|  |
| --- |
| **DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING**  **IV SEMESTER** |

**DEEE IV SEMESTER**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sl  No | Course  Code | Course Name | **Teaching Scheme** | | | | | **Examination Scheme** | | | | | | | |
| Instruction  Periods per week | | | Total  Periods per semester | Credits | **Continuous internal**  **evaluation** | | | **Semester end examination** | | | | |
| L | T | P |  |  | Mid  sem1 | Mid  sem  2 | Internal  evaluation | Max Marks | Min Marks | | Total  marks | Min marks for passing including internals |
|  |
| 1 | 18EE-401F | Advanced Engineering Mathematics | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | | 14 | 100 | 35 |
| 2 | 18EE- 402C | Electrical Power Systems | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | | 14 | 100 | 35 |
| 3 | 18EE- 403C | AC Machines | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | | 14 | 100 | 35 |
| 4 | 18EE- 404C | General Mechanical Engineering | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | | 14 | 100 | 35 |
| 5 | 18EE- 405C | Digital Electronics | 3 | 1 | 0 | 60 | 3 | 20 | 20 | 20 | 40 | | 14 | 100 | 35 |
| 6 | 18EE-406P | Electrical Engineering Drawing Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | | 20 | 100 | 50 |
| 7 | 18EE- 407P | AC Machines Lab Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | | 20 | 100 | 50 |
| 8 | 18EE- 408P | Electrical CAD Lab Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | | 20 | 100 | 50 |
| 9 | 18EE- 409P | Digital Electronics Lab Practice | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | | 20 | 100 | 50 |
| 10 | 18EE—410P | Advanced Communication Skills and Life Skills | 1 | 0 | 2 | 45 | 1.5 | 20 | 20 | 20 | 40 | | 20 | 100 | 50 |
| 11 |  | Skill Upgradation | 0 | 0 | 7 | 105 | 2.5 | 0 | 0 | **Rubrics** | | |  | -- | - |
|  |  |  | 20 | 5 | 17 | 630 | **25** | 200 | 200 | 200 | 400 | | 170 | 1000 | 425 |
|  | Activities: student performance is to be assessed through Rubrics | | | | | | | | | | | | | | |

**ADVANCED ENGINEERING MATHEMATICS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Course Title** | **: Advanced Engineering**  **Mathematics**  **Traction**  **Mathematics** | | **Course Code** | | **: 18EE-401F** | |
| **Semester** | **: IV** | | **Course Group** | | **: Foundation** | |
| **Teaching Scheme in periods ( L : T :P) :** | | **: 45 : 15 : 0** | | **Credits** | | **: 3** | |
| **Methodology** | **: Lecture + Tutorial** | | **Total Contact Periods** | | **: 60** | |
| **CIE**  **(Continuous Internal Evaluation)** | **: 60 Marks** | | **SEE : 40 Marks**  **(Semester End Examination)**  **: 40 Marks** | | | |

**Pre requisites:**

This course requires the knowledge of Engineering Mathematics at Diploma first year level and Applied Engineering Mathematics at Diploma 3rd Semester level.

**Course Outcomes:**

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

|  |  |
| --- | --- |
| CO 1 | Solve simple Homogeneous Linear Differential Equations |
| CO 2 | Solve simple Non-Homogeneous Linear Differential Equations |
| CO 3 | Express f(x) as a Fourier series in the given interval |
| CO 4 | Express f(x) as a Fourier Half-Range Cosine series and Sine series |
| CO 5 | Find Laplace transforms of simple functions |
| CO 6 | Find Inverse Laplace transforms of simple functions and solve Linear Differential Equations using Laplace Transformations. |

**Course Contents:**

**Unit – I Duration: 05 Periods (L:3.75 – T:1.25)**

**Homogeneous Linear Differential equations with constant coefficients**

Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.

**Unit – II Duration: 15 Periods (L:11.25 – T:3.75)**

**Non-Homogeneous Linear Differential equations with constant coefficients**

Non-homogenous linear differential equations with constant coefficients of the form f(D)y = X, where X is in the form k(a constant ) ,eax, sin ax, cos ax, xn, (n= 1,2,3) Complimentary Function (CF), Particular Integral (PI) and General Solution (GS).

**Unit-III Duration: 10 Periods (L: 7.5 – T: 2.5)**

**Fourier series**

Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval, Euler’s formulae, sufficient conditions for existence of Fourier series for a function. Even, Odd functions and Fourier series over the Interval (0,2) and (-)

**Unit – IV Duration: 05 Periods (L:3.75 – T:1.25)**

**Fourier Half-range series**

Representation of a function as Fourier Half-range Sine series and Cosine series over the interval (0, π)

**Unit – V Duration: 10Periods (L: 7.5 – T:2.5)**

**Laplace Transformations:**

Definition, sufficient conditions for existence of Laplace Transform, Laplace Transform of elementary functions, linearity property, Change of scale property, First shifting theorem , multiplication by tn, division by t, Laplace Transform of derivatives and integrals, unit step function, Laplace Transform of second shifting theorem

**Unit – VI Duration: 15 Periods (L:11.25 – T:3.75)**

**Inverse Laplace transforms:**

Inverse Laplace transforms- shifting theorems and change of scale property, multiplication by sn and division by s –Inverse Laplace Transform using partial fractions – convolution theorem (no proof) – application of Laplace Transformations to solve ordinary differential equations of second order with initial conditions.

**Recommended Books:**

1. Higher Engineering Mathematics, B.S.Grewal .
2. Laplace Transforms - Murray R. Spigel .
3. Ordinary Differential Equations – R. S. Aggarwal.
4. Fourier Series – A.R. Vasishtha and Gupta.

**Suggested E-Learning references:**

1. [www.freebookcentre.net/mathematics/introductory-mathematics-books.html](http://www.freebookcentre.net/mathematics/introductory-mathematics-books.html)

2. E-books:www.mathebook.net

**Suggested Learning Outcomes**

**Unit-I**

1. **Solve Homogeneous linear differential equations with constant coefficients in engineering situations**

1.1 Solve Differential equations of the type (aD2 +bD + c)y = 0 when the roots of the auxiliary equation are real and different, real and repeated, complex.

1.2 Solve the higher order homogeneous Lineardifferential equations with constant coefficients.

**Unit-II**

1. **Solve Non Homogeneous linear differential equations with constant coefficients in engineering situations**

2.1 Explain the concept of complementary function, particular Integral and general solution of a differential equation.

2.2 Solve nth order differential equation of the type *f(D) y = X* where *f(D)* is a polynomial of second order and *X* is a function of the form k*, eax ,Sinax, Cosax, xn.*

2.3 Solve simple problems on the above types of 2.2

**Unit-III**

**3.0 Understand the Fourier series expansion of functions**

3.1 Define the orthogonality of functions in an interval.

3.2 Define Fourier series of a function in the interval (C, C+and write the Euler’s formulae for determining the Fourier coefficients.

3.3 Write sufficient conditions for the existence of Fourier series for a function.

3.4 Write Fourier series of simple functions in the range (0, and (-.

3.5 Write Fourier series for even and odd functions in the interval (-

3.6 Solve simple problems on even and odd functions in the interval. (0,2(-

**Unit- IV**

**4.0 Understand the Half – Range Fourier series expansion of functions**

4.1 Write Half – Range Cosine series of a function in the range.

4.2 Write Half – Range Sine series of a function in the range.

4.3 Solve simple problems on Half – Range Cosine and Sine series over the interval

**Unit-V**

**5.0 Understand Laplace transforms**

5.1 Write the definition of Laplace Transform and Laplace transform of standard functions.

5.2 Explain the sufficient conditions of existence of Laplace Transform.

5.3 Write the properties of Laplace Transform – Linearity property, First shifting theorem,

Change of Scale property.

5.4 Solve simple problems using the above properties.

5.5 Write formulae for Laplace transform of , , , in terms of Laplace transform of. f (t)

5.6 Solve simple problems using the above formulae.

5.7 Define unit step function and write the Laplace Transform of unit step function.

5.8 Write Second shifting theorem.

**Unit-VI**

**6.0 Use Laplace transforms and Inverse Laplace transforms to solve differential**

**equation in engineering problems**

6.1Define inverse Laplace Transform and write inverse Laplace Transforms of standard functions.

6.2 Solve simple problems on Inverse Laplace Transforms.

6.2 Write Shifting theorems and Change of scale property of inverse Laplace Transform.

6.3 Solve simple problems on 6.2

6.4Write inverse Laplace Transforms corresponding to Laplace Transform of the functions

6.5 Solve simple problems on 6.4

6.6Define convolution of two functions and state convolution theorem.

6.7Solve simple problems on Convolution theorem.

6.8Use Laplace and inverse Laplace Transforms to solve simple differential equations of

Second order.

**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.

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | 3 | 2 | 2 | 1 |  |  | 1 |  |  | 3 | 1,2,3,4,7,10 |
| CO2 | 3 | 2 | 2 | 1 |  |  | 1 |  |  | 3 | 1,2,3,4,7,10 |
| CO3 | 3 | 2 | 2 | 1 |  |  | 1 |  |  | 3 | 1,2,3,4,7,10 |
| CO4 | 3 | 2 | 2 | 1 |  |  | 1 |  |  | 3 | 1,2,3,4,7,10 |
| CO5 | 3 | 2 | 2 | 1 |  |  | 1 |  |  | 3 | 1,2,3,4,7,10 |
| CO6 | 3 | 2 | 2 | 1 |  |  | 1 |  |  | 3 | 1,2,3,4,7,10 |

|  |
| --- |
| **Internal Evaluation** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 4 | 1 | Nil | 4 Marks |
| 02 | Part-B | Understanding(U) | 4 | 3 | 2 | 6 Marks |
| 03 | Part-C | Application(A) | 4 | 5 | 2 | 10 Marks |
| Total Marks | | | | | | 20 Marks |

|  |  |  |
| --- | --- | --- |
| Test | Units | Marks |
| Mid Sem 1 | 1 and 2 | 20 |
| Mid Sem 2 | 3 and 4 | 20 |
| Slip Test 1 | 1 and 2 | 5 |
| Slip Test 2 | 3 and 4 | 5 |
| Assignments | - | 5 |
| Seminars | - | 5 |
|  | Total | 60 |

**QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS**

**MID SEM-I EXAM**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A | Remarks |
| 1 | Unit-I | 1,2 | 5(a) | 7(a) |  |
| 5(b) | 7(b) |  |
| 2 | Unit-II | 3,4 | 6(a) | 8(a) |  |
| 6(b) | 8(b) |  |
| Total Questions |  | 4 | 4 | 4 |  |

**MID SEM-II EXAM**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A | Remarks |
| 1 | Unit-III | 1,2 | 5(a) | 7(a) |  |
| 5(b) | 7(b) |  |
| 2 | Unit-IV | 3,4 | 6(a) | 8(a) |  |
| 6(b) | 8(b) |  |
| Total Questions |  | 4 | 4 | 4 |  |

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1page and 2 pages respectively

**QUESTION PAPER PATTERN FOR SEMESTER END EXAM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 8 | 1 | Nil | 8 Marks |
| 02 | Part-B | Understanding(U) | 8 | 3 | 4 | 12 Marks |
| 03 | Part-C | Application(A) | 8 | 5 | 4 | 20 Marks |
| Total Marks | | | | | | 40 Marks |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit No | Questions to be set for SEE | | | | |
| R | | | U | A |
| I | Q4 | Q1 | | Q9(a) | Q13(a) |
| II |
| III | Q2 | | Q10(a) | Q14(a) |
| IV |
| V | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q13(b), Q15(a), Q15(b) |
| VI | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q14(b), Q16(a), Q16(b) |
| Total Questions | 8 | | | 8 | 8 |

**Code: 18EE-401F**

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA**

**BOARD DIPLOMA EXAMINATIONS**

**MID SEM –I, MODEL PAPER, IV SEMESTER**

**ADVANCED ENGINEERING MATHEMATICS**

**TIME: 1: 00 Hour Max. Marks: 20**

**PART-A**

Instructions: 1. Answer **ALL** questions 04 X 01 = 04

2. Each question carries **ONE** mark

1. Write the General solution of (aD2+bD+c)y = 0, whose roots of auxiliary equation are real and distinct.

2. Find the roots of auxiliary equation of the differential equation (

1. Find the Particular Integral of
2. Find the P.I of

**PART-B**

Instructions: 1. Answer any **TWO** questions 02 X 03 = 06

2. Each question carries **THREE** marks

5 a) Solve (D2 + 3D – 54)y = 0

Or

5 b) Solve (D2 +16)y = 0

6 a) Solve =

Or

6 b) Find P.I of = sin2x

**PART C**

Instructions: 1. Answer **ALL** questions 02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Solve (D3 – 2D2 – 4D + 8) y = 0

Or

7 b) Solve (D3 – D2 – D +1)y = 0

8 a) Solve =

Or

8 b) Solve =

**Code: 18EE-401F**

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA**

**BOARD DIPLOMA EXAMINATIONS**

**MID SEM –II, MODEL PAPER, IV SEMESTER**

**ADVANCED ENGINEERING MATHEMATICS**

**TIME: 1: 00 Hours Max. Marks: 20 PART-A**

Instructions: 1. Answer **ALL** questions 04 X 01 = 04

2. Each question carries **ONE** mark

* 1. Define periodic function and give one example
  2. Define Fourier series of the function f(x) in the interval (0, 2)
  3. Write Half-range sine series of f(x) in the interval (0,
  4. Find for f(x) = in 0

**PART-B**

Instructions: 1. Answer any **TWO** questions 02 X 03 = 06

2. Each question carries **THREE** marks

5 a) If f(x) = in (0, 2, then find the value of an in Fourier series of f(x)

Or

5 b) If f(x) = in (-, then find the value of a1 in Fourier series of f(x)

6 a).Find the value of an in half-range Cosine series for the function f(x) = exin (0,

Or

6 b) Obtain the Fourier Half – Range Sine series for f(x) =(

**PART C**

Instructions: 1. Answer any **TWO** questions 02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Obtain the Fourier series for f(x) = x in the interval 0

Or

7 b) Find the Fourier series for f(x) =( in the interval (-. Hence show that

- +- + ……….+ =

8 a) Express f(x) = πx – x2 as a half-range Sine series in (0,

Or

8 b) Find the half –range cosine series for the function f(x) = in the interval (0,

**18EE-401F**

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

**SEMESTER END EXAM MODEL PAPER**

**IV SEMESTER EXAMINATION**

**ADVANCED ENGINEERING MATHEMATICS**

**Time: 2 hours [Total Marks: 40]**

**PART-A**

Instructions: 1. Answer **ALL** questions 08 X 01 = 08

2. Each question carries **ONE** mark

1. Find the roots of auxiliary equation of the differential equation
2. Define Fourier Series for the function f(x) in the interval ( c, c+2
3. Find the Particular Integral of
4. Find
5. Find
6. State the First Shifting theorem of Laplace Transforms.
7. Find
8. Find

**PART-B**

Instructions: 1. Answer any **FOUR** questions 04 X 03 = 12

2. Each question carries **THREE** marks

9a) Solve (D2+D + 1) y = 4e3x

Or

1. b) Find
2. a) Find Half Range Sine Series of f(x) = x in

Or

10 b) Find

1. a) If L{f(t)} = , find L{f(3t)}

Or

1. b) Find using Laplace Transform Technique
2. a) Show that =

or

12 b) Find

**PART C**

Instructions: 1. Answer any **FOUR** questions 04 X 05 = 20

2. Each question carries **FIVE** marks

13 a) Solve:(D2 + D -2) y = x + sinx

Or

1. b) Find L
2. a) Expand f(x) = x2 as a Fourier series in the interval 

Or

14 b) Find

15 a) Find

Or

15 b) Evaluate 

16 a) Find using Convolution theorem .

Or

16 b) Solve the differential equation y’’– 2y’– 8y = Sint , when y (0) = 3, y’ (0) = 6 by

Laplace Transform method.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**ELECTRICAL POWER SYSTEMS**

|  |  |
| --- | --- |
| **Course Title : Electrical Power Systems Semester : IV**  **Teaching Scheme in Periods : 45:15:0**  **(L:T:P)**  **Methodology : Lecture + Tutorial**  **CIE : 60 Marks**  **(Continuous Internal Evaluation)** | **Course Code : 18EE-402C**  **Course Group : Core**  **Credits : 3**  **Total Contact Periods :60**  **SEE : 40 Marks**  **(Semester End Examination)** |

**Pre requisites**

This course requires the knowledge of

1. Basic principle and working of generator, transformers
2. Voltage and current calculations in the circuits using KCL,KVL

**Course Outcomes**

|  |  |
| --- | --- |
| CO1 : | Differentiate various Energy sources & thermal power station |
| CO2 : | Describe the construction and working of Hydroelectric power station and Nuclear Power station |
| CO3 : | Describe various types of Transmission Systems. |
| CO4 : | Evaluate the performance of transmission lines |
| CO5 : | Describe Electrical and Mechanical aspects of Transmission and Distribution lines |
| CO6 : | Evaluate various aspects in Distribution systems. |

**Blue Print of Marks for SEE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit No** | **Unit Name** | **Periods** | **Questions to be set for SEE** | | | | |
| **R** | | | **U** | **A** |
| 1 | Sources of Energy &Thermal Power Station | 10 | Q4 | Q1 | | Q9(a) | Q13(a) |
| 2 | Hydro Electric  Power Station &Nuclear Power Station | 10 |
| 3 | AC & DC Transmission systems | 10 | Q2 | | Q10(a) | Q14(a) |
| 4 | Performance of the transmission lines | 10 |
| 5 | Line structures for  Transmission and Distribution | 10 | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q13(b), Q15(a), Q15(b) |
| 6 | Distribution systems | 10 | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q14(b), Q16(a), Q16(b) |
| **Total** | | 60 | 8 | | | 8 | 8 |

**Course Content**

**UNIT 1 - Sources of Energy &Thermal Power Station Duration: 10 Periods (L:7.5– T:2.5)**

Different sources of energy - Need for Non-Conventional Energy based power generation – Methods of generation of energy from different sources of power- Merits and Limitations of Conventional and Non-conventional sources - Thermal Power Station - pulverization, Condensation – Types of cooling towers.

**UNIT 2– Hydro Electric Power Station &Nuclear PowerStation**

**Duration:10 Periods (L:7.5– T:2.5)**

Hydro Electric Power Station - Factors for site selection and limitations in location –Hydrograph - Classification of hydroelectric power - Layout diagram of various Hydro Power Stations –Nuclear energy, fission and fusion reactions - Merits in using nuclear energy. Nuclear fuels - Working of moderator type nuclear power station with a block diagram - Materials used for coolant, reflector and control rods.

**UNIT 3 –AC and DC Transmission systems Duration: 10 Periods(L:7.5 – T:2.5)**

Transmission Lines- classification of Transmission systems - Relative advantages of AC & DC Transmission - Basic Concept of High voltage DC Transmission - Types of HVDC transmission- Advantages and disadvantages of HVDC transmission - Types of conductors – Current distortion effects.

**UNIT 4 - Performance of the transmission lines Duration: 10Periods (L:7.5 – T:2.5)**

Transmission line parameters – Expressions for Inductance of transmission system –Problems on computing Inductance - Expression for capacitance of a transmission system-Problems on computing capacitance –Classify transmission lines - Regulation of short transmission lines – Percentage regulation – Problems on computing Percentage regulation – Ferranti Effect – Corona.

**UNIT 5 - Line structures for Transmission and Distribution Duration: 10Periods (L:7.5 – T:2.5)**

Components of Overhead lines – factors affecting conductors spacing and ground clearance - Sag-derivation- Factors affecting sag, Problems on calculating sag - Disadvantages of loose span – Insulators - Requirements of insulators - Types of Insulators – Advantages of Polymer insulators - Voltage distribution across string of suspension Insulators- string efficiency- Problems on string efficiency - Methods of improving string efficiency.

**UNIT 6 – Distribution Systems Duration:10Periods (L:7.5 – T:2.5)**

Definition of substation-need of substation- classification of sub-stations - Relative merits of indoor and outdoor sub-stations –Purpose of various equipment in sub-stations - Classification of Distribution systems - Steps in voltage drop calculation – problems – Micro Grid - Concept of smart GRID

**Recommended Books**

1. S.L.Uppal-Electrical Power
2. Soni,Guptha,Bhatnagar-Electrical Power Systems - DhanpatRai& Sons
3. A.T.Starr -Generation, Transmission and Utilisation
4. C.L.Wadhwa -Electrical Power Systems - New age international(P) limited
5. NEDCAP -Non Conventional Energy Guide Lines
6. J B Guptha -Electrical power plants
7. G.D. Roy Non conventional energy sources
8. CL Wadhwa -Electrical power Systems - New Age International(P) limited.
9. KR Padiyar - HVDC Power Transmission system Technology
10. S.N. Singh -Electrical Power generation, transmission and distribution.

**Suggested E-Learning references**

1. http://electrical4u.com/

2. [www.nptel.ac.in](http://www.nptel.ac.in)

3. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/>

**Suggested Learning Outcomes**

**After completion of the subject, the student shall be able to**

1. List different sources of energy
2. Classify the sources of energy into conventional and non-conventional types.
3. State the necessity of developing non-conventional methods of power generation.
4. State the relative merits and limitations of Conventional and Non-Conventional types

of sources.

1. State the method of generating electrical energy from Solar Power
2. State the method of generating electrical energy from Tidal Power
3. State the method of generating electrical energy from Wind power
4. State the method of generating electrical energy from Biomass
5. State the method of generating electrical energy from Geo Thermal Power
6. State the working principle of thermal power stations.
7. List the requirements for setting up of Thermal Power Station.
8. Draw the detailed line diagram of a condensing type thermal power station.
9. Explain the principle of working of each component of thermal power station.
10. Define Pulverization.
11. Mention the advantages of Pulverization
12. Define Condensation.
13. Mention the advantages of Condensation
14. State the necessity of cooling towers in thermal power plant
15. List the types of cooling towers used in thermal power plants.
16. State the principle of working of Hydro power station.
17. Mention the requirement and factors for site selection of Hydro Electric Power station.
18. Define Hydrograph.
19. Classify the Hydro Electric Power stations based upon head.
20. Classify the Hydro Electric Power stations based upon duty
21. Classify the Hydro Electric Power stations based upon location
22. Classify the Hydro Electric Power stations based upon hydraulic considerations.
23. Explain the working of High Head Power Station with layout diagram.
24. Explain the working of Medium Head Power Station with layout diagram.
25. Explain the working of low Head Power Station with layout diagram.
26. State the need of Surge Tank.
27. State the need of Forebay.
28. State the need of Spill gates.
29. State the importance of nuclear energy.
30. Explain fission reaction.
31. Explain fusion reaction.
32. State the merits of using nuclear energy
33. Mention the various nuclear fuels used in nuclear power station.
34. Explain the working of a Nuclear power station with a block diagram.
35. State the materials used for coolant.
36. State the materials used for Reflector.
37. State the materials used for control rods.
38. State the need of transmission lines.
39. State the need of distribution lines.
40. Classify transmission systems.
41. State the advantages of D.C transmission systems.
42. State the advantages of A.C transmission systems.
43. State the advantages of Extra high voltage transmission systems.
44. Explain the effects of Supply frequency on Transmission lines.
45. Explain the effects of Supply voltage on Transmission lines.
46. State the effect of voltage on Line efficiency
47. State the effect of voltage on Voltage drop.
48. State the effect of voltage on Line loss.
49. State the effect of voltage on Active & reactive Power.
50. State the effect of voltage on Volume of conductor material.
51. Explain the concept of HVDC transmission.
52. List the types of HVDC transmission.
53. List the advantages of HVDC transmission.
54. List the disadvantages of HVDC transmission.
55. Explain the different types of conductors used in transmission line.
56. List various Current distortion effects.
57. State Skin effect
58. State Proximity effect
59. State Spirality effect
60. List various transmission line parameters.
61. State the expression for inductance of 1 phase system (No Derivation)
62. Solve problems on inductance of 1 phase system
63. State the expression for the inductance of 3 phase symmetrical round conductor.

(No Derivation)

1. Solve problems on the inductance of 3 phase symmetrical round conductor.
2. State the expression for the inductance of 3 phase asymmetrically spaced round

Conductors (No derivation)

1. Solve problems on the inductance of 3 phase asymmetrically spaced round conductors
2. State the expression for capacitance of 1 phase system (No Derivation)
3. Solve problems on capacitance of 1 phase system
4. State the expression for the capacitance of 3 phase symmetrical round conductor.

(No Derivation)

1. Solve problems on the capacitance of 3 phase symmetrical round conductor.
2. State the expression for the capacitance of 3 phase asymmetrically spaced round

conductors (No derivation)

1. Solve problems on the capacitance of 3 phase asymmetrically spaced round conductors
2. Define Short transmission line.
3. Define Medium transmission line.
4. Define Long transmission line.
5. Define Regulation.
6. Define Percentage Regulation.
7. State the approximate formula for percentage regulation.(no derivation)
8. Compute the Sending end voltage for short transmission line
9. Compute the Sending end Power factor for short transmission line
10. Compute the Percentage Regulation for short transmission line
11. Draw the phasor diagram
12. State `Ferranti' effect
13. Define Corona
14. State the main components of overhead lines
15. State the factors on which the conductor spacing and ground clearance depend
16. Define `Sag'
17. State the factors affecting the sag
18. Derive an equation for the approximate method of calculating sag when the supports

are at the same level in still air.

1. Derive an equation for the approximate method of calculating sag when the supports

are at the same level with the effect of wind.

1. Derive an equation for the approximate method of calculating sag when the supports

are at the same level with the effect of ice.

1. Solve the problems on calculating sag.
2. State the disadvantages of loose spans(sag more than prescribed value)
3. State the purpose of insulators in transmission and distribution lines
4. State the requirements of insulators.
5. List various types of Insulators.
6. State applications of the Pin type insulators.
7. State applications of the Strain type insulators.
8. State applications of the Suspension type insulators.
9. State applications of the Shackle type insulators.
10. Define a Polymer insulator.
11. State the advantages of Polymer insulators.
12. Derive the voltage across individual disc of a string insulator (upto 3 discs).
13. Solve problems on distribution of voltage across string
14. Define Flashover.
15. Define Puncture.
16. Define String-efficiency.
17. State the methods of improving string efficiency
18. State the need for substations.
19. State the relative merits of indoor substation, outdoor substation and Gas insulated

Substations over others.

1. List the equipment used in substation.
2. State the purpose of the Bus bars.
3. State the purpose of the Transformers.
4. State the purpose of the Switch gear.
5. State the purpose of the Indicating and Metering equipment
6. State the purpose of the Protective relays
7. State the purpose of the Lightning arrestors
8. State the purpose of the Wavetrap.
9. Distinguish between primary distribution and secondary distribution.
10. State the purpose of Feeder.
11. State the purpose of Distributors.
12. State the purpose of Service mains.
13. Classify the type of distribution systems according to Type of current.
14. Classify the type of distribution systems according to Construction.
15. Classify the type of distribution systems according to Service.
16. Classify the type of distribution systems according to Number of wires.
17. Classify the type of distribution systems according to Scheme of connections.
18. List the type of distribution systems.
19. State the advantages and disadvantages of Radial system
20. State the advantages and disadvantages of Ring main system.
21. List the steps to calculate the voltage drop in 1-phase A.C. distributors
22. Solve problems on voltage drop calculations in A.C. Distributors.
23. Solve problems on voltage drop calculations in D.C Distributors.
24. Define Micro Grid.
25. Explain the concept of smart grid

**Suggested Student Activities**

1. Student visits Library to refer to Electrical Manuals.
2. Student prepares the models of the power plants
3. Student visits Power generating stations familiarize with the equipment.
4. Visit Power nearby substations and gets familiar with the components.
5. Students may be asked to prepare model project of the power system.
6. Prepare charts on different Generating stations in our state mentioning their locations.
7. Gather information of HVDC transmission projects in India and prepare a report
8. Identify different insulators in your surroundings and prepare a report
9. Watch Youtube videos on SMART GRID and MICRO GRID and prepare a summary report
10. Group discussion.
11. Surprise tests and Quiz.

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO\PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | - | 3 | - | - | 3 | 2 | 2 | - | - | 3 | 2,5,6,7,10 |
| CO2 | - | 3 | - | - | 3 | 2 | 2 | - | - | 3 | 2,5,6,7,10 |
| CO3 | - | 3 | - | - | 3 | - | - | - | - | 3 | 2,5,10 |
| CO4 | 3 | 3 | - | - | 3 | - | - | - | - | 3 | 1,2,5,10 |
| CO5 | 3 | 3 | - | - | 3 | - | 1 | - | - | 3 | 1,2,5,7,10 |
| CO6 | 3 | 3 | - | - | 3 | 1 | 2 | - | - | 3 | 1,2,56,7,10 |

|  |
| --- |
| **Continuous Internal Evaluation (CIE)** |

|  |  |  |
| --- | --- | --- |
| Test | Units | Marks |
| Mid Sem 1 | 1 and 2 | 20 |
| Mid Sem 2 | 3 and 4 | 20 |
| Slip Test 1 | 1 and 2 | 5 |
| Slip Test 2 | 3 and 4 | 5 |
| Assignments | - | 5 |
| Seminars | - | 5 |
|  | Total | 60 |

**QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 4 | 1 | Nil | 4 Marks |
| 02 | Part-B | Understanding(U) | 4 | 3 | 2 | 6 Marks |
| 03 | Part-C | Application(A) | 4 | 5 | 2 | 10 Marks |
| Total Marks | | | | | | 20 Marks |

**MID SEM-I EXAM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A |
| 1 | Unit-I | 1,2 | 5(a) | 7(a) |
| 5(b) | 7(b) |
| 2 | Unit-II | 3,4 | 6(a) | 8(a) |
| 6(b) | 8(b) |
| Total Questions |  | 4 | 4 | 4 |

**MID SEM-II EXAM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A |
| 1 | Unit-III | 1,2 | 5(a) | 7(a) |
| 5(b) | 7(b) |
| 2 | Unit-IV | 3,4 | 6(a) | 8(a) |
| 6(b) | 8(b) |
| Total Questions |  | 4 | 4 | 4 |

**The length of answer for each question framed in respect of Part-A, B&C shall not exceed  
 ¼ of a page side, 1 page side and 2page sides respectively.**

**QUESTION PAPER PATTERN FOR SEMESTER END EXAM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 8 | 1 | Nil | 8 Marks |
| 02 | Part-B | Understanding(U) | 8 | 3 | 4 | 12 Marks |
| 03 | Part-C | Application(A) | 8 | 5 | 4 | 20 Marks |
| Total Marks | | | | | | 40 Marks |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit No | Questions to be set for SEE | | | | |
| R | | | U | A |
| I | Q4 | Q1 | | Q9(a) | Q13(a) |
| II |
| III | Q2 | | Q10(a) | Q14(a) |
| IV |
| V | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q13(b), Q15(a), Q15(b) |
| VI | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q14(b), Q16(a), Q16(b) |
| Total Questions | 8 | | | 8 | 8 |

**STATE board OF TECHNICAL EDUCATION & TRAINING, TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-402C**

**ELECTRICAL POWER SYSTEMS**

**MID SEM -i EXAM MODEL PAPER**

**Time: 1 hour Total Marks: 20**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A Marks: 4 x 1=4**

**Instructions:** (1) Answer all questions

(2) Each question carries **one** mark.

1. List the various sources of Energy .
2. List the types of cooling towers used in Thermal power plant
3. Define Hydrograph
4. State the need of Spill gates

**PART - B Marks: 2 x 3 = 6**

**Instructions:** (1) Answer the following questions.

(2) Each question carries **three** marks.

5a) State the need of Non-conventional Energy Sources

**OR**

5b) What is Coal Pulverisation?

6 a) State the importance of nuclear energy

**OR**

6 b)Write the merits of Nuclear Energy.

**PART - C Marks: 2 x 5= 10**

**Instructions:** (1) Answer the following questions.

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

7 a) Draw a single line diagram of a Thermal Power station

**OR**

7 b) State the relative merits and limitations of Conventional and Non-Conventional types of sources

8 a) Explain the principle of working of Hydro power station.

**OR**

8 b) Explain the working of High Head Power Station with layout diagram

**STATE board OF TECHNICAL EDUCATION & TRAINING, TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-402C**

**ELECTRICAL POWER SYSTEMS**

**MID SEM –iI EXAM MODEL PAPER**

**Time: 1 hour Total Marks: 20**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A Marks: 4 x 1=4**

**Instructions:** (1) Answer all questions

(2) Each question carries **one** mark.

1. State the need of transmission lines.
2. List the types of HVDC transmission
3. List various transmission line parameters
4. Define Medium transmission line

**PART - B Marks: 2 x 3 = 6**

**Instructions:** (1) Answer the following questions.

(2) Each question carries **three** marks.

5a) State the advantages of Extra high voltage transmission systems.

**OR**

5 b) State Skin effect

6 a) State `Ferranti' effect

**OR**

6 b) Define Percentage Regulation.

**PART - C Marks: 2 x 5= 10**

**Instructions:** (1) Answer the following questions.

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

1. a) Explain the different types of conductors used in transmission line.

**OR**

7 b) Explain the concept of HVDC transmission.

8 a) A 3-phase overhead line conductors are arranged in a horizontal plane and are 3 m

apart. The diameter of each conductor is 1cm.Calculate the capacitance per km of each

conductor

**OR**

1. b) A single phase transmission line has a resistance of 0.20 ohms and an inductive reactance of 0.40 ohm. Find the voltage at the sending end to give 500KVA at 2kV at the receiving end at load power factor of 0.707 lagging

**18EE-402C**

**STATE board OF TECHNICAL EDUCATION & TRAINING, TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-402C**

**ELECTRICAL POWER SYSTEMS**

**SEMESTER END EXAM MODEL PAPER**

**Time: 2 hourS Total Marks: 40**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A**

**Instructions:** (1) Answer all questions

(2) Each question carries **one** mark.  **Marks: 8 X 1 = 8**

1. Define Hydrograph.

2. List the types of HVDC transmission.

3 .Define `sag'

4. List the transmission line parameters.

5. Define Flashover.

6. Define a Polymer insulator.

7. State the need for substations.

8. State the purpose of Feeder.

**PART - B**

**Instructions:** (1) Answer the following questions

(2) Each question carries **three** marks. **Marks: 4 X 3 = 12**

9a) State the relative merits and limitations of Conventional and Non-Conventional types of sources

**OR**

9 b) State the requirements of insulators

10a) State the expression for the inductance of 3 phase symmetrical round conductor.

**OR**

10b) State the purpose of the Lightning arrestors

11a) State the purpose of insulators in transmission and distribution lines

**OR**

11b) State the disadvantages of loose spans.

1. a) State the purpose of the Indicating and Metering equipment

**OR**

12 b) Distinguish between primary distribution and secondary distribution

**PART - C**

**Instructions:** (1) Answer the following questions

(2) Each question carries **five** marks.  **Marks: 4 X 5 = 20**

13a) Explain the principle of working of each component of thermal power station.

**OR**

1. (b) State the requirements of insulators and give the list of insulators
2. a) A single phase transmission line has a resistance of 0.20 ohms and an inductive reactance of 0.40 ohm.Find the voltage at the sending end to give 500KVA at 2kV at the receiving end at load power factor of 0.707 lagging

**OR**

14 b) Explain the concept of smart GRID

15a) Derive an equation for the approximate method of calculating sag when the supports

are at the same level with the effect of ice

**OR**

15 b) An insulator string consists of 3 units each having a safe working voltage of 15kV. The ratio of self-capacitive to shunt capacitive of each unit is 8 1 : . Find the maximum safe working voltage of the string and string efficiency

1. a) Explain Feeder, distributors and service mains

**OR**

16 b) A single phase a.c distributor AB 300 meters long is fed from end A and is loaded as under (i) 100 Amps at 0.707 p.f lagging 200 meters from point A (ii) 200 amps at 0.8 p.f lagging 300 meters from point A. The total resistance and the reactance of the distributor is 0.2 ohms and 0.1 ohms per km respectively. Calculate the total voltage drop in the distributor. The load power factors refer to the voltage at the far end

**AC MACHINES**

|  |  |
| --- | --- |
| **Course Title : AC Machines**  **Semester : IV**  **Teaching Scheme in Periods : 45:15:0**  **(L:T:P)**  **Methodology : Lecture + Tutorial**  **CIE : 60 Marks**  **(Continuous Internal Evaluation)** | **Course Code : 18EE-403C**  **Course Group : Core**  **Credits : 3**  **Total Contact Periods :60**  **SEE : 40 Marks**  **(Semester End Examination)** |

**Pre requisites**

This course requires the basic knowledge of electromagnetic circuits, and physical forces induced in conductors.

**Course Outcomes**

|  |  |
| --- | --- |
| CO1 : | Describe the construction and working of single phase transformer |
| CO2 : | Determine the Equivalent circuit parameters of a single phase transformer |
| CO3 : | Evaluate the performance of single phase transformers |
| CO4 : | Describe the construction of three phase transformers and their applications |
| CO5 : | Analyze the behavior of alternators |
| CO6 : | To be familiar with the working of single phase transformer |

**Blue Print of Marks for SEE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit No** | **Unit Name** | **Periods** | **Questions to be set for SEE** | | | | |
| **R** | | | **U** | **A** |
| 1 | Fundamentals of single phase transformers | 8 | Q4 | Q1 | | Q9(a) | Q13(a) |
| 2 | Tests on single phase transformers | 12 |
| 3 | Performance of single phase transformers | 10 | Q2 | | Q10(a) | Q14(a) |
| 4 | Three phase transformers | 10 |
| 5 | Alternators | 12 | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q13(b), Q15(a), Q15(b) |
| 6 | Operation of alternators | 8 | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q14(b), Q16(a), Q16(b) |
| **Total** | | 60 | 8 | | | 8 | 8 |

**Course Content**

|  |  |
| --- | --- |
| **UNIT 1 : Fundamentals of single phase Transformer** | **Duration: 8 Periods (L: 6 - T: 2)** |
| Introduction to transformer-Classifications of transformers,-Construction of transformers-Theory of an ideal transformer –EMF equation derivation –Problems on calculation of EMF-Transformer ratio-Special transformers- expression for copper saving –applications | |
| **UNIT 2 :Tests on single phase transformers** | **Duration: 12 Periods (L:9 - T:3)** |
| Working of Transformer on no load – Vector Diagram –Working of Transformer on load – Vector Diagram-Equivalent circuit of transformer-Short circuit test-Open circuit test-Determination of Equivalent circuit parameters-Problems – Sumpner’s test | |
| **UNIT 3 Performance of single phase transformers** | **Duration: 10 Periods (L: 7.5 - T: 2.5)** |
| Regulation-Derivation of approximate equation for regulation based on vector diagram for lagging, leading, unity power factor – Numerical problems on regulation-efficiency- condition for maximum efficiency – problems on efficiency- Calculation of all day efficiency for a given load cycle- problems on all day efficiency | |
| **UNIT 4 Three Phase Transformers** | **Duration: 10 Periods (L: 7.5 - T:2.5)** |
| Three Phase Transformers-Construction-Different transformer configurations-Applications of different transformer configurations-parallel operation -Tap changing gear - NO load and ON load tap changing procedure- Applications of three phase transformer**s** | |
| **UNIT 5 Alternators** | **Duration: 12 Periods (L:9 - T: 3)** |
| Alternators –Types of alternators – Brief description of parts with sketches and function of each part, construction- Specifications-Assembly - Exciter and pilot exciter - Stationary armature type construction - Advantages, Concentrated and distributed windings - short pitch and full pitch coils - Effect of chording and distribution factors - EMF equation - Derivation – Problems- phasor diagram for unity, lagging and leading power factor loads – permanent magnet synchronous generator | |
| **UNIT 6 Operation of alternators** | **Duration: 8 Periods (L: 6 – T: 2)** |
| Regulation – Different methods of finding regulation- Calculation of regulation by synchronous impedance method- Necessity for parallel operation –Condition to be fulfilled for Synchronization,-Synchronisation by lamp methods – Procedure to connect a Diesel Engine generator to the supply mains –Load sharing – simple problems-Effect of change in excitation and input of an alternator connected to infinite bus. | |

**Recommended Books**

1. B.L. Theraja-Electrical Technology – Vol –II S.Chand& Co.
2. M.G Say –AC machines
3. P.S. Bhimbra–Electrical machines – Khanna Publishers
4. A.E. Fritzgerald, C. Kingsley and S. Umans Electrical machinery-McGraw Hill
5. MV Deshpande-Electric machines – Wheeler publishing.
6. BR Gupta and VandanaSinghal– Fundamentals of Electric machines

**Suggested E-Learning references**

1. http://electrical4u.com/
2. [www.nptel.ac.in](http://www.nptel.ac.in)
3. [https://www.siemens.com/content/dam/internet/siemens-com/global/products-services](https://www.siemens.com/content/dam/internet/siemens-com/global/products-services/energy/high-voltage/transformers/brochures-transformers-en/siemens-transformers-in-the-power-engineering-guide-transformers-product-brochure.pdf)

**Suggested Learning Outcomes**

**After completion of the subject, the student shall be able to**

* 1. Define the word ‘Transformer’
  2. Explain the working principle of single-phase transformer.
  3. State the reason for not operating transformer on DC Supply
  4. Classify the transformers based on Number of phases
  5. Classify the transformers based on Construction
  6. Classify the transformers based on Function
  7. Explain the constructional details of transformers.
  8. State the purpose and function of each part of the transformer with legible sketch.
  9. Explain about core type transformer
  10. Explain about the shell type transformer.
  11. Distinguish between core type and shell type transformers.
  12. Define an Ideal Transformer
  13. Derive the E.M.F equation of a single phase transformer.
  14. Solve problems on EMF equation
  15. Define Turns Ratio of transformer
  16. Define Voltage transformation Ratio of transformer
  17. Define Current transformation Ratio of transformer
  18. List the special transformers used in industry.
  19. Define an Auto transformer
  20. Derive the expression for saving of copper in auto transformer
  21. State the advantages of autotransformers
  22. State the disadvantages of autotransformers
  23. List the applications of transformers
  24. Explain working of transformer at No-Load with the help of its vector diagram.
  25. Explain working of transformer at Load with the help of vector diagram for Unity power factor
  26. Explain working of transformer at Load with the help of vector diagram for Lagging power factor
  27. Explain working of transformer at Load with the help of vector diagram for leading power factor
  28. State the losses taking place in a transformer.
  29. State the effects of resistance and leakage reactance of primary and secondary windings.
  30. State the significance of air gap
  31. Draw the equivalent circuit of a transformer by approximation
  32. Explain the procedure to find equivalent circuit parameters from No-load test on single phase transformer
  33. Explain the procedure to find equivalent circuit parameters from short circuit test on single phase transformer
  34. Problems on the computing the equivalent circuit parameters of a single phase transformer
  35. Explain the procedure of conducting polarity test on single-phase transformer.
  36. Explain the procedure of conducting Sumpner's test on a transformer
  37. State the necessity of break down voltage test on transformer oil

1. Define Regulation
2. Derive the approximate equation of regulation for transformer.
3. Solve the problems to calculate the regulation of a single phase transformer for loads with unity power factor
4. Solve the problems to calculate the regulation of a single phase transformer for loads with lagging power factor
5. Solve the problems to calculate the regulation of a single phase transformer for loads with leading power factor
6. State the reason for using the unit KVA for the transformer rating
7. Derive efficiency of a single phase transformer
8. Find the condition for maximum efficiency of a single phase transformer
9. Compute numerical problems for calculating the efficiency of the transformer
10. Define all day efficiency
11. Solve numerical problems for calculating all day efficiency
12. Define Distribution transformer
13. Define Power Transformer
14. Differentiate between distribution transformer and power transformer.
15. Mention the reasons for failures of a transformer
16. State the reasons for humming noise near a transformer and the methods to reduce the noise level.
17. State the advantages of 3 phase transformer over single phase transformer
18. List the different types of three phase transformers by giving their symbolic representation and voltage relationships.
19. State the applications of star-star transformer
20. Mention the applications of delta-star transformers
21. List the applications of star-delta transformers
22. State the applications of delta-delta transformers
23. State the need for parallel operation of transformer.
24. Mention the specifications of a transformer
25. State the Benefits for use of amorphous core in a transformer
26. Mention the conditions for parallel operation and load sharing of transformers.
27. State the necessity of cooling of power transformers.
28. Explain the methods of cooling of power transformer.
29. Draw a legible sketch of a power transformer
30. Explain the function of each part of a power transformer.
31. Explain the ‘ON load’ and ‘OFF load’ tap changing.
32. Explain the procedure for tap changing on load and no load tap changer
33. Mention the purpose of application of a transformer as phase shifter
34. State the purpose of application of a transformer as reactor
35. Mention the purpose of application of a transformer as HVDC Transformer
36. State the purpose of application of a transformer as traction transformer
37. Explain the Principle of working of Alternators
38. Describe the constructional details of Alternators with legible sketch.
39. Classify the alternators based on rotor construction
40. Explain the construction and working of Cylindrical rotor alternator
41. Explain the construction and working of salient pole rotor alternator
42. State the specifications of an alternator
43. State the advantage of Stationary Armature.
44. List the main parts of alternator
45. Mention the materials used for different parts of an alternator
46. Derive the expression for Chording factor
47. State the effect of chording factor
48. Derive the expression for Distribution factor
49. State the effect of Distribution factor
50. Derive EMF equation of an alternator taking into account distribution factor and pitch factor.
51. Solve simple problems on EMF equation
52. State the need for an exciter in an Alternator.
53. List the various types of exciters
54. Explain armature reaction of Alternator at different power factors
55. State the reasons for voltage variations on Load.
56. Define the term synchronous impedance.
57. State the effects of synchronous impedance on the operation of the Alternator
58. Draw the equivalent circuit representing armature resistance, leakage reactance and armature reaction reactance
59. Obtain the relation between No load EMF and terminal voltage in Alternator.
60. Draw the vector diagram for No load EMF in alternator at different load power factors
61. Describe the construction and working of permanent magnet synchronous generator
62. List the applications of permanent magnet synchronous generator
63. Define regulation of an alternator.
64. List the different methods of finding the regulation of alternator.
65. Calculate the regulation by synchronous impedance method.
66. State the expressions for No load emf of alternator at different powerfactors
67. Solve problems on Synchronous impedance method.
68. Explain the necessity for parallel operation of three phase alternators
69. State the conditions for synchronization for three phase alternator
70. Define synchronization of alternators
71. List the methods of synchronization of alternators
72. Explain the procedure for synchronization of alternators by using Dark and Bright lamp method
73. Explain the procedure for synchronization of alternators by using Synchroscope
74. Describe the procedure to connect a Diesel Engine generator to the supply mains
75. Explain the method for adjusting the loads shared by two alternators (or one alternator with Infinite bus bar).
76. Explain the effect of change in input and excitation of an alternator connected to infinite bus.
77. Solve problems on load sharing.

**Suggested Student Activities**

1. Prepare charts on types of transformers clearly labeling the parts.
2. Visit nearby transformer in your surroundings and prepare a report on the observations made during visit along with photos.
3. Visit the transformer manufacturing unit and prepare a report
4. Prepare a report on different transformers available in your Institute.
5. Do the maintenance of 50MVA transformer
6. Make charts of various transformer configurations
7. Quiz
8. Group discussion
9. Surprise test.

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO\PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | 2 | 3 | - | - | 1 | - | - | - | - | 3 | 1, 2, 5,10 |
| CO2 | 2 | 3 | - | - | 1 | - | 2 | - | - | 3 | 1,2, 5, 7, 10 |
| CO3 | 3 | 3 | - | - | - | - | 2 | - | - | 3 | 1, 2, 7,10 |
| CO4 | - | 3 | - | - | 1 | - | - | - | - | 3 | 2, 5, 10 |
| CO5 | 3 | 3 | - | - | 1 | - | - | - | - | 3 | 1, 2, 5,10 |
| CO6 | 3 | 3 | - | - | 2 | - | 2 | - | - | 3 | 1,2, 5, 7, 10 |

|  |
| --- |
| **Continuous Internal Evaluation (CIE)** |

|  |  |  |
| --- | --- | --- |
| Test | Units | Marks |
| Mid Sem 1 | 1 and 2 | 20 |
| Mid Sem 2 | 3 and 4 | 20 |
| Slip Test 1 | 1 and 2 | 5 |
| Slip Test 2 | 3 and 4 | 5 |
| Assignments | - | 5 |
| Seminars | - | 5 |
|  | Total | 60 |

**QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 4 | 1 | Nil | 4 Marks |
| 02 | Part-B | Understanding(U) | 4 | 3 | 2 | 6 Marks |
| 03 | Part-C | Application(A) | 4 | 5 | 2 | 10 Marks |
| Total Marks | | | | | | 20 Marks |

**MID SEM-I EXAM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A |
| 1 | Unit-I | 1,2 | 5(a) | 7(a) |
| 5(b) | 7(b) |
| 2 | Unit-II | 3,4 | 6(a) | 8(a) |
| 6(b) | 8(b) |
| Total Questions |  | 4 | 4 | 4 |

**MID SEM-II EXAM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A |
| 1 | Unit-III | 1,2 | 5(a) | 7(a) |
| 5(b) | 7(b) |
| 2 | Unit-IV | 3,4 | 6(a) | 8(a) |
| 6(b) | 8(b) |
| Total Questions |  | 4 | 4 | 4 |

**The length of answer for each question framed in respect of Part-A, B&C shall not exceed  
 ¼ of a page side, 1 page side and 2page sides respectively.**

**QUESTION PAPER PATTERN FOR SEMESTER END EXAM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 8 | 1 | Nil | 8 Marks |
| 02 | Part-B | Understanding(U) | 8 | 3 | 4 | 12 Marks |
| 03 | Part-C | Application(A) | 8 | 5 | 4 | 20 Marks |
| Total Marks | | | | | | 40 Marks |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit No | Questions to be set for SEE | | | | |
| R | | | U | A |
| I | Q4 | Q1 | | Q9(a) | Q13(a) |
| II |
| III | Q2 | | Q10(a) | Q14(a) |
| IV |
| V | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q13(b), Q15(a), Q15(b) |
| VI | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q14(b), Q16(a), Q16(b) |
| Total Questions | 8 | | | 8 | 8 |

**STATE board OF TECHNICAL EDUCATION & TRAINING, TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-403C**

**ac machines**

**MID SEM -i EXAM MODEL PAPER**

**Time: 1 hour Total Marks: 20**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A Marks: 4 x 1=4**

**Instructions:** (1) Answer all questions

(2) Each question carries **one** mark.

1. Define Transformer.
2. Define Turns Ratio in transformer
3. Draw the vector diagram of a transformer on NO load
4. List the losses taking place in a transformer

**PART - B Marks: 2 x 3 = 6**

**Instructions:** (1) Answer the following questions.

(2) Each question carries **three** marks.

5a) A single phase transformer has 400 turns on the primary winding and 1000 turns on the secondary winding.If it is operating at 50Hz supply with a maximum flux of 0.045wb find (i) the primary and secondary induced emf

**OR**

5 b) What are the advantages of an Auto transformer

6 a) Draw the equivalent circuit of a transformer by approximation

**OR**

6 b)State the significance of airgap

**PART - C Marks: 2 x 5= 10**

**Instructions:** (1) Answer the following questions.

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

7 a) Distinguish between core type and shell type transformers.

**OR**

7 b) Explain the function of each part of the transformer .

8 a) Explain working of transformer at Load with the help of vector diagram for Unity power factor

**OR**

8 b) The resistances and leakage reactance’s of a 30 kVA, 2400 V/240 V distribution transformer are R1 = 0.68 Ω; = 0.0068 Ω; ;;

Where subscript 1 denotes the 2400 V winding and subscript 2 denotes the 240 V winding.   
Each quantity is referred to its own side of the transformer.Draw the equivalent circuit   
referred to High Voltage side

**STATE board OF TECHNICAL EDUCATION & TRAINING, TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-403C**

**ac machines**

**MID SEM –iI EXAM MODEL PAPER**

**Time: 1 hour Total Marks: 20**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A Marks: 4 x 1=4**

**Instructions:** (1) Answer all questions

(2) Each question carries **one** mark.

1. Define Regulation
2. Define All Day Efficiency
3. State the applications of star-star transformer
4. State the necessity of cooling of power transformers

**PART - B Marks: 2 x 3 = 6**

**Instructions:** (1) Answer the following questions.

(2) Each question carries **three** marks.

5a) State the reason for using the unit KVA for the transformer rating

**OR**

1. b) State the reasons for humming noise near a transformer

6 a) State the advantages of 3 phase transformer over bank of three single phase transformers

**OR**

6 b) State the need for parallel operation of a transformer

.

**PART - C Marks: 2 x 5= 10**

**Instructions:** (1) Answer the following questions.

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

7a) Differentiate between distribution transformer and power transformer.

**OR**

7 b) A 500KVA ,6000/400 V ,1-ϕ transformer has a primary and secondary winding resistances of 0.4Ω and 0.0015Ω respectively. The Iron losses are 3.2KW ,Calculate the efficiency of transformer on full load assuming the p.f of the load to be 0.8 lagging

8 a) Explain the OFF load tap changing method on a transformer

**OR**

8 b) Explain the methods of cooling of power transformer.

**18EE-403C**

**STATE board OF TECHNICAL EDUCATION & TRAINING, TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-403C**

**ac machines**

**SEMESTER END EXAM MODEL PAPER**

**Time: 2 hourS Total Marks: 40**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A**

**Instructions:** (1) Answer all questions

(2) Each question carries **one** mark.  **Marks: 8 X 1 = 8**

1. List the applications of transformers

2. Define Regulation

3. List the main parts of alternator

4. State the need for parallel operation of a transformer

5.State the specifications of an alternator

6. List the types of exciters

7. Define regulation of an alternator.

8. List the different methods of finding the regulation of alternator

**PART - B**

**Instructions:** (1) Answer the following questions

(2) Each question carries **three** marks. **Marks: 4 X 3 = 12**

9a) State the losses taking place in a transformer

**OR**

9b) Calculate the e.m.f induced per phase in a 3-ϕ ,8-pole ,50 Hz star connected alternator .The stator has 160 slots and 6 conductors per slot. Assume Kp=1 and Kd=0.96.The flux per pole is 0.16 wb

10a) State the advantages of three phase transformers over bank of three single phase   
transformers

**OR**

10b) Explain the effect of change in input and excitation of an alternator connected to infinite bus

11a) Classify the alternators based on rotor construction

**OR**

11b) State the advantage of Stationary Armature.

12a) State the conditions for synchronization for three phase alternator

**OR**

1. b) Explain the necessity for parallel operation of three phase alternators

**PART - C**

**Instructions:** (1) Answer the following questions

(2) Each question carries **five** marks.  **Marks: 4 X 5 = 20**

13a) Derive the E.M.F equation of a single phase transformer.

**OR**

1. (b) Derive the expression for Chording factor
2. a) Explain the function of each part of a power transformer

**OR**

14b) Two alternators working in parallel have induced *emf’s* on open circuit of and and having reactances of *j2* Ω and *j3* Ω respectively. Calculate

1. Terminal voltage
2. Power delivered by each of the alternators to a resistive load of 6 Ω.

Neglect alternator resistances

15a) Obtain the relation between No load EMF and terminal voltage in Alternator at leading powerfactor.

**OR**

15 b. Explain armature reaction of Alternator at different power factors

16a) Explain the procedure of synchronising of alternators by using synchroscope method

**OR**

16 b) A 200 kVA, 415 V, 50 Hz, 3-ø alternator has effective armature resistance of 0.01 Ω and an armature leakage reactance of 0.05 Ω. Compute the voltage induced in the armature winding when the alternator is delivering rated current at a load *pf* of 0.8 lag and 0.8 lead

**GENERAL MECHANICAL ENGINEERING**

|  |  |
| --- | --- |
| **Course Title : General Mechanical Engineering**  **Semester : IV**  **Teaching Scheme in Periods : 45:15:0**  **(L:T:P)**  **Methodology : Lecture + Tutorial**  **CIE : 60 Marks**  **(Continuous Internal Evaluation)** | **Course Code : 18EE-404C**  **Course Group : Core**  **Credits : 3**  **Total Contact Periods :60**  **SEE : 40 Marks**  **(Semester End Examination)** |

**Pre requisites**

This course requires the basic knowledge of basic sciences at secondary school level

**Course Outcomes**

|  |  |
| --- | --- |
| CO1 | Solve simple problems on stresses, strains |
| CO2 | Solve simple problems on torsion in shafts |
| CO3 | Explain the Construction and working of IC Engines. |
| CO4 | Describe the working of Boilers |
| CO5 | Describe the construction and working of Turbines |
| CO6 | Compare various types of Pumps |

**Blue Print of Marks for SEE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit No** | **Unit Name** | **Periods** | **Questions to be set for SEE** | | | | |
| **R** | | | **U** | **A** |
| 1 | Simple Stresses & Strains | 10 | Q4 | Q1 | | Q9(a) | Q13(a) |
| 2 | Torsion in Shafts | 10 |
| 3 | I.C Engines | 12 | Q2 | | Q10(a) | Q14(a) |
| 4 | Boilers | 8 |
| 5 | Turbines | 10 | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q13(b), Q15(a), Q15(b) |
| 6 | Pumps & Lubricants | 10 | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q14(b), Q16(a), Q16(b) |
| **Total** | | 60 | 8 | | | 8 | 8 |

**Course Content**

**UNIT-1 Simple Stresses & Strains Duration: Periods 10(L: 8 – T:2)**

Stress – strain - Poisson’s ratio - elastic limit - statement of Hooke’s law - stress-strain diagram with salient features for ductile materials under tensile stress - Elastic moduli - Young’s modulus - Modulus of rigidity, - Bulk modulus - Working stress - Ultimate stress - Factor of safety. Simple problems

**UNIT-2 Torsion in Shafts Duration: Periods 10(L: 8 – T: 2)**

Classification of shafts - Function of shafts - Polar moment of inertia of shafts - Torsion equation*,* maximum torque - power transmitted by the shaft - design of shaft based on strength and rigidity - Simple problems on shafts.

##### UNIT-3 I.C Engines Duration: Periods 12 (L: 9 – T: 3)

I.C Engines - classification of heat engines and I.C engines - Comparison between petrol and diesel engine - Functions of carburetor, fuel injection pump, governing of I.C engines.

**UNIT-4 Boilers Duration: Periods 8 (L:6– T: 2)**

Boilers - Classification of boilers - Boiler mountings- Boiler accessories

**UNIT-5 Turbines Duration: Periods 10(L: 7.5 – T: 2.5)**

Steam turbine - comparison between impulse and reaction turbines - classification of hydraulic turbines

**UNIT-6 Pumps & Lubricants Duration: Periods 10 (L: 7.5 – T: 2.5)**

Hydraulic pumps – classification - comparison between various pumps -lubricants - properties ,types, examples and their applications

**Recommended Books**

1. Strength of materials by Ramamrutham

2. Strength of materials by ZakaraiaBaig

2. Strength of materials by Surender Singh

3. Strength of materials by S.B.Junarker

4. General Mechanical Engineering by Lakshminarayana

5. General Mechanical Engineering by GopalaKrishna

6. Hydraulic Machinery by Jagadishalal

**7.** Strength of Materials by R.S. Kurmi

**Suggested E-Learning references**

1. [www.learn](http://www.learn) engineering.org

2. [www.nptel.ac.in](http://www.nptel.ac.in)

3. [www.onlinestudies.com](http://www.onlinestudies.com)

**Suggested Learning Outcomes**

**After completion of the subject, the student shall be able to**

1. Define stress
2. Define strain
3. Mention the different types of stresses.
4. Mention the different types of strains.
5. State Hooke’s law
6. Define Modulus of elasticity
7. Draw typical stress-strain curve for an M S Specimen under tension
8. Define factor of safety
9. Define Poisson’s ratio
10. State the relationship between elastic constants.
11. Calculate the dimensional changes in the bodies of uniform circular cross section subjected to tensile and compressive forces
12. Solve simple problems on Stress.
13. Solve simple problems on Strain.
14. Solve simple problems on Poisson’s ratio.
15. Solve simple problems on calculation of the dimensional changes in the bodies of uniform circular cross section subjected to tensile and compressive forces.
16. State the function of shafts.
17. Classify shafts.
18. Specify the standard sizes of shafts.
19. Define Polar moment of inertia
20. Give the expression for Polar moment of inertia of solid shaft.
21. Give the expression for Polar moment of inertia of hollow shaft.
22. Explain the terms involved in simple torsion equation.
23. Maximum torque transmitted and power transmitted.
24. Design the size of solid shaft-Strength point of view and stiffness point of view
25. Simple problems.
26. Define I.C. Engine.
27. Classify heat engine.
28. Mention types of I.C engines.
29. Explain the construction of I.C. Engines.
30. Identify the various parts of Diesel engine and Petrol engine.
31. Explain the principle of 4-stroke diesel engine.
32. Explain the principle of 4-stroke petrol engine.
33. Explain the principle of 2-stroke diesel engine.
34. Explain the principle of 2-stroke petrol engine.
35. Distinguish between 4-stroke cycle and 2-stroke cycles.
36. Distinguish between diesel engine and petrol engine.
37. State the function of carburettor.
38. State the functions of fuel pump.
39. State the functions of Governor.
40. Explain the function of a boiler.
41. Classification of boilers.
42. Compare fire tube boiler with water tube boiler.
43. Explain construction and working principle of simple vertical boiler.
44. Describe construction and working principle of Cochran boiler.
45. Explain construction and working principle of Lancashire boiler.
46. Describe construction and working principle of Babcock and Wilcox boiler.
47. Explain construction and working principle of Benson boiler
48. Describe Lamont boiler with a neat sketch.
49. List different mountings of a boiler.
50. Mention the necessity of Water level indicator
51. Write the necessity of Pressure gauge.
52. State the necessity of Stop valve
53. Mention the necessity of Feed check valve.
54. Write the necessity of Safety valve.
55. State the necessity of Fusible plug.
56. Explain the working principle of Super heater.
57. Describe the working principle of Super heater.
58. Explain the working principle of Air pre heater.
59. Define turbine.
60. Explain the principle of working of a steam turbine.
61. Classify the turbine based on action of steam.
62. Explain the working principle of impulse turbine
63. Explain the working principle of Reaction turbine
64. Compare impulse turbine with reaction turbine.
65. Describe the working principle of the De Level and Parson’s reaction turbines.
66. Classify the water turbines.
67. Explain the construction and working of Pelton wheel.
68. Explain the construction and working of Francis turbine
69. Explain the construction and working of Kaplan turbine
70. Compare Pelton wheel, Francis turbine and Kaplan turbine
71. Define Pump
72. Differences between a centrifugal pump and a reciprocating pump
73. Explain the principle of operation of centrifugal pump.
74. Explain the constructional details of centrifugal pump.
75. Describe working principle and construction of double stage reciprocating pump.
76. Explain the principle of jet pump and submersible pump.
77. State the purpose of lubrication.
78. State the properties of a lubricant
79. List the types of lubricants with examples.
80. Mention the application of lubricants.

**Suggested Student Activities**

1. Prepare a chart for the various Formulae used.

2. Draw the constructional features of an I.C Engine, types of turbines and pumps.

3. Sketch the layout of a steam generation plant.

4. Quiz

5. A visit to nearby power plant station to identify motors, pumps.

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO\PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | 2 | 3 | - | - | 2 | - | - | - | - | 3 | 1,2,5,10 |
| CO2 | 2 | 3 | - | - | 3 | - | - | - | - | 3 | 1,2,5,10 |
| CO3 | - | 3 | - | - | 3 | 1 | - | - | - | 3 | 2,5,6,10 |
| CO4 | - | 3 | - | - | 3 | 1 | - | - | - | 3 | 2,5,6,10 |
| CO5 | - | 3 | - | - | 3 | 1 | - | - | - | 3 | 2,5,6,10 |
| CO6 | - | 3 | - | - | 3 | - | - | - | - | 3 | 2,5,10 |

|  |
| --- |
| **Continuous Internal Evaluation (CIE)** |

|  |  |  |
| --- | --- | --- |
| Test | Units | Marks |
| Mid Sem 1 | 1 and 2 | 20 |
| Mid Sem 2 | 3 and 4 | 20 |
| Slip Test 1 | 1 and 2 | 5 |
| Slip Test 2 | 3 and 4 | 5 |
| Assignments | - | 5 |
| Seminars | - | 5 |
|  | Total | 60 |

**QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 4 | 1 | Nil | 4 Marks |
| 02 | Part-B | Understanding(U) | 4 | 3 | 2 | 6 Marks |
| 03 | Part-C | Application(A) | 4 | 5 | 2 | 10 Marks |
| Total Marks | | | | | | 20 Marks |

**MID SEM-I EXAM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A |
| 1 | Unit-I | 1,2 | 5(a) | 7(a) |
| 5(b) | 7(b) |
| 2 | Unit-II | 3,4 | 6(a) | 8(a) |
| 6(b) | 8(b) |
| Total Questions |  | 4 | 4 | 4 |

**MID SEM-II EXAM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A |
| 1 | Unit-III | 1,2 | 5(a) | 7(a) |
| 5(b) | 7(b) |
| 2 | Unit-IV | 3,4 | 6(a) | 8(a) |
| 6(b) | 8(b) |
| Total Questions |  | 4 | 4 | 4 |

**The length of answer for each question framed in respect of Part-A, B&C shall not exceed  
 ¼ of a page side, 1 page side and 2page sides respectively.**

**QUESTION PAPER PATTERN FOR SEMESTER END EXAM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 8 | 1 | Nil | 8 Marks |
| 02 | Part-B | Understanding(U) | 8 | 3 | 4 | 12 Marks |
| 03 | Part-C | Application(A) | 8 | 5 | 4 | 20 Marks |
| Total Marks | | | | | | 40 Marks |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit No | Questions to be set for SEE | | | | |
| R | | | U | A |
| I | Q4 | Q1 | | Q9(a) | Q13(a) |
| II |
| III | Q2 | | Q10(a) | Q14(a) |
| IV |
| V | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q13(b) Q15(a), Q15(b) |
| VI | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q14(b) Q16(a), Q16(b) |
| Total Questions | 8 | | | 8 | 8 |

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

**Model Question paper**

**DEEE IV semester Mid Semester-I Examination**

**Corse Code:18EE-404C Duration:1 hour**

**Course Name: General Mechanical Engineering Max.Marks:20**

**PART-A**

Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1. State Hooke’s law
2. Define Poisson’s ratio
3. State the function of shafts
4. Give the expression for Polar moment of inertia of solid shaft

**PART-B**

Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

1. a) Define factor of safety

**OR**

b) Define Modulus of elasticity

1. a) Classify shafts.

**OR**

b) Give the expression for Polar moment of inertia of hollow shaft.

**PART-C**

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

1. a) State the relationship between elastic constants

**OR**

b) Draw typical stress-strain curve for an M S Specimen under tension.

1. a) Explain the terms involved in simple torsion equation.

**OR**

1. Design the size of solid shaft from strength point of view.

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

**Model Question paper**

**DEEE IV semester Mid Semester-II Examination**

**Corse Code:18EE-404C Duration:1 hour**

**Course Name: General Mechanical Engineering Max.Marks:20**

**PART-A**

Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1. Define I.C. Engine
2. State the functions of fuel pump in an IC engine
3. State the necessity of boiler water level indicator
4. State the function of superheater

**PART-B**

Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

1. a) Classify heat engine

**OR**

b) State the functions of carburetor in an IC engine

1. a) Classify boilers.

**OR**

b) Compare fire tube boilers and water tube boilers in any three aspects.

**PART-C**

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

1. a) Explain the construction of I.C. Engines

**OR**

b) Distinguish between diesel engine and petrol engine in any five aspects.

1. a) Explain the operation of Lamont boiler with a neat sketch.

**OR**

1. Explain the operation of Benson boiler with a neat sketch.

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

**Model Question paper**

**DEEE IV semester**

**Semester End Examination**

**Corse Code: 18EE-404C Duration:2 hours**

**Course Name: General Mechanical Engineering Max.Marks:40Marks**

**PART-A**

Answer **all** questions 8**x1 =8 Marks**

1. State Hooke’s law
2. State the function of economizer
3. State the purpose of lubrication
4. Define IC engine
5. Classify turbines based on action of steam
6. Classify water turbines
7. State the desirable properties of lubricants
8. List the types of lubricants

**PART-B**

Answer **four** questions **4 x 3 = 12 Marks**

1. a) Mention different types of stresses

**OR**

1. Compare impulse turbine and reaction turbine in any three aspects.
2. a) State the function of speed governor in an IC engine.

**OR**

b) List the applications of lubricants.

1. a) Compare impulse turbine and reaction turbine in any three aspects.

**OR**

b) State the working principle of steam turbine.

1. a) Classify hydraulic turbines.

**OR**

b) Compare centrifugal pump and reciprocating pump in any three aspects.

**PART - C**

**Instructions:** (1) Answer the following questions

(2) Each question carries **five** marks.  **Marks: 4 X 5 = 20**

1. a) Draw typical stress-strain curve for an M S Specimen under tension

**OR**

1. Explain the working of Parson’s reaction turbine with a neat sketch.
2. a) Explain the working of four stroke diesel engine with a neat sketch.

**OR**

b) Explain the principle of operation of centrifugal pump.

1. a) Explain the working principle of Pelton wheel

**OR**

**b)**Explain the working principle of Kaplan turbine

1. a) Explain the principle of operation of jet pump.

**OR**

b) Distinguish between a centrifugal pump and a reciprocating pump in any five aspects.

**DIGITAL ELECTRONICS**

|  |  |
| --- | --- |
| **Course Title : Digital Electronics Semester : IV**  **Teaching Scheme in Periods : 45:15:0**  **(L:T:P)**  **Methodology : Lecture + Tutorial**  **CIE : 60 Marks**  **(Continuous Internal Evaluation)** | **Course Code : 18EE-405C**  **Course Group : Core**  **Credits : 3**  **Total Contact Periods :60**  **SEE : 40 Marks**  **(Semester End Examination)** |

**Pre requisites**

The student should have a basic knowledge of Science and Mathematics in Secondary Education and knowledge of basics of Electrical Engineering and Analog Electronics.

**Course Outcomes**

|  |  |
| --- | --- |
| CO1 : | Perform Data conversion between basic Numbering systems |
| CO2 : | Apply Boolean theorems to minimize digital circuits. |
| CO3 : | Design Combinational Logic circuits using logic gates. |
| CO4 : | Construct flip-flop circuits. |
| CO5 : | Construct counters and shift registers. |
| CO6 : | Perform A/D and D/A Conversion |

**Blue Print of Marks for SEE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit No** | **Unit Name** | **Periods** | **Questions to be set for SEE** | | | | |
| **R** | | | **U** | **A** |
| 1 | Number Systems | 08 | Q4 | Q1 | | Q9(a) | Q13(a) |
| 2 | Boolean Algebra and Logic Gates | 12 |
| 3 | Combinational circuits | 12 | Q2 | | Q10(a) | Q14(a) |
| 4 | Basics of Sequential Circuits | 08 |
| 5 | Registers and Counters | 12 | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q14(b), Q15(a), Q15(b) |
| 6 | A /D and D/A Converters | 08 | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q13(b), Q16(a), Q16(b) |
| **Total** | | 60 | 8 | | | 8 | 8 |

**Course Content**

**UNIT 1 – Number Systems Duration: 08 Periods (L:6 - T:2)**

Number systems - Binary operations - 1’s Compliment - 2’s Compliment – Conversion of one number system to another number system - Weighted and un-weighted Codes - Priority Bit

**UNIT 2 - Boolean Algebra and Logic Gates Duration: 12 Periods (L:9 - T: 3)**

Boolean Algebra - Boolean Laws and Theorems - Basic Logic Gates - Concept of Duality - De-Morgan’s Theorem - Universal Gates- ExOR gate – ExNor gate - Canonical and Standard Forms of Boolean Function - Simplification of Boolean expression upto 3 variables using Karnaugh’s Maps - realizing simplified expression by Logic Gates.

**UNIT 3 - Combinational Circuits Duration: 12 Periods (L:9 - T: 3)**

Combinational circuits - Half and Full Adders – Multiplexer - De-Multiplexer - Decoder **-** Encoders

**UNIT 4 - Basics of Sequential Circuits Duration: 08 Periods (L:6 - T: 2)**

Sequential Circuits – Need of Clock - Triggering Types – Flip-flops - Asynchronous Inputs –555 Timer IC – Multivibrators.

**UNIT 5 - Registers and Counters Duration: 12 Periods (L:9 - T: 3)**

Registers **-** Counters – Modulus of Counters -Asynchronous Counter (4-bit)- Synchronous Counter (4-bit)

**UNIT 6 - A-to D and D-to A Converters Duration: 08 Periods (L:6 - T: 2)**

Analog and Digital signals - Analog to Digital converter – Digital to Analog converter – Specifications of ADC and DAC – Applications of ADC and DAC

**Recommended Books**

1. Digital Systems-principles and applications. Ronald J. Tocci, Neal S.Widmer, GregoryL.Moss, 10th edition
2. Digital Fundamentals by T. L. Floyd, Pearson International Publications, Ninth

Edition, 2000.

1. Digital Computer Electronics by Malvino and leach. 3rd edition Tata McGraw-Hill Education
2. Modern Digital Electronics by R P Jain, Tata McGraw-Hill Education, 2003.

**Suggested E-Learning references**

* 1. [www.nptel.ac.in](http://www.nptel.ac.in)
  2. <http://freevideolectures.com/Course/3164/Digital-Electronics>
  3. <http://www.freebyte.com/electronics/>
  4. <https://www.circuitlogix.com>
  5. <http://www.vlab.co.in>
  6. [www.electronics-tutorials.ws](http://www.electronics-tutorials.ws)
  7. <http://www.allaboutcircuits.com>
  8. <http://ocw.mit.edu/>

**Suggested Learning Outcomes**

**After completion of the subject, the student shall be able to**

1. List various Number systems with their radix.
2. Convert a given decimal number into Binary numbers.
3. Convert a given Binary number into decimal numbers.
4. Convert a given decimal number into Hexadecimal numbers.
5. Convert a given Hexadecimal number into decimal numbers.
6. Convert a given binary number into hexadecimal number system.
7. Convert a given hexadecimal number into binary number system.
8. Perform binary addition, subtraction and Multiplication.
9. Write 1's complement and 2's complement numbers for a given binary number.
10. Perform subtraction of binary numbers in 1’s complement method.
11. Perform subtraction of binary numbers in 2's complement method.
12. Define weighted and Un-weighted codes
13. Write binary equivalent number for a number in BCD.
14. Convert binary number to equivalent BCD.
15. Compare Binary and BCD.
16. Write binary equivalent number for a number in Gray code
17. Convert binary number to Gray code.
18. State the specific applications of Gray code.
19. Write binary equivalent number for a number in Excess-3 code.
20. Convert binary number to Excess-3 code.
21. .State the importance of Parity Bit.
22. Define bit, byte and word.
23. Define Boolean Function and Truth table.
24. State the Boolean Postulates.
25. Define Basic gates AND, OR, NOT
26. Explain Basic gates AND, OR, NOT with output expression, symbol and truth Table.
27. Define Universal gates: NAND, NOR
28. Explain Universal gates: NAND, NOR with output expression, symbol and truth Table.
29. Define EX-OR Gate.
30. Explain EX-OR Gate with output expression, symbol and truth Table.
31. Define EX-NOR Gate.
32. Explain EX-NOR Gate with output expression, symbol and truth Table.
33. State De Morgan’s Theorems
34. Draw the simplified logic diagram of given Boolean expression (upto 3 variables) using Boolean Postulates along with De Morgan’s Theorems.
35. Write output expression of a given Logic Diagram along with truth table.
36. Realize Basic Gates using Universal Gates.
37. Realize EXOR gates using Universal Gates.
38. Realize EXNOR gates using Universal Gates.
39. Differentiate between Canonical and Standard forms of Boolean expression.
40. Convert a given Boolean expression in SOP forms.
41. Convert a given Boolean expression in POS forms.
42. Identify Pairs, Quads and Octets in Karnaugh’s maps.
43. Draw the simplified logic diagram of given Boolean expression (upto 3 variables) using Karnaugh’s Maps.
44. Define Combinational Circuit.
45. Develop the logical diagram of a Half-adder along with expression and Truth table output.
46. Develop the logical diagram of a Full-adder along with expression and Truth table output.
47. Realize Full-adder using Half-adder and basic gates.
48. Explain the operation of a 4-bit parallel adder developed using Full-Adder.
49. Define a Multiplexer.
50. Explain the working of 8:1 Multiplexer along with Truth table and Logical Diagram.
51. Realize Logic gates using suitable Multiplexer.
52. Realize SOP expressions (of 3 variables) using suitable Multiplexer.
53. Define a De-Multiplexer.
54. Explain the working of 1:8 De- Multiplexer along with Truth table and Logical Diagram.
55. Define a Decoder.
56. Explain the working of 3 to 8 Decoder along with Truth table and Logical Diagram.
57. Realize SOP expressions (of 3 variables) using suitable Decoder.
58. Define an Encoder.
59. Explain the working of Decimal to BCD encoder circuit.
60. Define a sequential Circuit.
61. Compare combinational and sequential circuits.
62. State the need for clock.
63. State the concept of Edge Triggering.
64. Define Level Triggering.
65. Explain the working of clocked R-S Flip-Flop (NAND gate implementation) with truth table.
66. Explain the working of clocked J-K Flip-Flop with truth table
67. Define Race-around condition.
68. Explain the Edge triggering method used to overcome Race-around condition.
69. Explain the Master Slave JK Flip Flop mentioning how it overcomes Race-around condition.
70. Explain the working of clocked D Flip-Flop with truth table.
71. Explain the working of clocked T Flip-Flop with truth table.
72. Realize D Flip flop using J-K Flip-Flop.
73. Realize T Flip flop using J-K Flip-Flop.
74. Mention the applications of Flip-Flops.
75. Define Asynchronous inputs.
76. State the need for Preset input.
77. State the need for Clear input.
78. Explain the internal block diagram of 555 Timer IC.
79. Define a Multivibrator.
80. Explain the working of Monostable multivibrator using 555 IC.
81. Explain the working of Astable multivibrator using 555 IC.
82. Explain the working of Bi-stable multivibrator using Flip-Flops.
83. State the need of a register
84. Classify Registers.
85. Explain the working of 4-bit shift left registers with a circuit and timing diagram.
86. Describe the working of 4-bit shift right registers with a circuit and timing diagram.
87. Explain the working of 3 bit Ring counter with a circuit and timing diagram.
88. Describe the working of a twisted ring counter developed by 3-bit ring counter with circuit and   
    timing diagram.
89. Define a counter
90. Differentiate between counter and timer.
91. Define Modulus of a counter.
92. Explain the working of 4-bit Asynchronous Up counter with a circuit and timing diagram.
93. Describe the working of 4-bit Asynchronous Down counter with a circuit and timing diagram.
94. Explain the working of 4-bit Asynchronous Up-Down counter with a circuit and timing diagram.
95. Describe the working of Asynchronous decade counter with a circuit and timing diagram.
96. Explain the working of 4-bit Synchronous counter with a circuit and timing diagram.
97. Distinguish between Asynchronous and Synchronous counters.
98. Define Analog signal.
99. Define a Digital signal.
100. State the need for A/D conversion and D/A conversion.
101. State the basic principle of D/A conversion.
102. Define resolution.
103. Define Accuracy.
104. Define Monotonicity.
105. State the settling time of D/A converter.
106. Describe the working of 4-bit D/A converter using Binary weighted resistors.
107. Explain the working of 4-bit D/A converter using R-2R ladder network.
108. Describe the working of 3-bit Flash Type A/D Converter.
109. Explain the A/D conversion using successive approximate method.
110. Explain the working of Counter type A/D converter.
111. Identify the fastest A/D converter and justify.
112. Mention the applications of ADC.
113. State the applications of DAC.

**Suggested Student Activities**

1. Student identifies different digital devices used in day to day life by a common man at home.
2. Discuss about the drawbacks of digital devices like performance AC remotes at different temperatures etc.
3. Student reads a mini project from a magazine on a topic related to this course and presents a seminar to share the idea of it.
4. Group discussion
5. Surprise test

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO\PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | 3 | 2 | - | - | - | - | - | - | - | 3 | 1,2,10 |
| CO2 | - | 3 | - | - | 2 | - | - | 2 | - | 3 | 2,5,8,10 |
| CO3 | - | 3 | - | - | 3 | - | - | 2 | - | 3 | 2,5,8,10 |
| CO4 | - | 3 | - | - | 3 | - | - | - | - | 3 | 2,5,10 |
| CO5 | - | 3 | - | - | 3 | - | - | - | - | 3 | 2,5,10 |
| CO6 | - | 3 | - | - | 3 | - | - | - | - | 3 | 2,5,10 |

|  |
| --- |
| **Continuous Internal Evaluation (CIE)** |

|  |  |  |
| --- | --- | --- |
| Test | Units | Marks |
| Mid Sem 1 | 1 and 2 | 20 |
| Mid Sem 2 | 3 and 4 | 20 |
| Slip Test 1 | 1 and 2 | 5 |
| Slip Test 2 | 3 and 4 | 5 |
| Assignments | - | 5 |
| Seminars | - | 5 |
|  | Total | 60 |

**QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 4 | 1 | Nil | 4 Marks |
| 02 | Part-B | Understanding(U) | 4 | 3 | 2 | 6 Marks |
| 03 | Part-C | Application(A) | 4 | 5 | 2 | 10 Marks |
| Total Marks | | | | | | 20 Marks |

**MID SEM-I EXAM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A |
| 1 | Unit-I | 1,2 | 5(a) | 7(a) |
| 5(b) | 7(b) |
| 2 | Unit-II | 3,4 | 6(a) | 8(a) |
| 6(b) | 8(b) |
| Total Questions |  | 4 | 4 | 4 |

**MID SEM-II EXAM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Unit No | R | U | A |
| 1 | Unit-III | 1,2 | 5(a) | 7(a) |
| 5(b) | 7(b) |
| 2 | Unit-IV | 3,4 | 6(a) | 8(a) |
| 6(b) | 8(b) |
| Total Questions |  | 4 | 4 | 4 |

**The length of answer for each question framed in respect of Part-A, B&C shall not exceed  
 ¼ of a page side, 1 page side and 2page sides respectively.**

**QUESTION PAPER PATTERN FOR SEMESTER END EXAM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 8 | 1 | Nil | 8 Marks |
| 02 | Part-B | Understanding(U) | 8 | 3 | 4 | 12 Marks |
| 03 | Part-C | Application(A) | 8 | 5 | 4 | 20 Marks |
| Total Marks | | | | | | 40 Marks |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit No | Questions to be set for SEE | | | | |
| R | | | U | A |
| I | Q4 | Q1 | | Q9(a) | Q13(a) |
| II |
| III | Q2 | | Q10(a) | Q14(a) |
| IV |
| V | Q3 | Q5,Q6 | Q9(b), Q11(a), Q11(b) | Q13(b) Q15(a), Q15(b) |
| VI | Q7,Q8 | Q10(b), Q12(a), Q12(b) | Q14(b) Q16(a), Q16(b) |
| Total Questions | 8 | | | 8 | 8 |

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

**Model Question paper**

**DEEE IV Semester**

**Mid Semester-I Examination**

**Corse Code: 18EE-405C Duration: 1 Hour**

**Course Name: Digital Electronics Max.Marks: 20**

**PART-A**

Answer **all** questions, Each Question carries *one* mark 4**x1 = 4 Marks**

1. Convert binary number 1001(2) to Decimal.
2. Write the 1’s compliment of 1001(2).
3. Draw the symbol of two input AND gate.
4. List the Universal gates.

**PART-B**

Answer the following questions. Each question carries *three* marks **2x 3 = 6 Marks**

1. a) Convert the following hexadecimal numbers into decimal equivalent B2F8.

(OR)

b) Define weighted and Un-weighted codes

1. a) Realize basic gates using NAND gate.

(OR)

b) State De-Morgan’s laws.

**PART-C**

Answer the following questions. Each question carries *five* marks **2x5 = 10Marks**

a) State the Unique feature of Gray code and its application

(OR)

b) Perform binary subtraction of 100101**(2)** from 110011**(2)** using 2’s complement method.

8)

a) Define EX-OR and EX-NOR Gates and write their Truth Table, output expression and draw Symbol.

(OR)

b) Simplify Boolean expressions using K-map and draw the logic diagram.

f = A B C + A B C + A B C + A B C

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

**Model Question paper**

**DEEE IV Semester**

**Mid Semester-II Examination**

**Corse Code: 18EE-405C Duration: 1 Hour**

**Course Name: Digital Electronics Max.Marks: 20**

**PART-A**

Answer **all** questions, Each Question carries *one* mark 4**x1 = 4 Marks**

1. List any two combinational circuits.
2. Define Multiplexer.
3. Define sequential circuit.
4. List any two applications of flip-flops.

**PART-B**

Answer the following questions. Each question carries *three* marks **2x 3 = 6 Marks**

1. a) Develop the Truth table, output expression and logical diagram of a Half-adder.

(OR)

b)Explain the working of 4:1 Multiplexer with Truth table .

1. a) State the concept of Edge triggering.

(OR)

b) Define asynchronous inputs.

**PART-C**

Answer the following questions. Each question carries *five* marks **2x5 = 10Marks**

1. a) Realize Full-adder using Half-adder and basic gates.

(OR)

b) Develop a 4-bit parallel adder using Full-Adder and explain its operation

1. a) Explain the working of clocked J-K flip-flop with truth table.

(OR)

b) Discuss the methods to overcome race around condition in J-K flip-flops.

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

**Model Question paper**

**DEEE IV Semester**

**Semester End Examination**

**Corse Code: 18EE-405C Duration: 2 Hours**

**Course Name: Digital Electronics Maximum .Marks: 40**

**PART-A**

**Answer all questions 8x1 = 8 Marks**

1. Convert binary number 0111(2) to Decimal.
2. Write the truth table for an Half-adder.
3. List the different types of registers.
4. Draw the symbol of D-type Flip-Flop.
5. State the need for a Register.
6. Define Counter.
7. Define Analog Signal.
8. Define Resolution of a D/A converter.

**PART-B**

**Answer the following questions** **4x3= 12 Marks**

* 1. Subtract 11110**(2)** from 10101**(2)** by using 2’s Compliment method.

(OR)

* 1. Differentiate between Counters and Timers in three aspects.
  2. Define a Combinational Circuit.

(OR)

* 1. State the need for A/D and D/A conversion.
  2. Draw the circuit of of 4-bit shift left registers.

(OR)

* 1. Differentiate between Synchronous and Asynchronous counters.
  2. State the basic principle of D/A conversion.

(OR)

* 1. An 8-bit D/A convertor has a step size of 20mV.Determine the full-scale output and percentage resolution.

**PART-C**

**Answer the following questions** **4x 5=20 Marks**

* 1. Convert the following Boolean function into SOP and POS form

f (A,B,C)= A + A B C + A B

(OR)

* 1. Explain the working of 4-bit Asynchronous Up counter with a circuit and timing diagram
  2. Explain the working of 8:1 Mux along with Truth table and Logical Diagram.

(OR)

* 1. Explain the working of a 3-bit flash type ADC.
  2. Explain shifting data bit-by-bit in a 3-bit shift - right register with relevant diagram.

(OR)

* 1. Explain the working of Three bit synchronous up counter with block diagram, truth table and timing diagram.
  2. Explain the working of Counter type A/D converter

(OR)

* 1. Explain A/D conversion using successive approximate method.

**ELECTRICAL ENGINEERING DRAWING PRACTICE**

|  |  |
| --- | --- |
| **Course Title : Electrical Engineering Drawing Practice Semester : IV**  **Teaching Scheme in Periods :15:0:30**  **(L:T:P)**  **Methodology :Lecture + Practical**  **CIE : 60 Marks**  **(Continuous Internal Evaluation)** | **Course Code : 18EE-406P**  **Course Group : Practical**  **Credits : 1.5**  **Total Contact Periods :45**  **SEE : 40 Marks**  **(Semester End Examination)** |

**Pre requisites**

The student should have knowledge of Engg. Graphics.

**Course Outcomes**

|  |  |
| --- | --- |
| CO1 : | Draw various Electrical symbols & fuses |
| CO2 : | Draw the sectional views of transformers |
| CO3 : | Draw the cross sectional view of different types of underground cables |
| CO4 : | Develop DC & AC machine windings. |
| CO5 : | Draw the line supports and layout of substations |
| CO6 : | Draw various Power system protection Equipment |

**Blue Print of Marks for SEE**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Unit No** | **Unit Name** | **Periods** | **Questions to be set for SEE** | | |
| **R** | **U/A** | |
| 1 | Electrical symbols & fuses | 06 | Q1 | Q5(a) | |
| 2 | Transformers | 09 |
| 3 | Underground Cables | 06 | Q2 |
| 4 | D.C & A.C windings | 09 |
| 5 | Line Supports and Substations | 06 | Q3 | Q5(b) | Q6(a) |
| 6 | Power System Protection Equipments | 09 | Q4 | Q6(b) |
| **Total** | | 45 | 4 | 4 | |

**Course Content**

* + 1. **Electrical symbols & fuses Duration: 6 Periods (L:2 - P:4)**

Graphical Electrical symbols of different electrical devices - Views of fuses

* + 1. **Transformers Duration: 9 Periods (L:3 - P:6)**

Single- phase single stepped core type transformer - Core sections, sectional views, Three phase three stepped core type transformers- Core sections, sectional views.

* + 1. **Underground Cables Duration: 6 Periods (L:2 - P:4)**

Cross sectional views of single core, 2 core, 3 core, 3.5 core & 4 core cables, SL & H type cables.

* + 1. **DC &AC winding Duration: 9 Periods (L:3 - P:6)**

Simplex lap and wave winding for DC armature - Single layer lap and wave winding for 1- phase and 3- phase AC machines

* + 1. **Line Supports and Substations layout Duration: 6 Periods (L:2 - P:4)**

Supporting steel towers –Poles – Stays & Guys - single line diagram substations - Single line diagram of Grid connected Solar PV system

* + 1. **Power system Protection Equipment Duration: 9 Periods (L:3 - P:6)**

Lightning arrestors – Circuit breakers - Earthing

**Recommended Books**

* 1. “Electrical Engineering Drawing” by S.K.Bhattacharya, NewAge International Publishers
  2. “Electrical Drafting” - S.F. DEVALAPUR EEPB
  3. “Electrical Drawing” - K.L. NARANG

**Suggested E-Learning references**

* + 1. [www.nptel.ac.in](http://www.nptel.ac.in)
    2. <https://www.academia.edu> (<https://www.academia.edu/26976158/ELECTRICAL>\_ENGINEERING\_drawing\_by\_Dr.\_S\_K\_Bhattacharya.pdf)

**Specific Learning Outcomes**

**After completion of the subject, the student shall be able to**

* 1. Draw standard symbols of electrical components: Constant Resistor and variable Resistor, Constant Inductor and variable inductor, Constant capacitor and variable capacitor.
  2. Draw standard symbols of electrical components: DC Voltage Source, DC current source, Battery, Single phase AC voltage source, three phase AC voltage source, transformer, Ammeter, Voltmeter, Powerfactor meter and Wattmeter.
  3. Draw standard symbols of electrical fixtures: On way Switch and two ways Switch, Normally Open & Normally Close Push buttons, Fuse, Circuit breaker, Isolators, Ground and Electrical Switchbox.
  4. Draw standard symbols of electrical fixtures: Wall mounted lamp fixture, Ceiling fan, Power vent fan, Fluorescent light fixture, Bell, Buzzer, Single and three phase Electric motors, Motor starter.
  5. Draw Sectional end view of Rewirable fuse.
  6. Draw Sectional Elevation of Rewirable fuse.
  7. Draw Sectional end view of HRC fuse.

2.1 Draw the cross section of single stepped core of one limb of transformer.

2.2 Draw the cross section of 2 stepped core of one limb of transformer.

2.3 Draw the cross section of 3 stepped core of one limb of transformer.

2.4 Draw sectional Plan of a single-phase single stepped core type Transformer from the   
given data.

2.5 Draw sectional Plan & Elevation of a single-phase single stepped core type   
Transformer from the given data.

2.6. Draw sectional plan of a 3 phase three stepped core type transformers from the given   
 data.

2.7 Draw sectional Plan & Elevation of a 3 phase three stepped core type transformers   
 from the given data.

* 1. Draw the cross sectional view of single core cable.
  2. Draw the cross sectional view of Two core cable.
  3. Draw the cross sectional view of three core XLPE insulated armoured cable.
  4. Draw the cross sectional view of 3.5 core XLPE insulated armoured cable.
  5. Draw the cross sectional view of four core XLPE insulated armoured cable.
  6. Draw the cross sectional view of H type cable.
  7. Draw the cross sectional view of S.L type cable.
  8. Develop winding diagram for a simplex Lap connected DC machine
  9. Develop winding diagram for a simplex Wave connected DC machine
  10. Develop winding diagram of a 1-phase single layer lap winding.
  11. Develop winding diagram of a 1-phase single layer wave winding.
  12. Develop winding diagram of a 3-phase single layer lap winding.
  13. Develop winding diagram of a 3-phase single layer wave winding.

* 1. Draw the sketch of 132 KV steel tower of single circuit.
  2. Draw the sketch of 132 KV steel tower of double circuit.
  3. Draw the sketch of 220 KV steel towers of single circuit.
  4. Draw the sketch of 220 KV steel towers of double circuit.
  5. Draw the sketch of three phase 11KV pole.
  6. Draw the view of stranded steel wire guy marking all the accessories.
  7. Draw the single line diagram of 33kV / 11kV substation.
  8. Draw the single line diagram of 220KV/132 KV substation
  9. Draw single line diagram of Grid connected solar PV system.
  10. Draw the elevation of Plinth mounted substation.
  11. Draw the elevation of Pole mounted substation.

1. Draw the dimensioned sketch of Pipe earthing.
2. Draw the dimensioned sketch of Plate earthing.
3. Draw the sketch of Expulsion type lightning arrestor.
4. Draw the sketch of thyrite type lightning arrestor.
5. Draw the sketch of metal oxide type lightning arrestor.
6. Draw the sketch of Minimum oil circuit breaker with neat labelling.
7. Draw the sketch of Vacuum circuit breaker with neat labelling.
8. Draw the sketch of SF6 circuit breaker with neat labelling.

**Suggested Student Activities**

1. Student visits Distribution Transformer i.e., Pole mount and Plinth mount, note down the ratings of transformer and draw the sketch of the substation mentioning the parts.
2. Student should identify voltage ratings of different electrical lines and supports including LA’s, Guys etc running near their area and share the information on the same.
3. Group discussion
4. Surprise test

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO\PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | - | 1 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |
| CO2 | 1 | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 1,2,3,4,7,8,10 |
| CO3 | - | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |
| CO4 | - | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |
| CO5 | - | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |
| CO6 | - | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |

|  |
| --- |
| **Continuous Internal Evaluation (CIE)** |

|  |  |  |
| --- | --- | --- |
| Test | Units | Marks |
| Mid Sem 1 | 1 and 2 | 20 |
| Mid Sem 2 | 3 and 4 | 20 |
| Slip Test 1 | 1 and 2 | 5 |
| Slip Test 2 | 3 and 4 | 5 |
| Assignment | 1 | 5 |
| Seminars | 1 | 5 |
|  | Total | 60 |

**QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R)/ Understanding(U) | 2 | 4 | Nil | 8 Marks |
| 02 | Part-B | Understanding(U)/ Application(A) | 2 | 12 | 1 | 12 Marks |
| Total Marks | | | | | | 20 Marks |

**MID SEM-I EXAM**

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Unit No | R/U | U/A |
| 1 | Unit-I | Q1 | Q3(a) |
| 2 | Unit-II | Q2 | Q3(b) |
| Total Questions |  | 2 | 2 |

**MID SEM-II EXAM**

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Unit No | R/U | U/A |
| 1 | Unit-III | Q1 | Q3(a) |
| 2 | Unit-IV | Q2 | Q3(b) |
| Total Questions |  | 2 | 2 |

**QUESTION PAPER PATTERN FOR SEMESTER END EXAM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No | Description | Level | No of Questions | Marks for each question | Choice | Total Marks |
| 01 | Part-A | Remembering(R) | 4 | 4 | Nil | 16 Marks |
| 02 | Part-B | Understanding(U)/ Application(A) | 4 | 12 | 2 | 24 Marks |
| Total Marks | | | | | | 40 Marks |

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit No** | **Questions to be set for SEE** | | |
| **R/U** | **U/A** | |
| I | Q1 | Q5(a) | |
| II |
| III | Q2 |
| IV |
| V | Q3 | Q5(b) | Q6(a) |
| VI | Q4 | Q6(b) |
| **Total** | 4 | 4 | |

**STATE board OF TECHNICAL EDUCATION &TRAINING ,TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-406P**

**ELECTRICAL ENGG.DRAWING PRACTICE**

**MID SEM -i EXAM MODEL PAPER**

**Time: 1 hour Total Marks: 20**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A Marks: 2 x 4M= 8**

**Instructions:** (1) Answer all questions

(2) Each question carries **Four** marks.

1. Draw the following electrical symbols
2. Battery
3. Buzzer
4. Capacitor
5. Ammeter
6. fuse
7. Draw the cross section of 2 stepped core of one limb of transformer

**PART - B Marks: 1 x12M = 12**

**Instructions:** (1) Answer the following question.

(2) Each question carries **twelve** marks.

1. (a) Draw the following views of a single phase 220/110 V 10 KVA transformer
2. Front elevation
3. Plan in full section

Core: 1. Cross section of the core =one step core

2. Diameter of the circumcircle =7.5 cm

3. Distance between core centres =15 cm

Yoke height =8 cm

LT winding: 1.Outside diameter of LT coil =9 cm

2.Inside diameter of LT coil=8 cm

3. Height of LT winding =23 cm

4. Number of turns per limb=50

HT winding: 1.Outside diameter of HT coil =13.5 cm

2. Inside diameter of LT coil=11 cm

3. Height of LT winding =23 cm

4. Number of turns per limb=100

Total height of the transformer =40 cm

**(OR)**

3(b) Draw Sectional Plan and Elevation of Rewirable fuse.

**STATE board OF TECHNICAL EDUCATION &TRAINING ,TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-406P**

**ELECTRICAL ENGG.DRAWING PRACTICE**

**MID SEM -iI EXAM MODEL PAPER**

**Time: 1 HOUR Total Marks: 20**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A Marks: 2 x 4M= 8**

**Instructions:** (1) Answer all questions

(2) Each question carries **Four** marks.

* + 1. Draw the cross sectional view of Two core cable.
    2. Draw the table to develop winding diagram of a Single phase 4 pole induction motor with 24 slots, single layer full pitched lap winding.

**PART - B Marks: 1 x12M = 12**

**Instructions:** (1) Answer the following question.

(2) Each question carries **twelve** marks.

3(a) Develop winding diagram for a DC machine with 4 Pole 24 slot simplex Wave progressive winding with table.

**OR**

3(b) Draw the cross sectional view of four-core XLPE insulated armoured cable.

**STATE board OF TECHNICAL EDUCATION &TRAINING ,TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**Sub code: 18EE-406P**

**ELECTRICAL ENGG.DRAWING PRACTICE**

**SEMESTER end EXAM MODEL PAPER**

**Time: 2 hrs Total Marks: 40**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART – A Marks: 4 x 4M= 16**

**Instructions:** (1) Answer all questions

(2) Each question carries **Four** marks.

1. Draw Sectional end view of HRC fuse.
2. Draw the cross sectional view of 3 core armoured cable
3. Draw the single line diagram of 33kV / 11kV substation
4. Draw the free hand sketch of Thyrite type lightning arrester

**PART - B Marks: 2x12M = 24**

**Instructions:** (1) Answer all questions.

(2) Each question carries **twelve** marks.

5(a) Draw the elevation of Plinth mounted substation.

**OR**

5(b) Draw the dimensioned sketch of Plate earthing.

6(a) Draw single line diagram of Grid connected solar PV system.

**OR**

6(b) Draw the sketch of Minimum oil circuit breaker with neat labeling.

**AC MACHINES LAB PRACTICE**

|  |  |
| --- | --- |
| **Course Title : AC Machines Lab Practice Semester : IV**  **Teaching Scheme in Periods :15:0:30**  **(L:T:P)**  **Methodology :Lecture + Practical**  **CIE : 60 Marks**  **(Continuous Internal Evaluation)** | **Course Code : 18EE-407P**  **Course Group : Practical**  **Credits : 1.5**  **Total Contact Periods :45**  **SEE : 40 Marks**  **(Semester End Examination)** |

**Pre Requisites**

This course requires the knowledge of AC machines Transformers and Alternators.

**Course Outcomes**

|  |  |
| --- | --- |
| **Course Outcome** | |
| CO1 | Evaluate the performance of single phase transformer by conducting suitable tests. |
| CO2 | Analyze the load sharing between two Single phase transformers when they are operated in parallel |
| CO3 | Familiarize with Three phase Transformers |
| CO4 | Determine the dielectric strength of transformer oil |
| CO5 | Determine regulation of an Alternator by conducting suitable tests |
| CO6 | Synchronise the given Alternator with Supply Mains |

**Suggested Learning Outcomes**

**After completion of the subject, the student shall be able to**

**1.0 Evaluate the performance of single phase transformer by conducting suitable tests.**

* 1. Identify the terminals on 1-phase transformer.
  2. Conduct turns ratio test on given single phase transformer.
  3. Conduct O.C. and S.C. tests on 1-phase Transformer and from the result

a) Draw the equivalent circuit.

b) Calculate efficiency at various loads and power factors.

c) Find the load at which maximum efficiency occurs.

* 1. Obtain efficiency of 1-phase Transformer by conducting load test.
  2. Obtain regulation of 1-phase Transformer by conducting load test.
  3. Obtain the efficiency and regulation of two similar 1-phase transformers by conducting

Sumpner’s test.

1. **Analyze the load sharing between two Single phase transformers when they are operated**

**in parallel**

2.1 Connect two identical 1-ph transformers in parallel and analyze the load sharing.

**3.0 Familiarize with Three phase Transformers**

1. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Y-Y topology.
2. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Y- Δ topology.
3. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Δ -Y topology.
4. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Δ - Δ topology.

**Note**: Three single phase transformers may be used instead of a three phase transformer.

**4.0 Determine the dielectric strength of transformer oil**

4.1 Obtain the Dielectric Strength of transformer oil using oil testing kit.

**5.0 Determine regulation of an Alternator by conducting suitable tests**

5.1 Obtain voltage regulation by conducting (direct) load test on Alternator.

5.2 Obtain the regulation of Alternator by using synchronous impedance method.

**6.0 Synchronise the given Alternator with Supply Mains**

6.1 Synchronise the given Alternator with supply mains by using bright lamp method

**Recommended Books**

1. B.L. Theraja-Electrical Technology - Vol -II S.Chand& Co.
2. M.G Say -AC machines
3. P.S. Bhimbra -Electrical machines - Khanna Publishers
4. A.E. Fritzgerald, C. Kingsley and S. Umans Electrical machinery-McGraw Hill
5. MV Deshpande-Electric machines - Wheeler publishing.
6. BR Gupta and VandanaSinghal - Fundamentals of Electric machines

**Suggested E-Learning references**

1. http://electrical4u.com/
2. [www.nptel.ac.in](http://www.nptel.ac.in)
3. [https://www.siemens.com/content/dam/internet/siemens-com/global/products-services](https://www.siemens.com/content/dam/internet/siemens-com/global/products-services/energy/high-voltage/transformers/brochures-transformers-en/siemens-transformers-in-the-power-engineering-guide-transformers-product-brochure.pdf)

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO\PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |
| CO2 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |
| CO3 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |
| CO4 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |
| CO5 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |
| CO6 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |

**STATE board OF TECHNICAL EDUCATION &TRAINING ,TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**MID SEM - I**

**Course Code: 18EE-407P Duration: 1 hours**

**Course Name: AC Machines Lab Practice Max.Marks:20**

**-------------------------------------------------------------------------------------------------------------------------------**

**Note: *Answer allotted Question.***

***Instructions to the Candidate:***

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

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

* + - 1. Identify the terminals on 1-phase transformer and determine the turn ratio on transformer
      2. Conduct O.C. and S.C. tests on 1-phase Transformer and from the result

a) Draw the equivalent circuit.

b) Calculate efficiency at various loads and power factors.

c) Find the load at which maximum efficiency occurs.

1. Obtain efficiency of 1-phase Transformer by conducting load test.
2. Obtain regulation of 1-phase Transformer by conducting load test.
3. Obtain the efficiency and regulation of two similar 1-phase transformers by conducting

Sumpner’s test.

1. Connect two identical 1-ph transformers in parallel and analyze the load sharing.

**STATE board OF TECHNICAL EDUCATION &TRAINING ,TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**MID SEM - II**

**Corse Code: 18EE-407P Duration:1 hours**

**Course Name: AC Machines Lab Practice Max.Marks:20**

**-------------------------------------------------------------------------------------------------------------------------------**

**Note: *Answer allotted Question.***

***Instructions to the Candidate:***

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

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

1. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Y-Y topology.
2. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Y- Δ topology.
3. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Δ -Y topology.
4. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Δ - Δ topology.
5. Obtain the Dielectric Strength of transformer oil using oil testing kit.

**STATE board OF TECHNICAL EDUCATION &TRAINING, TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**semester end examination**

**Corse Code: 18EE-407P Duration:2 hours**

**Course Name: AC Machines Lab Practice Max.Marks:40**

**-------------------------------------------------------------------------------------------------------------------------------**

**Note: *Answer allotted Question.***

***Instructions to the Candidate:***

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

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

* + 1. Identify the terminals on 1-phase transformer and determine the turn ratio on transformer
    2. Conduct O.C. and S.C. tests on 1-phase Transformer and from the result

a) Draw the equivalent circuit.

b) Calculate efficiency at various loads and power factors.

c) Find the load at which maximum efficiency occurs.

* + 1. Obtain efficiency of 1-phase Transformer by conducting load test.
    2. Obtain regulation of 1-phase Transformer by conducting load test.
    3. Obtain the efficiency and regulation of two similar 1-phase transformers by conducting

Sumpner’s test.

* + 1. Connect two identical 1-ph transformers in parallel and analyze the load sharing.
    2. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Y-Y topology.
    3. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Y- Δ topology
    4. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Δ -Y topology.
    5. Verify the relation between (i) Phase Voltage & Line Voltage (ii) Phase current & Line Current of three phase transformer in Δ - Δ topology.
    6. Obtain the Dielectric Strength of transformer oil using oil testing kit.
    7. Obtain voltage regulation by conducting (direct) load test on Alternator.
    8. Obtain the regulation of Alternator by using synchronous impedance method.
    9. Synchronise the given Alternator with supply mains by using bright lamp method

**ELECTRICAL CAD LAB PRACTICE**

|  |  |
| --- | --- |
| **Course Title : Electrical CAD Lab Practice Semester : IV**  **Teaching Scheme in Periods :15:0:30**  **(L:T:P)**  **Methodology :Lecture + Practical**  **CIE : 60 Marks**  **(Continuous Internal Evaluation)** | **Course Code : 18EE-408P**  **Course Group : Practical**  **Credits : 1.5**  **Total Contact Periods :45**  **SEE : 40 Marks**  **(Semester End Examination)** |

**Pre requisites**

This course requires the knowledge of basic commands of CAD software.

**Course Outcomes**

|  |  |
| --- | --- |
| **Course Outcome** | |
| CO1 | Draw the symbols of Electrical components |
| CO2 | Draw the wiring layouts |
| CO3 | Draw the views of Electrical machines |
| CO4 | Draw the single line diagram of the Substations |
| CO5 | Draw the HV line supports |
| CO6 | Draw the views of Earthing |

**Suggested Learning Outcomes**

**After completion of the subject, the student shall be able to**

**1.0 Draw the symbols of Electrical components**

* 1. Draw standard symbols of electrical components: Constant Resistor and variable Resistor, Constant Inductor and variable inductor, Constant capacitor and variable capacitor, transformer.
  2. Draw standard symbols of electrical components: DC Voltage Source, DC current source, Battery, Single phase AC voltage source, three phase AC voltage source, Wall mounted lamp fixture, Ceiling fan.
  3. Draw standard symbols of electrical fixtures: On way Switch and two way Switch, Normally Open & Normally Close Push buttons, Fuse, Circuit breaker, Isolators and Ground.

**2.0 Draw the wiring layouts**

* 1. Draw the wiring layout for a given Single bedroom house.
  2. Draw the Wiring diagram of 3 phase Induction motor with energy meter, 1-phase preventer, Y- Δ starter with control panel/switchboard.
  3. Draw the wiring layout of Pump shed for given dimensions.
  4. Draw the wiring layout of workshop(with 2 or 3 Induction motors)

**3.0 Draw the views of Electrical machines**

1. Draw the cross section of single stepped core of one limb of transformer.
2. Draw the cross section of 2 stepped core of one limb of transformer.
3. Draw the cross section of 3 stepped core of one limb of transformer.
4. Draw sectional Plan of a single-phase single stepped core type Transformer from the given data.
5. Draw sectional plan of a 3 phase three stepped core type transformers from the given data.
6. Draw Plan & Elevation of a 3 phase transformers with cooling tubes.
7. Draw Elevation & End view of a 3 Squirrel cage Induction motor.
8. Draw Elevation & End view of a 3 Slip ring Induction motor.

**4.0 Draw the single line diagram of the Substations**

1. Draw the single line diagram of 33kV / 11kV substation.
2. Draw single line diagram of Grid connected solar PV system.

**5.0 Draw the HV line supports**

* 1. Draw the sketch of 132 KV steel tower of single circuit.
  2. Draw the sketch of 132 KV steel tower of double circuit.
  3. Draw the sketch of 220 KV steel towers of single circuit.
  4. Draw the sketch of 220 KV steel towers of double circuit.

**6.0 Draw the views of Earthing**

1. Draw the dimensioned sketch of Plate earthing.
2. Draw the dimensioned sketch of Pipe earthing

**Recommended Books**

1. Computer Aided Electrical Drawing

- YOGESH, NAGARAJA, NANDAN PHI Publication

2. Electrical Drafting - S.F. DEVALAPUR EEPB

3. Electrical Drawing - K.L. NARANG

4. Electrical Engineering Drawing – S. K. BHATTACHARYA

5. QCAD - An Introduction to Computer-Aided Design - By Andrew Mustun

**Suggested E-Learning references**

1. http://www.faveodesign.co.uk/CAD\_Drawings.html

2. http://cad.about.com/od/Learn\_CAD/a/The-Fundamentals-Of-Drafting.htm

3. http://transport.itu.edu.tr/PDF/iml332e/Fundamentals%20of%20CAD.

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO\PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | - | 1 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |
| CO2 | 1 | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 1,2,3,4,7,8,10 |
| CO3 | - | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |
| CO4 | - | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |
| CO5 | - | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |
| CO6 | - | 3 | 3 | 3 | - | - | 2 | 1 | - | 3 | 2,3,4,7,8,10 |

**STATE board OF TECHNICAL EDUCATION &TRAINING ,TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**MID SEM - I**

**Corse Code: 18EE-408P Duration: 1 hour**

**Course Name: Electrical CAD Lab Practice Max.Marks:20**

**-------------------------------------------------------------------------------------------------------------------------------**

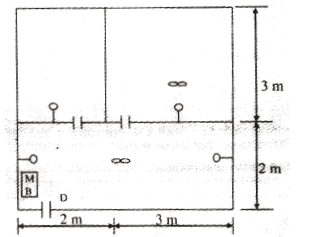
**Note: *Answer allotted Question.***

***Instructions to the Candidate:***

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

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

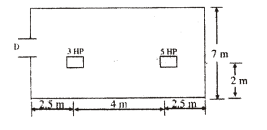
* 1. Draw standard symbols of electrical components: Constant Resistor and variable Resistor, Constant Inductor and variable inductor, Constant capacitor and variable capacitor, transformer.
  2. Draw standard symbols of electrical components: DC Voltage Source, DC current source, Battery, Single phase AC voltage source, three phase AC voltage source, Wall mounted lamp fixture, Ceiling fan.
  3. Draw standard symbols of electrical fixtures: On way Switch and two way Switch, Normally Open & Normally Close Push buttons, Fuse, Circuit breaker, Isolators and Ground.
  4. Draw the wiring layout for a given Single bedroom house

.

* 1. Draw the Wiring diagram of 3 phase Induction motor with energy meter, 1-phase preventer, Y- Δ starter with control panel/switchboard.
  2. Draw the wiring layout of Pump shed for dimensions given as below:

The distance between the LT pole and pump set shed (5m x 3m x 3m) is 10m. Assume any missing data.

* 1. Draw the wiring layout of given workshop.



**STATE board OF TECHNICAL EDUCATION &TRAINING ,TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**MID SEM - II**

**Corse Code: 18EE-408P Duration:1 hour**

**Course Name: Electrical CAD Lab Practice Max.Marks:20**

**-------------------------------------------------------------------------------------------------------------------------------**

**Note: *Answer allotted Question.***

***Instructions to the Candidate:***

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

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

1. Draw the cross section of single stepped core of one limb of transformer.
2. Draw the cross section of 2 stepped core of one limb of transformer.
3. Draw the cross section of 3 stepped core of one limb of transformer.

4. Draw sectional Plan of a 1-phase, 220/660 V, 2 kVA core-type transformer with the following data : Cross-section of the core is One step, Diameter of the circle 6 cm, Distance between core centres 13cm.

LT Winding: Outer diameter of 1st layer 9cm Inner diameter of 1st layer 6.5 cm

HT Winding: Outer diameter of HT winding 11 cm Inner diameter of HT winding 9·5 cm.

5. Draw sectional plan of a 3-phase, 220/660 V, 10 kVA core-type transformer with the following data: Cross-section of the core is 3 stepped Diameter of the circle 6·5 cm Distance between core centres 18·5 cm.

LT Winding: Outer diameter of 1st layer 9·25 cm Inner diameter of 1st layer 7·0 cm Outer diameter of 2nd layer 12·1 cm Thickness of each layer 1·2 cm

HT Winding: Outer diameter of HT winding 17·0 cm Inner diameter of HT winding 12·5 cm

1. Draw Plan & Elevation of a 3 phase transformers with cooling tubes.
2. Draw Elevation & End view of a 3 Squirrel cage Induction motor.
3. Draw Elevation & End view of a 3 Slip ring Induction motor.
4. Draw the single line diagram of 33kV / 11kV substation.
5. Draw single line diagram of Grid connected solar PV system.

**STATE board OF TECHNICAL EDUCATION &TRAINING, TELANGANA**

**diploma in ELECTRICAL & eLECTRONICS eNGG.**

**semester end examination**

**Corse Code: 18EE-408P Duration:2 hours**

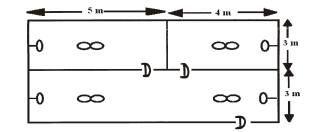
**Course Name: Electrical CAD Lab Practice Max.Marks:40**

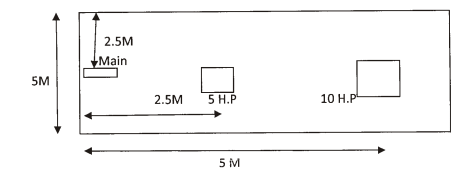
**-------------------------------------------------------------------------------------------------------------------------------**

**Note: *Answer allotted Question.***

***Instructions to the Candidate:***

* + 1. ***Choose appropriate values when not mentioned in the question***
  1. Draw standard symbols of electrical components: Constant Resistor and variable Resistor, Constant Inductor and variable inductor, Constant capacitor and variable capacitor, transformer.
  2. Draw standard symbols of electrical components: DC Voltage Source, DC current source, Battery, Single phase AC voltage source, three phase AC voltage source, Wall mounted lamp fixture, Ceiling fan.
  3. Draw standard symbols of electrical fixtures: On way Switch and two way Switch, Normally Open & Normally Close Push buttons, Fuse, Circuit breaker, Isolators and Ground.
  4. Draw the wiring layout for a given Single bedroom house.



* 1. Draw the Wiring diagram of 3 phase Induction motor with energy meter, 1-phase preventer, Y- Δ starter with control panel/switchboard.
  2. Draw the wiring layout of an irrigation pump set of 7·5 kW is to be installed at a distance of 15 m from a 3-phase, 415 V, distribution line. The pump room dimensions are 3 m × 5 m, –3·5 m height. Efficiency and power factors are 85% and 0·9 respectively. Assume any missing data.
  3. Draw the wiring layout of workshop
  4. Draw the cross section of single stepped core of one limb of transformer with diameter of circle as 6 cm.
  5. Draw the cross section of 2 stepped core of one limb of transformer with diameter of circle as 8 cm.
  6. Draw the cross section of 3 stepped core of one limb of transformer with diameter of circle as 7.5 cm.
  7. Draw sectional Plan of a 1-phase, 220/660 V, 2 kVA core-type transformer with the following data : Cross-section of the core is One step, Diameter of the circle 6 cm, Distance between core centres 13cm.

LT Winding: Outer diameter of 1st layer 9cm Inner diameter of 1st layer 6.5 cm

HT Winding: Outer diameter of HT winding 11 cm Inner diameter of HT winding 9·5 cm.

* 1. Draw the sectional plan of a 3-phase, 220/660 V, 10 kVA core-type transformer with the following data: Cross-section of the core is 3 stepped Diameter of the circle 6·5 cm Distance between core centres 18·5 cm.

LT Winding: Outer diameter of 1st layer 9·25 cm Inner diameter of 1st layer 7·0 cm Outer diameter of 2nd layer 12·1 cm Thickness of each layer 1·2 cm

HT Winding: Outer diameter of HT winding 17·0 cm Inner diameter of HT winding 12·5 cm

* 1. Draw Plan & Elevation of a 3 phase transformers with cooling tubes.
  2. Draw Elevation & End view of a 3 Squirrel cage Induction motor.
  3. Draw Elevation & End view of a 3 Slip ring Induction motor.
  4. Draw the single line diagram of 33kV / 11kV substation.
  5. Draw single line diagram of Grid connected solar PV system.
  6. Draw the sketch of 132 KV steel tower of single circuit.
  7. Draw the sketch of 132 KV steel tower of double circuit.
  8. Draw the sketch of 220 KV steel towers of single circuit.
  9. Draw the sketch of 220 KV steel towers of double circuit.
  10. Draw the dimensioned sketch of Plate earthing.
  11. Draw the dimensioned sketch of Pipe earthing

**DIGITAL ELECTRONICS LAB PRACTICE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Title** | **:Digital Electronics Lab Practice** | **Course Code** | **:18EE-409P** |
| **Semester** | **:IV** | **Course Group** | **:Practical** |
| **Teaching Scheme in Periods(L:T:P)** | **:15:0:30** | **Credits** | **:1.5** |
| **Methodology** | **:Lecture + Practical** | **Total Contact Periods** | **:45** |
| **CIE** | **:60 marks** | **SEE** | **:40 Marks** |

|  |
| --- |
| **Pre requisites** |

This course requires basic understanding of Boolean Algebra and Logic Gates.

**Course Outcomes**

|  |  |
| --- | --- |
| **Course Outcome** | |
| CO1 | Verify the truth tables of Logic gates |
| CO2 | Minimize the given Boolean expression using Boolean theorems and K-Maps |
| CO3 | Verify simple combinational circuits. |
| CO4 | Analyze the operation of Flip-Flops. |
| CO5 | Apply the knowledge of Flip-Flops to design counters. |

**Suggested Learning Outcomes**

**After completion of the subject, the student shall be able to**

1. **Verify the truth tables of Logic gates**
2. Identify the different parts of the digital trainer kit and precautions to be followed in handling ICs.
3. Identify Digital ICs, noting down pin details from data sheet and pins of ICs.
4. Verify the Truth Table of Basic logic gates AND, OR and NOT.
5. Verify the truth table of universal gates NAND and NOR gates.
6. Verify the truth table of XOR and XNOR gates.
7. Implement Basic Gates using NAND and NOR Gates and validate their operation.
8. Implement XOR and XNOR gates using NAND and NOR Gates and Validate their operation.
9. **Minimize the given Boolean expression using Boolean theorems and K-Maps**

2.1 Verify De Morgan's theorems.

2.2 Verify commutative, associative and distributive Boolean laws using suitable logic gates.

2.3 Verify the reduced expression of the given Boolean expression using Boolean theorems and K-Maps.

**3.0 Verify simple combinational circuits.**

1. Verify the truth table of Half-adder circuit.
2. Verify the truth table of Full-adder circuit.
3. Verify the operation of 4:1 Multiplexer.
4. Verify the operation of 1:4 De-Multiplexer
5. Verify operation of 3 to 8 line Decoder.
   1. **Analyze the operation of Flip-Flops.**
6. Verify the truth table of RS Flip flop.
7. Verify the truth table of clocked J-K Flip-Flop
8. Verify the truth table of clocked D - Flip-Flop.
9. Verify the truth table of clocked T- Flip-Flop.
10. To realize D - Flip-Flop using J-K Flip-Flop and validate their operation.
11. To realize T - Flip-Flop using J-K Flip-Flop and validate their operation.
12. **Apply the knowledge of Flip-Flops to design counters.**
13. Verify the operation of a 3-bit or 4-bit ring counter using suitable flip-flop IC.
14. Verify the operation of a 3-bit or 4-bit Asynchronous UP counter using suitable flip-flop IC.
15. Verify the operation of a 3-bit or 4-bit Asynchronous DOWN counter using suitable flip-flop IC.
16. Verify the operation of a 3-bit or 4-bit Synchronous UP counter using suitable flip-flop IC.

**Recommended Books**

1. Digital Systems-principles and applications. Ronald J. Tocci, Neal S.Widmer, GregoryL.Moss, 10th edition
2. Digital Fundamentals by T. L. Floyd, Pearson International Publications, Ninth Edition, 2000.
3. Digital Computer Electronics by Malvino and leach. 3rd edition Tata McGraw-Hill Education
4. Modern Digital Electronics by R P Jain, Tata McGraw-Hill Education, 2003.

**Suggested E-Learning references**

* 1. [www.nptel.ac.in](http://www.nptel.ac.in)
  2. <http://freevideolectures.com/Course/3164/Digital-Electronics>
  3. <http://www.freebyte.com/electronics/>
  4. <https://www.circuitlogix.com>
  5. <http://www.vlab.co.in>
  6. [www.electronics-tutorials.ws](http://www.electronics-tutorials.ws)
  7. <http://www.allaboutcircuits.com>
  8. <http://ocw.mit.edu/>

**CO-PO Mapping Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Basic knowledge | Discipline Knowledge | Experiments and practice | Engineering Tools | Engineer and society | Environment & sustainability | Ethics | Individual and Team work | Communication | Lifelong learning | Linked PO |
| CO\PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 |  |
| CO1 | - | 3 | 3 | 2 | 2 | - | 2 | 3 | - | 3 | 2,3,4,5,7,8,10 |
| CO2 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |
| CO3 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |
| CO4 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |
| CO5 | - | 3 | 3 | - | 2 | - | 2 | 3 | - | 3 | 2,3,5,7,8,10 |

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

**Model Question paper**

**DEEE IV MID SEM I**

**Course Code: 18EE-409P Duration:1 hour**

**Course Name: Digital Electronics Lab Practice Max.Marks:20**

**-----------------------------------------------------------------------------------------------------------**

***Instructions to the Candidate:***

***(i)Answer any One of the following Questions.***

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

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

1. Identify the different parts of the digital trainer kit and precautions to be followed in handling ICs.
2. Identify Digital ICs, noting down pin details from data sheet and pins of ICs.
3. Verify the Truth Table of Basic logic gates AND, OR and NOT.
4. Verify the truth table of universal gates NAND and NOR gates.
5. Verify the truth table of XOR and XNOR gates.
6. Implement Basic Gates using NAND and NOR Gates and validate their operation.
7. Implement XOR and XNOR gates using NAND and NOR Gates and Validate their operation.
8. Verify De Morgan's theorems.
9. Verify commutative, associative and distributive Boolean laws using suitable logic gates.

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

**Model Question paper**

**DEEE IV MID SEM II**

**Course Code: 18EE-409P Duration:1 hour**

**Course Name: Digital Electronics Lab Practice Max.Marks:20**

**-----------------------------------------------------------------------------------------------------------**

***Instructions to the Candidate:***

***(i)Answer any One of the following Questions.***

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

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

1. Verify the reduced expression of the below Boolean expression using Boolean theorems and K-Maps.



1. Verify the truth table of Half-adder circuit.
2. Verify the truth table of Full-adder circuit.
3. Verify the operation of 4:1 Multiplexer.
4. Verify the operation of 1:4 De-Multiplexer
5. Verify operation of 3 to 8 line Decoder.
6. Verify the truth table of RS Flip flop.
7. Verify the truth table of clocked J-K Flip-Flop
8. Verify the truth table of clocked D - Flip-Flop.
9. Verify the truth table of clocked T- Flip-Flop.

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

**DEEE IV Semester End Examination**

**Model Question paper**

**Course Code: 18EE-409P Duration:2 hours**

**Course Name: Digital Electronics Lab Practice Max.Marks:40**

**-----------------------------------------------------------------------------------------------------------**

***Instructions to the Candidate:***

***(i)Answer any One of the following Questions.***

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

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

1. Identify the different parts of the digital trainer kit and precautions to be followed in handling ICs.
2. Identify Digital ICs, noting down pin details from data sheet and pins of ICs.
3. Verify the Truth Table of Basic logic gates AND, OR and NOT.
4. Verify the truth table of universal gates NAND and NOR gates.
5. Verify the truth table of XOR and XNOR gates.
6. Implement Basic Gates using NAND and NOR Gates and validate their operation.
7. Implement XOR and XNOR gates using NAND and NOR Gates and Validate their operation.
8. Verify De Morgan's theorems.
9. Verify commutative, associative and distributive Boolean laws using suitable logic gates.
10. Verify the reduced expression of the below Boolean expression using Boolean theorems and K-Maps. 
11. Verify the truth table of Half-adder circuit.
12. Verify the truth table of Full-adder circuit.
13. Verify the operation of 4:1 Multiplexer.
14. Verify the operation of 1:4 De-Multiplexer
15. Verify operation of 3 to 8 line Decoder.
16. Verify the truth table of RS Flip flop.
17. Verify the truth table of clocked J-K Flip-Flop
18. Verify the truth table of clocked D - Flip-Flop.
19. Verify the truth table of clocked T- Flip-Flop.
20. To realize D - Flip-Flop using J-K Flip-Flop and validate their operation.
21. To realize T - Flip-Flop using J-K Flip-Flop and validate their operation
22. Verify the operation of a 3-bit or 4-bit ring counter using suitable flip-flop IC.
23. Verify the operation of a 3-bit or 4-bit Asynchronous UP counter using suitable flip-flop IC.
24. Verify the operation of a 3-bit or 4-bit Asynchronous DOWN counter using suitable flip-flop IC.
25. Verify the operation of a 3-bit or 4-bit Synchronous UP counter using suitable flip-flop IC.

ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Title** | **: Advanced Communication Skills and Life Skills** | **Course Code** | **: 18EE- 410P** |
| **Semester** | **: IV** | **Course Group** | **: Practical** |
| **Teaching Scheme in Periods- L: T:P** | **: 15:0:30** | **Credits** | **: 1.5** |
| **Methodology** | **: Lecture + Practical** | **Total Contact Periods** | **: 45** |
| **CIE** | **: 60 Marks** | **SEE** | **: 40 Marks** |

**Rationale:**

This course is designed to impart writing skills and employability skills to the students of diploma which will help them in obtaining and maintaining the employment.

**Prerequisites:**

This course requires the basic knowledge of vocabulary, grammar and four language learning skills, viz. Listening, Speaking, Reading and Writing.

**Course Outcomes:**

|  |  |
| --- | --- |
| **Modules** | At the end of the course the students will have the ability to: |
| **Presentation Skills** | Prepare a presentation.  Use presentation aids effectively.  Develop public speaking skills.  Learn to make PowerPoint Presentations effectively.  Present a Paper using appropriate body language. |
| **Writing Reports** | Learn kinds of reports.  Learn the format of a report.  Organise ideas.  Develop essential vocabulary useful to write scientific and technical reports. |
| **Interview Skills** | Learn the techniques to face an interview.  Learn the etiquette to communicate with employers.  Learn the dos and don’ts of an interview.  Learn the frequently asked questions in interviews.  Use appropriate body language.  Learn to face interviews telephonically.  Gain the confidence to face an interview by attending mock interview. |
| **Group Discussion** | Learn the dos and don’ts of a Group Discussion.  Participate in a Group Discussion in a healthy manner.  Use effective non-verbal communication.  Use appropriate phrases and expressions useful in agroup discussion. |
| **Workplace Awareness** | Learn workplace etiquette.  Identify the knowledge, skills and attributes useful at workplace.  Build strong workplace relationships.  Learn professional ethics.  Understand gender equality at the workplace  Develop a sense of responsibility towards thesociety. |
| **Writing Skills Useful at Workplace** | Learn various writing formats useful at workplace.  Develop an ability to apply technical information in documentation.  Revise and edit written documents effectively.  Develop corresponding skills - learn the kinds of business letters - the format of a business letter.  Learn effective e-mail writing skills.  Learn Business Memos.  Learn Notes and Narratives.  Learn Forms and Applications.  Prepare templates for different purposes.  Prepare an agenda of a meeting.  Prepare the minutes of a meeting.  Prepare Notices / Circulars for various purposes.  Prepare Press release. |

**CO-PO Matrix**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Course Outcome** |  | **Linked PO** |
| **CO 1** | Making effective presentations | **R/U/A** | **1, 2, 3,4, 5,6,7,8,9,10** |
| **CO 2** | Writing scientific and technical reports | **R/U/A** | **1,2,3,4, 5,6,7,8,9,10** |
| **CO 3** | Learn to face oral and telephonic interviews | **R/U/A** | **1,2,3,4, 7,9,** |
| **CO 4** | Learn to face group discussion | **R/U/A** | **1,2,3,7,8,9** |
| **CO 5** | Learn to write various formats useful at workplace | **R/U/A** | **1,2,3,5,7,8,9,10** |
| **CO6** | Learn workplace etiquette and ethics | **R/U/A** | **1,2,3,7,8,9,10** |

**Course Contents:**

1. Presentation Skills Duration: 6 periods
2. Writing Reports Duration: 9 periods
3. Interview Skills Duration:9 periods
4. Group Discussion Duration: 6 periods
5. Workplace Awareness Duration: 6 periods
6. Writing Skills Useful at Workplace Duration: 9 periods

**Suggested Student Activities:**

* Paper Presentations
* Seminars
* Mock Interviews
* Telephonic Interviews
* Group Discussions
* Role Plays
* Creating advertisements
* Five-minute activities
* Creating a model of workplace

**Evaluation Pattern:**

1. **Continuous Internal Examination: 60 Marks**
2. **Mid Sem - I**  20 marks

Syllabus:

1. Presentation Skills
2. Writing Reports
3. **Mid Sem – II:**  20 Marks

Syllabus:

1. Interview Skills
2. Group Discussion
3. **Internal assessment:** 20 marks
4. Seminars: 10 marks
5. Assignments: 5 marks
6. Lab record submission: 5 marks
7. **Semester End Examination : 40 Marks**
8. Write an essay on a given topic or participate in an activity: 15 Marks
9. Interview or Group Discussion: 15 Marks
10. *Viva Voce* 10 marks

**References:**

Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003.

Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.

Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004.

Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.

Fensterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D

Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011

**E-Learning Resources:**

<http://www.dailywritingtips.com/>

<http://www.englishdaily626.com/c-errors.php>

<http://www.owlnet.rice.edu/~cainproj/>

<http://www.thehumorsource.com/>

<http://www.indiabix.com/group-discussion/topics-with-answers/>

<http://networketiquette.net/>

<https://public.wsu.edu/~brians/errors>

<http://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15>

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

**FOURTH SEMESTER 18EE-410P**

**ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS**

**MID SEM - I**

**Time : 1 Hour Total Marks: 20 Marks**

**Part – A 10 marks**

**Instruction:** Answer any one of the following questions**.**

* + - 1. Write the guidelines for preparing a PowerPoint presentation.
      2. How do you prepare yourself for presenting a technical paper?
      3. Mention a few presentation aids and how do you use them effectively?

**Part – B 10 marks**

**Instruction:** Answer any one of the following questions**.**

* + - 1. Write the format of a report and describe it.
      2. Write a report on the accident you have seen recently.
      3. Give the outline of a project report and describe it.

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

**FOURTH SEMESTER18EE-410P**

**ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS**

**MID SEM - II**

**Time : 1 Hour Total Marks: 20 Marks**

**Part – A 10 marks**

**Instruction:** Answer any one of the following questions**.**

1. What are the dos and don’ts for a formal interview?
2. What at least ten frequently asked questions in a formal interview?
3. How do you prepare for a telephonic interview?

**Part – B 10 marks**

**Instruction:** Answer any one of the following questions**.**

1. What are the dos and don’ts of a group discussion?
2. Mention some phrases and expressions commonly used in a group discussion.
3. Write a short paragraph on the steps you take while participating in a group discussion.

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

**FOURTH SEMESTER 18EE-410P**

**ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS**

**SEMESTER END EXAM**

**Time : 3 Hours Total Marks: 40 Marks**

**Part – A 10 marks**

**Instruction:** Pick any one question from the given lot.

1. Prepare the outline of a project report and describe it.
2. Write the guidelines for preparing the slides of a PowerPoint presentation.
3. Write the minutes of the meeting conducted at the Principal’s chamber to conduct the annual day celebrations. Prepare the agenda of the annual day celebrations.
4. Describe the workplace etiquette.
5. Prepare a press note for the ‘*Job Mela’* which is going to be conducted at your institute.

**Part – B 15 marks**

1. Interview / Group Discussion

**Part – C 15 marks**

1. *Viva Voce*

**DEEE SKILL UPGRADATION ACTIVITY SHEET**

|  |  |
| --- | --- |
| **Course Title : Skill Upgradation**  **Semester : IV**  **Methodology : Activities** | **Credits :2.5**  **Total Contact Periods : 105** |

**Suggested Course Outcomes**

1. **Address the identified needs of the community collaboratively to facilitate positive social change.**
2. Prepare a chart related to the topics covered in the present semester.
3. Listen to expert talk, guest lecture, youtube video and write a summary.
4. Participate in Haritha Haram and submit a small report about the activities.
5. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
6. Seminar on problems with possible solutions in the campus or nearby places
7. Group discussions or enacting a play on topics creating awareness about socio-economic problems
8. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
9. Participate in NCC

**(PO5, 6, 7, 8, 9, 10)**

## Listen attentively to others and respond appropriately

1. Listen to expert talk, guest lecture, youtube video and write a summary.
2. Participating in Group discussions or enacting a play on topics creating awareness about socio-economic problems that can be mitigated by technologies.
3. Participate in quiz on technical aspects or current affairs
4. Participate in Mock Interview

**(PO5, 7, 8, 9, 10)**

1. **Adapt your style to the occasion, task, and audience**
2. Group discussions or enacting a play on topics creating awareness about socio-economic problems that can be mitigated by technologies.
3. Seminar on problems with possible solutions in the campus or nearby places
4. Participate in Mock Interview

**(PO5, 6, 7, 8, 9, 10)**

1. **Articulate ideas in various formats including oral, written, nonverbal, visual, and electronic devices.**
2. Prepare a chart related to the topics covered in the present semester.
3. Refer to an e-journal and submit a summary report on upcoming technologies.
4. Visit factory / industry and submit a report/PPT on the observations made.
5. Prepare a mini project and submit report.
6. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
7. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
8. Seminar on problems with possible solutions in the campus or nearby places
9. Participate in Mock Interview

**(PO5, 6, 7, 8, 9, 10)**

## Demonstrate ability to recognize and effectively manage ambiguous ideas, experiences and situations

1. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
2. Seminar on problems with possible solutions in the campus or nearby places

**(PO5, 6, 7, 8, 9, 10)**

## Analyze the interconnections between individuals and society as well as how individual actions have an impact on others.

1. Participate in Haritha Haram and submit a small report about the activities.
2. Participate in Swatch Bharath and write an essay on the importance of the program
3. Participate in NCC

**(PO5, 6, 7, 8, 9, 10)**

## Utilize others’ ideas, strengths, knowledge, and abilities to foster an inclusive environment & Develop and sustain healthy and meaningful relationships with others

1. Prepare a mini project and submit report.
2. Participate in Haritha Haram and submit a small report about the activities.
3. Participate in Swatch Bharath and write an essay on the importance of the program
4. Participate in NCC

**(PO5, 6, 7, 8, 9, 10)**

## Ability to recognize their strengths and those of others to work towards a shared vision.

1. Prepare a mini project and submit report.
2. Participate in Haritha Haram and submit a small report about the activities.
3. Participate in Swatch Bharath and write an essay on the importance of the program
4. Participate in NCC

**(PO5, 6, 7, 8, 9, 10)**

## Act in alignment with one’s own values to contribute to one’s life-long growth and learning.

1. Physical activities such as sports, yoga, meditation and other relaxation techniques

**(PO5, 6, 7, 8, 9, 10)**

1. **Gain, process, and act upon knowledge regarding the effects of individual, community, national, and international level choices on ecosystems and people.**
2. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
3. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
4. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
5. Seminar on problems with possible solutions in the campus or nearby places

**(PO5, 6, 7, 8, 9, 10)**

|  |  |  |
| --- | --- | --- |
| **CO** | **Outcome** | **CO/PO Mapping** |
| CO1 | Address the identified needs of the community collaboratively to facilitate positive social change. | 5, 6, 7, 8, 9, 10 |
| CO2 | Listen attentively to others and respond appropriately | 5, 6, 7, 8, 9, 10 |
| CO3 | Adapt your style to the occasion, task, and audience | 5, 6, 7, 8, 9, 10 |
| CO4 | Articulate ideas in various formats including oral, written, nonverbal, visual, and electronic devices. | 5, 6, 7, 8, 9, 10 |
| CO5 | Demonstrate ability to recognize and effectively manage ambiguous ideas, experiences and situations | 5, 6, 7, 8, 9, 10 |
| CO6 | Analyze the interconnections between individuals and society as well as how individual actions have an impact on others. | 5, 6, 7, 8, 9, 10 |
| CO7 | Utilize others’ ideas, strengths, knowledge, and abilities to foster an inclusive environment & Develop and sustain healthy and meaningful relationships with others | 5, 6, 7, 8, 9, 10 |
| CO8 | Ability to recognize their strengths and those of others to work towards a shared vision | 5, 6, 7, 8, 9, 10 |
| CO9 | Act in alignment with one’s own values to contribute to one’s life-long growth and learning. | 5, 6, 7, 8, 9, 10 |
| CO10 | Gain, process, and act upon knowledge regarding the effects of individual, community, national, and international level choices on ecosystems and people. | 5, 6, 7, 8, 9, 10 |

**Note**: The above COs may map to other POs from 1 to 4 apart from PO’s 5 to 10 depending on the topic

**Suggested Student Activities**

1. Prepare a chart related to the topics covered in the present semester.
2. Refer to an e-journal and submit a summary report on upcoming technologies.
3. Visit factory / industry and submit a report/PPT on the observations made.
4. Prepare a mini project and submit report.
5. Listen to expert talk, guest lecture, youtube video and write a summary.
6. Participate in Haritha Haram and submit a small report about the activities.
7. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
8. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
9. Participate in Swatch Bharath and write an essay on the importance of the program
10. Group discussions or enacting a play on topics creating awareness about socio-economic problems
11. Physical activities such as sports, games, yoga, meditation and other relaxation techniques
12. Participate in quiz on technical aspects or current affairs
13. Seminar on problems with possible solutions in the campus or nearby places
14. Participate in NCC
15. Participate in Mock interviews

Note: The above student activities will be assessed using rubrics. A sample rubrics template is given below. The subject teacher can assess students using rubrics with atleast four relevant aspects.

**RUBRICS MODEL (For assessing Presentation skills)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Aspects | Needs improvement | Satisfactory | Good | Exemplary |
| Collection  of data | Collects very  limited  information | Collect much  Information with very  limited relevance  to the topic | Collects  some basic  information with little bit of irrelevance | Collects a  great deal of  information with relevance |
| Presentation  of data | Clumsy presentation of data | Presents data well; but presentation needs to be more meaningful | Presents data well but need to improve clarity | Presents data in an understandable yet concise manner |
| Fulfill  team’s roles  & duties | Performs very  little duties but  Unreliable. | Performs very  little duties and is inactive | Performs  nearly all  duties | Performs all  duties of  assigned  team roles |
| Shares  work  equally | Rarely does  the assigned  work; often  needs  reminding | Usually does  the assigned  work; rarely  needs  reminding | Normally  does the  assigned  work | Always does  the assigned  work without  having to be  reminded |
| Interaction with  other team  mates | Usually does  most of the  talking; rarely  allows others  to speak | Talks good;  but never  show interest  in listening to  others | Listens, but  sometimes  talks too  much | Listens and  speaks a fair  amount |
| Audibility and clarity in speech | Hardly audible and unclear | Very little audibility and clarity | Audible most of the time with clarity | Audible and clear |
| Understanding content | Lacks content understanding and is clearly a work in progress | Little depth of content understanding | Some depth of content understanding is evident but needs improvement | Insight and depth of content understanding are evident |
| Content  Presentation | Content is inaccurate and information is not presented in a logical order making it difficult to follow | Content is accurate and information is not presented in a logical order making it difficult to follow | Content is accurate but some information is not presented in a logical order but is still generally easy to follow | Content is accurate and information is presented in a logical order |

**Suggested additional aspects for assessing Leadership Qualities:**

1. Carrying self
2. Punctuality
3. Team work abilities
4. Moral values
5. Communication skills
6. Ensures the work is done in time

**Suggested additional aspects for assessing “Participation in social task”**

1. Interested to know the current situation of society.
2. Shows interest to participate in given social task.
3. Reliable
4. Helping nature
5. Inter personal skills
6. Ensures task is completed

**Suggested additional aspects for assessing “Participation in Technical task”**

1. Updated to new technologies
2. Identifies problems in society that can be solved using technology
3. Interested to participate in finding possible technical solutions to identified project
4. Reliable
5. Interpersonal skills

**Suggested additional aspects for Carrying Self:**

1. Stand or sit straight.
2. Keep your head level.
3. Relax your shoulders.
4. Spread your weight evenly on both legs.
5. If sitting, keep your elbows on the arms of your chair, rather than tightly against your sides.
6. Make appropriate eye contact while communicating.
7. Lower the pitch of your voice.
8. Speak more clearly.