Axis perpendicular to one of the planes
(b) Axis parallel to VP and inclined to HP and vice versa.

**2.0 Sectional views (06 Hours)**

Need for drawing sectional views – what is a sectional view - Location of cutting plane – Purpose of cutting plane line – Selection of cutting plane to give maximum information (vertical and offset planes) - Hatching – Section of regular solids inclined to one plane and parallel to other plane

**3.0 Auxiliary views (06 Hours)**

Need for drawing auxiliary views -Explanation of the basic principles of drawing an auxiliary views - explanation of reference plane and auxiliary plane -Partial auxiliary view.

**4.0 Pictorial Drawings (15 Hours)**

Brief description of different types of pictorial drawing viz., Isometric, oblique, and perspective and their use - Isometric drawings: Iso axis, angle between them, meaning of

visual distortion in dimensions - Need for an isometric scale, difference between Isometric scale and ordinary scale difference between Isometric view and Isometric projection - Isometric and non-Isometric lines -Isometric drawing of common features like rectangles, circular shapes, non-isometric lines - Use of box and offset methods.

**5.0 Development of Surfaces (09 Hours)**

Need for preparing development of surface with reference to sheet metal work -Concept of true length of a line with reference to its orthographic projection when the line is (i) parallel to the plane of projection (ii) inclined to one principal and parallel to the other - Development of simple solids like cubes, prisms, cylinders, cones, pyramid (sketches only) -Types of development: Parallel line and radial line development -Procedure of drawing development, drawings of trays, funnels, elbow pipes and rectangular ducts.

## Reference Books


Engineering Drawing by Kapildev – (Asian Publisher)
Engineering Drawing by BasantAgarwal& 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


## Suggested Specific Learning Outcomes

**1.0 Apply Principles of Projection of solids**

1.1. Draw the projections of solids to axis of solids parallel to one plane.
1.2. Draw the projections of solids to axis of solid inclined to other plane.

**2.0 Appreciate the need of Sectional Views**

2.1 Explain the need to draw sectional views.
2.2 Select the section plane for a given component to reveal maximum information.
2.3 Explain the positions of section plane with reference planes
2.4 Differentiate between true shape and apparent shape of section
2.5 Draw sectional views and true sections of regular solids discussed in 6.0
2.6 Apply principles of hatching.

**3.0 Understand the need of auxiliary views**

3.1 State the need of Auxiliary views for a given engineering drawing.
3.2 Draw the auxiliary views of a given engineering component
3.3 Differentiate between auxiliary view and apparent view

**4.0 Prepare pictorial drawings**

4.1 State the need of pictorial drawings.
4.2 Differentiate between isometric scale and true scale.
4.3 Prepare Isometric views for the given orthographic drawings.

**5.0 Interpret Development of surfaces of different solids**

5.1 State the need for preparing development drawing.
5.2 Prepare development of simple engineering objects (cubes, prisms, cylinders, cones, pyramid) using parallel line and radial line method.
5.3 Prepare development of surface of engineering components like trays,funnel, $90^0$ elbow & rectangular duct.

# 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 | Projection Solids | -- | 3 | -- | -- | 2 | 35 | 64 |
| 2 | Sectional Views | -- | 2 | -- | | 1 | 20 | 36 |
| | Total | | 5 | | | 3 | 55 | 100 |
| **Second Mid Examination** | | | | | | | | |
| 3 | Auxiliary views | -- | 2 | -- | -- | 1 | 20 | 36 |
| 4 | Pictorial drawing | -- | 3 | -- | -- | 2 | 35 | 64 |
| | 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:**

Carries **5** Short Questions, students have to attempt **4** Questions and Each Question Carries **5** Marks.**(4 / 5 X 5 = 20 Marks)**

**Part B:**

Carries **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 Minimum 50% of the total (i.e. 20 Marks).**

| Course Outcome | | CL | Linked Program Objectives (PO) |
|---|---|---|---|
| CO1 | Apply the principles of Projection of solids also draw the projections of solids. | R / U / A | 1, 2, 3, 4, 9, 10 |
| CO2 | Appreciate the need of Sectional views also draw the sectional views and true sections of the engineering components. | R / U / A | 1, 2, 3, 4, 9, 10 |
| CO3 | Escalate the need of auxiliary views and draw the auxiliary views of the given engineering components. | R / U / A | 1, 2, 3, 4, 9, 10 |
| CO4 | Gainthe knowledge of Isometric views of engineering components also draw the isometric views of given components. | R / U / A | 1, 2, 3, 4, 9, 10 |
| CO5 | Grasp the knowledge and draw the development of surfaces of different engineering components | 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** |
| **Advanced 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 : | **Advanced Computer Aided Drafting** | Course Code | **18EC-207P** |
| Semester | **II** | Course Group | **Core** |
| Teaching Scheme in Hrs(L:T:P) | **7.5:0:30** | Credits | **1.5** |
| Methodology | **Tutorials + 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. | Make a drawing with Layers | **6** | | **2** | | **20** | **25** |
| 2 | Create and insert the Blocks and add attributes | **9** | | | | | |
| 3 | Generate Solid models with different surfaces | **15** | | **2** | | **20** | **25** |
| 4. | Create complicated 3D drawings using layers and blocks | **15** | | | **2** | **40** | **50** |
| | **Total** | **45** | | **4** | **2** | **80** | **100** |

**R: Remembering, U: Understanding, A: Applying**

**SEE Question Paper Pattern:**
**Maximum Marks: 80, Time: 3Hrs**
**Part – A: Short answer questions: 4 X 10= 40 Marks**
**Part - B: Essay Type Questions: 2 X 20= 40 Marks**

This course requires the Basic CAD Skills and concepts of engineering drawing

**Pre requisites**

**Course Outcomes**

| | |
|---|---|
| **CO1** | Significance of Layers. Create and assign properties to layers and modify layers |
| **CO2** | Importance and advantages of blocks. Use of standard blocks and user defined blocks |
| **CO3** | Need of solid modeling and various methods of solid modeling with different surfaces |
| **CO4** | Create and modify 3D drawings |

**Course Contents**

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

**Organize the information on layers**

Setting a current layer, layers color, line type, line weight, print style locking and unlocking of layers, the layer visibility and layer printing. Setting of current line type.The loading of additional line types, creating and naming of line type, editing of line type.

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

**Use the Blocks, Attributes and External references to manage the drawing blocks**

The purpose of a block, creating a block, inserting a block, redefining a block, exploding a block

**Attribute**

Editing attribute definitions, attaching attribute to blocks. Editing attributes attached to blocks, Extracting attributes information.

**UNIT -3** **Duration: 15 periods (T:2.5 + P:10hrs)**

**3.0 Viewing entities in three dimensions**

Setting a new viewing direction

Dynamically setting a view direction

**3.1 Creation of three-dimensional entities using different methods**

Drawing of two dimensional entities in three dimensional space.

Converting two dimensional planar entities into three dimensional entities by applying elevation and thickness.

Converting two dimensional planar entities into three dimensional entities by revolving or extruding.

Creation of three-dimensional faces, rectangular meshes, ruled surface meshes, extruded surface meshes, revolved surface meshes, three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions, extruded solids, revolved solids, composite solids, intersect solids.

**3.2 Editing in three dimensions**

Rotating in three dimensions, Array in three dimensions (Rectangular and polar).

Mirroring in three dimensions, aligning in three dimensions.

**3.3 Editing of three dimensional solids**

Sectioning and Slicing of solids, hiding, shading and rendering.

**3.4 Selection of material from library**

Enable the material library, editing materials and material library.

**UNIT- 4**

**Application of above three units**

**Recommended Books**

2. 4MCAD User Guide- IntelliCAD Technology Consortium

**Suggested learning outcomes**

**1.0 Organize the information on layers**

- **1.1** Explain the need and importance of Layers.
- **1.2** Practice creating new layer, naming the layer and assigning properties like Layer colour, Line type and line weight and setting the current layer
- **1.3** Practice the locking and unlocking of layers
- **1.4** Practice the Freezing and thawing of layers
- **1.5** Practice the layer visibility and layer printing
- **1.6** Practice the loading of additional line types

**2.0 Use the Blocks, Attributes and External references to manage the Drawing**

**2.1** Define a block
**2.2** Explain the purpose of a block
**2.3** Practice the creating a block
**2.4** Practice the inserting a block
**2.5** Practice the redefining a block
**2.6** Practice the exploding a block
**2.7** Define an Attribute
**2.8** Practice the editing attribute definitions
**2.9** Practice the attaching attribute to blocks
**2.10** Edit attributes attached to blocks
**2.11** Extract attributes information
**2.12** Define external reference
**2.13** Practice the Attaching, Removing, and Reloading of external references
**2.14** Practice the Binding, Clipping and changing the path of external references

**3.0 Understand the concepts of 3D**

View entities in three dimensions
**3.0.1** To set a new viewing direction
**3.0.2** To dynamically set a view direction

**3.1 Create three-dimensional entities using different methods**

**3.1.1** Draw two dimensional entities in three dimensional space.
**3.1.2** Convert two dimensional planar entities into three dimensional entities by applying elevation and thickness.
**3.1.3** Convert two dimensional planar entities into three dimensional entities by revolving or extruding.
**3.1.4** Create three-dimensional faces.
**3.1.5** Create rectangular meshes.
**3.1.6** Create ruled surface meshes.
**3.1.7** Create extruded surface meshes.
**3.1.8** Create revolved surface meshes.
**3.1.9** Create three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions.
**3.1.10** Create extruded solids.
**3.1.11** Create revolved solids.
**3.1.12** Create composite solids.
**3.1.13** Create intersect solids.

**3.2 Editing in three dimensions**

**3.2.1** Rotate in three dimensions
**3.2.2** Array in three dimensions (Rectangular and polar)
**3.2.3** Mirror in three dimensions
**3.2.4** Align in three dimensions

**3.3 Edit three dimensional solids**

**3.3.1** Practice Sectioning and Slicing solids
**3.3.2** Practice hiding, shading and rendering

**4 Practice applications on above units**

| Exercise | Key components |
|---|---|
| Layers | • Importance of layers<br>• Creation of new layers and controlling properties of layers |
| Working with blocks | • Create, insert and explode a block<br>• Attach attribute to blocks<br>• Edit and extract attributes attached to blocks |
| View entities in three dimensions | • Set a new viewing direction<br>• Set dynamically view direction |
| Create three-dimensional entities | • Create three-dimensional faces<br>• Create rectangular meshes, ruled surface meshes, extruded surface meshes, revolved surface meshes<br>• Create three dimensional entities such as boxes, Cylinders. |
| Edit in three dimensions | • Rotate in three dimensions<br>• Array in three dimensions (Rectangular and polar)<br>• Mirror in three dimensions<br>• Align in three dimensions |
| Edit three dimensional solids | • Practice Sectioning and Slicing solids<br>• Practice hiding, shading and rendering |
| Practice the selection of material from library | • Enable material library<br>• Edit materials and material library |

| Course Outcome | | Cognizant Level | Linked PO | Teaching Hours |
|---|---|---|---|---|
| **CO1** | Significance of Layers. Create and assign properties to layers and modify layers | U/A | 1,2,3,9,10 | 15 |
| **CO2** | Importance and advantages of blocks. Use of standard blocks and user defined blocks | U/A | 1,2,3,9,10 | 9 |
| **CO3** | Need of solid modeling and various methods of solid modeling with different surfaces | U/A | 1,2,3,9,10 | 6 |
| **CO4** | Create and modify 3D drawings | A | 1,2,3,10 | 15 |

# SEMICONDUCTOR DEVICES LAB PRACTICE

| | | | |
|---|---|---|---|
| Course Title : | **Semiconductor devices Lab Practice** | Course Code | 18**EC-208P** |
| Semester | **II** | Course Group | **Core** |
| Teaching Scheme in Periods(L:T:P) | **7.5:00:37.5** | Credits | **1.5** |
| Methodology | **Lecture + Practicals** | Total Contact Hours : | **45 Pds** |
| CIE | **60 Marks** | SEE | **40 Marks** |

**Pre requisites**

This course requires the basic skills of Handling Basic Electronics tools and Components, knowledge of connecting cables and meters

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

| Unit No | Unit name | Periods | Marks for SEE | | | Marks weightage | %Weightage |
|---|---|---|---|---|---|---|---|
| | | | Handling | Manipulation | Precision | | |
| **1** | Semiconductor Diodes | **15** | **4** | **2** | **6** | **12** | **30** |
| **2** | Power supplies | **15** | **4** | **2** | **6** | **12** | **30** |
| **3** | Transistors and FET | **15** | **2** | **4** | **10** | **16** | **40** |
| | Total | **45** | **10** | **8** | **22** | **40** | **100** |

**Course Contents**

**Semiconductor Diodes and Rectifiers**

1. Draw the forward & reverse characteristics of Silicon diode
   i) a) Determine Knee voltage, b) Identify Cutoff, and Linear regions
   ii) Test the diode with DMM & Analogue multimeter and identify the Terminals
   iii) Connect a 6V lamp in series with diode and observe the behaviour a) under forward and Reverse biased conditions. b) On low voltage AC supply
   iv) Observe the effect of temperature on diode reverse current by heating the diode with a soldering Iron
2. Draw the forward & reverse characteristics of Zener diode and determine Breakdown Voltage
   i) Test the Zener diode with DMM & Analogue multimeter and identify the Terminals
   ii) Produce different reference voltages by using a 12V Zener diode and Resistance ladder network
   iii) Produce higher reference voltage by connecting twoZener diodes in series
3. Implement Rectifier circuits using Diodes and observe the effect of Filtering
   a) Implement Half wave rectifier with and without filter
   b) Implement Full wave rectifier with and without filter
4. Implement Bridge rectifier with and without filter

a) Implement Voltage Doubler circuit

b) Connect a diode IN4007 in series with a 60W 230V Lamp and test it.(Record your observations)

5. Build a Regulated power supply and draw the regulation characteristics

a. i) using Zener diode ii) using 3 Terminal +ve Regulator

b. i) implement a –ve 3 Terminal Regula r ii) Implement a Dual regulated power supply using both +ve and –ve 3 terminal regulators

6. Build an adjustable +ve Regulated power supply using LM 317 and Test

II. Transistors & Field Effect transistors

7. Draw Input and output characteristics of NPN Transistor and determine Beta of the transistor

a) Plot Input & Output characteristics for CB configuration

b) Plot Input & Output characteristics for CE configuration

c) Test the Transistor with DMM & Analogue multimeter and identify the Terminals and Type of transistor and find the β

8. Use Transistor as a Switch

a) Turn on and turn off a relay using Transistor ( BC148 as a switch.)

b) Connect a 6v lamp in series with BD139 and observe the effect of base current variation on lamp brightness .

9. Draw the input and output characteristics of JFET and determine pinchoff voltage and transconductance.

a) Test the JFET with DMM &Analogue multimeter and identify the Terminals

10. Use JFET as a current source

a) Implement a constant current source with a FET by applying appropriate gate bias

b) Practically Verify High input impedance characteristic of the gate circuit.

**Suggested Student Activities**

(i) Collection of catalogues and specification sheets, preparation of a chart displaying symbols of passive components and connectors/cables.

(ii) Collection of the contributors (scientists) and contribution details to the field of Electrical and Electronics engineering

(iii) Any other such activities that can contribute to the student's knowledge in respect of this course.

(iv)Record the best practices used in the disposal of E-waste and precautions in the operation of electrical appliances.

| Course Outcome | | Linked PO |
|---|---|---|
| CO1 | Identify the significance of Semiconductor Devices in Circuit Building Blocks | 1,2,3,4,5,6,7,8 |
| CO2 | Identify Different Diodes,Transistors and Use them to Design Power Supplies for Desired Ratings | 1,2,3,4 |
| CO3 | Apply the Combination of Diodes and Transistors for Amplifier Applications | 1,2,3 |
| CO4 | Design simple circuit using Electronic Semiconductor Devices | 1,2,3,10 |

**E Learning Resources**

1.http://electrical4u.com/
2. www.electronics-tutorials.ws
3. www.nptel.ac.in

# State Board of Technical Education and Training,Telangana
## Semester End Examination<u>Model</u> Question paper
**<u>DECE II semester practical Examination</u>**

**Corse Code:18EC-208P** **Duration:3 hours**
**Course Name: Semiconductor Devices Lab Practice** **Max.Marks:40**

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***<u>Instructions to the Candidate:</u>***
***(i)Answer any <u>One</u> of the following Questions.***
***(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment***
***(iii) Draw the circuit diagram for illustration ,choose appropriate values when not mentioned in the question***

1.Obtain the forward & reverse characteristics of Silicon diode
   i) a) Determine Knee voltage, b) Identify Cutoff, and Linear regions
   ii) Test the diode with DMM & Analogue multimeter and identify the Terminals
2. Connect a 6V lamp in series with diode and observe the behaviour a) under forward and Reverse biased conditions. b) On low voltage AC supply c) Observe the effect of temperature on diode reverse current by heating the diode with a soldering Iron
3. Obtain the forward & reverse characteristics of Zener diode and determine Breakdown Voltage
4. i) Test the Zener diode with DMM & Analogue multimeter and identify the Terminals
   ii) Produce different reference voltages by using a 12V Zener diode and Resistance ladder network
   iii) Produce higher reference voltage by connecting twoZener diodes in series
5. Implement Half wave Rectifier circuits using Diodes and observe the effect with and without filter
6 Implement Fullwave Rectifier circuits using Diodes and observe the effect with and without filter
7. Implement Bridge rectifier and observe the effect with and without filter
8.(a) Construct a Voltage Doubler circuit
   b) Connect a diode IN4007 in series with a 60W 230V Lamp and test it.(Record your observations)
9. Build a Regulated power supply and draw the regulation characteristics
   a. i) using Zener diode ii) using 3 Terminal +ve Regulator
   b. i) implement a –ve 3 Terminal Regula r ii) Implement a Dual regulated power supply using both +ve and –ve 3 terminal regulators
10. Build an adjustable +ve Regulated power supply using LM 317 and Test

II. Transistors & Field Effect transistors

11. (i)Plot the Input and output characteristics of the given NPN Transistor in CE configuration and determine Beta of the transistor (ii)Test the Transistor with DMM & Analogue multimeter and identify the Terminals and Type of transistor and find the β
12. Plot Input & Output characteristics of the given NPN Transistor in CB configuration
13. Use Transistor as a Switch
   a) Turn on and turn off a relay using Transistor ( BC148 as a switch.)
   b) Connect a 6v lamp in series with BD139 and observe the effect of base current variation on lamp brightness .
14. Draw the input and output characteristics of JFET and determine pinchoff voltage and transconductance.
   a) Test the JFET with DMM &Analogue multimeter and identify the Terminals
   15. Use JFET as a current source a) Implement a constant current source with a FET by applying

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

| | | | |
|---|---|---|---|
| **Course Title** | **Applied Science Lab Practice (Physics Lab)** | **Course Code** | **18EC-209P(A)** |
| **Semester** | **II** | **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: Determine the Focal length and focal power of convex lenses using U-V and graphical method.
2: Determine the value of acceleration due to gravity using Simple Pendulum and verify with L-$T^2$graph.
3: Determine the velocity of sound in air at room temperature .
4: Determine the refractive index of a solid using travelling microscope.
5: Practice the mapping of magnetic lines of force-locating neutral points.

## References:


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


## PHYSICS PRACTICALS

### List of experiments

Semester II

1. Convex lens-Determination of Focal length and focal power using U-V and graphical method.

2: Simple Pendulum-Determination of the value of acceleration due to gravity and verify with L-$T^2$graph.
3: Resonance apparatus-Determination of velocity of sound in air at room temperature .
4: Travelling microscope-Determination of refractive index of a solid.
5: Practice the mapping of magnetic lines of force-location of neutral points

**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 | Focal length and Focal power of convex lens (Separate & Combination) | U/A | | 1,2,3,8,9 | L:P::1:2 |
| CO 2 | Acceleration due to gravity using simple pendulum | U/A | | 1,2,3,8,9 | L:P::1:2 |
| CO 3 | Velocity of sound in air – (Resonance method) | U/A | | 1,2,3,8,9 | L:P::1:2 |
| CO 4 | Refractive index of solid using traveling microscope | U/A | | 1,2,3,8,9 | L:P::1:2 |
| CO 5 | Mapping of magnet lines of force-locating neutral points | 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 (No of Periods) | Competencies | Key competencies |
|---|---|---|

| | | |
|---|---|---|
| 1. Focal length and Focal power of convex lens (Separate & Combination) | • Fix the object distance<br>• Find the Image distance<br>• Calculate the focal length and power of convex lens and combination of convex lenses | • Calculate the focal length and power of convex lens<br>• Draw u-v and 1/u – 1/v graph |
| 2. Simple pendulum – acceleration due to gravity – length of seconds pendulum | • Fix the simple pendulum to the stand<br>• Adjust the length of pendulum<br>• Find the time for number of oscillations<br>• Find the time period<br>• Calculate the acceleration due to gravity<br>• Draw l-T and l-$T^2$ graph | • Find the time for number of oscillations<br>• Find the time period<br>• Calculate the acceleration due to gravity<br>• Draw l-T and l-$T^2$ graph |
| 3. Velocity of sound in air –Resonance method | • Arrange the resonance apparatus<br>• Adjust the reservoir level for booming sound<br>• Find the first and second resonanting lengths<br>• Calculate velocity of sound | • Adjust the reservoir level<br>• Find the first and second resonanting lengths<br>• Calculate velocity of sound<br>• Calculate velocity of sound at $0^0$ C |
| 4. Refractive index of solid using traveling microscope | • Find the least count of vernier on microscope<br>• Place the graph paper below microscope<br>• Read the scale<br>• Calculate the refractive index of glass slab | • Read the scale<br>• Calculate the refractive index of glass slab |
| 5. Mapping of magnet lines of Force – neutral points | • Draw magnetic meridian<br>• Place the bar magnet in NN(North pole of bar magnet pointing North) and NS (South pole of bar magnet pointing North) directions<br>• Draw magnetic lines of force<br>• Locate the neutral points along equatorial and axial lines | • Draw magnetic lines of force<br>• Locate the neutral points along equatorial and axial lines |

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

| | |
|---|---|
| Course Title: **Applied Science Lab Practice (Chemistry Lab)** | Course Code: **18 EC-209(B)** |
| Semester: **II** | 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 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 Periods** |
|---|---|---|---|---|
| **CO1** | Estimate the amount of the mohr's salt in the given solution | **U/A** | 1,2,3,8 | L:P ::1:2 |
| **CO2** | Determination of acidity , alkalinity and pH of given water samples/ solutions. | **U/A** | 1,2,3,8 | L:P ::3:6 |
| **CO3** | Estimate the amount of the chlorides in the given solution. | **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. Estimation of Mohr's salt by using 0.02M potassium permanganate solution.
2. Determination of acidity of water sample by using 0.02N NaOH solution.
3. Determination of alkalinity of water sample by using 0.02N $H_2SO_4$ solution.
4. Estimate the chloride content present in water sample by using 0.0141N $AgNO_3$ solution.
5. Find out the pH of the given solution by using pH meter.

**Suggested Learning Outcomes**

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

1. Estimate Mohr's salt by using standard potassium permanganate solution.
2. Determine the partial and total acidity of water sample by using 0.02N NaOH solution.
3. Determine the partial and total alkalinity of water sample by using 0.02N $H_2SO_4$ solution.
4. Estimate the chloride content present in water sample by using 0.0141N $AgNO_3$ solution.
5. Find out the pH of the given solution by using pH meter.

**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 |

# INFORMATION TECHNOLOGY LAB PRACTICE

| | |
|---|---|
| Course Title : **INFORMATION TECHNOLOGY LAB PRACTICE**<br>Semester : **II**<br>Teaching Scheme in Hrs (L:T:P) : **0:1:2**<br>Type of course **: Tutorial + Practical**<br>CIE : **60 Marks** | Course Code : **18EC-210P**<br>Course Group : **Core**<br>Credits : **3**<br>Total Contact Hours : **37.5Hrs/45Pds**<br>SEE : **40 Marks** |

**Prerequisites**
Knowledge of Computer basics and DOS

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

| Course Outcome | | CL | Linked PO | Practical hrs |
|---|---|---|---|---|
| **CO1** | Demonstrate skills using spreadsheet software | **A** | **1,2,3,4,8,9,10** | **15** |
| **CO2** | Demonstrate skills using presentation software | **A** | **1,2,3,4,8,9,10** | **15** |
| **CO3** | Demonstrate skills using database software | **A** | **1,2,3,4,8,9,10** | **15** |
| | | **Total Sessions** | | **45** |

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

**Course Content**

## Spread Sheet

1. Open MS-Excel and identify the components on the screen
2. Create a Worksheet in MS-Excel and save it in .xls or .xlsx format
3. Inserting column and row in Excel
4. Creation of new worksheet in the existing Excel Book file
5. Generate a Chart using the data in Excel-worksheet
6. Automate calculations in a worksheet using formula
7. Sort and filter data in a worksheet
8. Protecting a worksheet, working with multiple sheets
9.

## Presentation Software

10. Create a simple Power point presentation for a small topic and saving in .ppt or pptx format
11. Inserting a new slide in the existing PowerPoint file
12. Inserting chart or image in a PowerPoint slide
13. Exercise with animation and sound features in PowerPoint
14. Exercise with Rehearse Timings feature in PowerPoint
15. Exercise in printing the PowerPoint file in (a) Slides (b) Handouts

**Database Management System**

16. Create a table for given data and save in .mdb or .accdb format
17. Add, Delete and rename fields
18. Use the Primary key field
19. Enter and edit data
20. Use Relationships option
21. Create forms
22. Modify and save forms
23. Create and use queries
24. Sort data
25. Display data

26. Create and print reports

**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/

**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 | Practical Sessions |
|---|---|---|---|---|---|
| **CO1** | Demonstrate skills using spreadsheet software | **1,2,3,4,5,6,7,8** | **1,2,3,4,8,9,10** | **A** | **15** |
| **CO2** | Demonstrate skills using presentation software | **9,10,11,12,13,14** | **1,2,3,4,8,9,10** | **A** | **15** |
| **CO3** | Demonstrate skills using database software | **15,16,17,18,19,20,21, 22,23,24,25** | **1,2,3,4,8,9,10** | **A** | **15** |

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

**Course-PO Attainment Matrix**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

**Course Delivery**

The course will be delivered through tutorial of one hour and one & half hours of hands on practice per week.

**Suggested Student Activities:**

1. Create a spreadsheet for the class
2. Create power point presentation for a course
3. Create a database for the class

**Format for Student Activity Assessment**

**Internal Assesment**

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

**Model Question Bank**

| Course Title: **IT LAB PRACTICE** | Course Code: **18EC210P** |
|---|---|

1. Using Spreadsheet Application, create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.
2. You have a monthly income of Rs.10000. Your monthly expenditures are Rent- Rs 3000, Food- Rs. 1500, Electricity- Rs.100, Phone- Rs. 150, and Cable TV-Rs. 200. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month). Use Spreadsheet Application.
3. Using Spreadsheet Application, create a worksheet containing the pay details (containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF, PT, Insurance, Gross and Net salary) of the employees using formulas.
4. Using Spreadsheet Application, create a Simple Bar Chart to highlight the results of your institute for three years.
5. Using Spreadsheet Application, create a Pie Chart for a sample data and give legends.
6. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.
7. Create a presentation about a book containing Title, Author, Publisher and Contents.
8. Create an automated (timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool