

# **Sai Nath University**

## **Assignment For DIPLOMA in Electrical Engineering 4<sup>th</sup> Sem.**

The Assignment will consist of two parts, A and B. Part A will have 5 short answer questions (40-60 words) of 4 marks each. Part B will have 2 long answer questions of 10 marks each

### **All questions are compulsory.**

These Assignments should be completed and submitted in written form by the student to his/her respective Faculty/ Examiners. Assignment Submission Dates are:

➤ JUNE-2018

### **List Of Suggested Questions**

The list of suggested questions are for students to practice. Although optional, we recommend that students solve these questions, as they will help them in preparing for exams as well as in clearing the important concepts of the subject.

### **List of Practical and suggested practical's**

The list of practical's should be done by the students in their Lab Sessions. These are the basic practical's, which each student should be able to do himself independently. While the list of suggested practicals are optional, but it is recommended that students should perform those practical so as to have a thorough knowledge of the subject

### **Education Delivery Schedule (EDS)**

As per University Semester scheme, the minimum contact hours of each paper has been Divided into two hours theory and practical class.

The faculty will maintain this attendance paper wise for his/her batch.

**Subject Code****Subject Name****DEEE-401****Electrical Measurement & Instrument****DEEE-402****Electrical Circuit & Network****DEEE-403****Electrical Machine1****DEEE-404****Electrical Power System-1****DEEE-405****Electrical Engineering Material & Wiring****DEEE-406****PRACTICALS**



## SAINATH UNIVERSITY

### Cover page of Assignment

ID NUMBER .....

NAME .....

COURSE Diploma Engg.....

STREAM Electrical.....

SEM 4<sup>th</sup> .....

SUBJECT CODE .....

SUBJECT NAME .....

**Assignments will be completed by the Student in his/her own handwriting.**

**DEEE-401**  
**[Electrical Measurement & Instrument]**  
**Part A**

- (a) Distinguish between the Direct and Indirect methods of measurement. Cite examples to support your answer.
- (b) Define the terms : (i) Repeatability (ii) Accuracy (iii) Precision (iv) Resolution (v) Linearity
- (c). Explain the working of electro-resonance type power factor meter. Draw the phasor diagram under different power factor conditions.
- (d) Explain the Digital Voltmeter (DVM). Classify the various types and explain the Ramp type digital voltmeter, with the help of a neat diagram.
- (e) Describe the working of strip-chart recorder. What are the different types of tracing systems used in it ? Explain with the help of a suitable diagram.
- (f) An energy meter is designed to make 100 revolutions of disc for one unit of energy.

**Part B**

- (a) Explain the construction and working principle of a maximum demand indicator.
- (b) Describe various types of instrument transformers. How do they differ from power transformer.
- (c) Write short notes on any two of the following :
- (1) Phase Sequence Indicator
  - (2) Analogue Multimeter
  - (3) Recording Instrument
- (d) Explain the damping system employed in a measuring instruments. Explain the various types of damping with the help of neat sketches

**DEEE-402**  
**Electrical Circuit & Network**  
**Part A**

- (a) State and explain nodal analysis with the help of a suitable example.
- (b) State, prove and explain maximum power transfer theorem.
- (c) State the condition of series resonance. Also define and derive the Quality factor of a series resonant circuit.
- (d) A coil of resistance  $100 \Omega$  and inductance  $100 \text{ mH}$  is connected in series with a  $100 \text{ pF}$  capacitor. The circuit is connected to a  $10 \text{ V}$  variable frequency source.
- Calculate
- (i) the resonant frequency,
  - (ii) the current at resonance,
  - (iii) Q-factor of the circuit.
- (e) Explain power triangle and impedance triangle. Also give the formula and units of real, imaginary and apparent power in case of an a.c. circuit.

- (f) A resistance of 20  $\Omega$  is in series with an inductance of 0.1 henry with the terminal voltage of 230 volt 50 Hz. Find the value of current. Also calculate the phase angle between voltage and current.
- (g) State and explain Superposition theorem with the help of suitable diagrams.

## Part B

- (A) Write short notes on any two of the following :
- Delta Star Transformation
  - Nodal Analysis
  - Parallel Resonance
  - Duality and Dual Networks
- (B) What do you understand by statically and dynamically induced emf ? Write down the difference between them with examples.
- (C) Derive the relation between line current and phase current for a three-phase three-wire system. 7
- (D) What are the advantages of a three-phase system over a single phase system ?

## DEEE-403 Electrical Machine-1

### Part A

- (A) Draw the equivalent circuit of a 1-phase transformer and show how the constants of primary and secondary windings may be combined to give a simplified equivalent circuit with the values of constants given in terms of the secondary winding.
- (B) Explain the construction and working principle of an auto-transformer.
- (C) Explain the parallel operation of a single-phase transformer.
- (D) Describe the heat-run test of a 1-4 transformer, with the circuit diagram. What are the limitations of the test ?

### Part B

- (A) What is the function of armature winding ? Explain different types of winding in d.c. machines.
- (B) Explain the armature reaction in a d.c. machine.
- (C) Draw and explain the torque — current characteristics of shunt, series and compound motors.
- (D) Draw the connection diagram of two shunt generators connected in parallel and discuss their load.
- (E) Derive the e.m.f. equation of a d.c. generator.

## DEEE-404 Electrical Power System-1

### Part A

- (A) What are the bundled conductors ? Discuss their advantages.
- (B) Explain the 'Skin effect' and 'Proximity effect' referred to overhead lines.
- (C) Calculate the A, B, C and D parameters for medium transmission line for nominal T-model.
- (D) Explain the Ferranti effect with the help of a phasor diagram.

- (E) explain how the surge impedance loading affects the Ferranti effect.  
 (F) What are the main causes of dielectric loss ? Also derive the formula for dielectric power loss.

## **Part B**

- (A). Calculate the sag for a span of 200 m, if the ultimate tensile strength of conductor is 8000 kgf. The weight of the conductor is 800 kgf/km. Allow factor of safety of two.  
 (B) Draw the equivalent circuit and phasor diagram of short transmission line and calculate the voltage regulation of short transmission line.  
 (C) Explain why the voltage distribution along a string of suspension insulators is normally non-uniform.  
 (D) Define string efficiency. What is the necessity of having a high string efficiency ? How can it be achieved ?  
 (E) Derive the expression for the inductance of a symmetrical three-phase line. What is meant by the term equivalent spacing ? State its significance.  
 (F) Draw and explain the single-line diagram of a power system.  
 (G) Write short notes on the following :  
 (i) Spacing of conductors  
 (ii) Types of towers used for overhead line

## **DEEE-405**

## **Electrical Engineering Material & Wiring**

### **Part A**

- (A) What are the requirements of an ideal traction system ?  
 (B) write the advantages of electrical traction over other non-electrical systems of traction.  
 (C) Explain the basic principle involved in the rheostatic braking of DC motors used in traction.  
 (D) Explain different methods of induction heating. Give some applications of induction heating.  
 (E) Explain the construction and operation of a fluorescent tube and compare it with a tungsten filament .

### **Part B**

- (1) State Faraday's laws of electrolysis and explain them clearly.  
 (A) Explain a refrigeration cycle by means of a neat sketch.  
 (B) Enumerate the various factors to be considered while designing street lighting.  
 (C) Draw a complete diagram showing therein different components of an air-conditioning plant. What is the function of each component ?  
 (D) Define the term 'welding'. Enumerate the various welding processes. 7 (b) What is a polar curve ? How is it useful to an illumination engineer ?

**DEEE-406**  
**PRACTICALS**

Write about following after practical's are done:

- (i)** Resistivity
- (ii)** Conductivity
- (iii)** Potential Difference
- (iv)** Resistance Temperature Coefficient
- (v)** Active Power
- (vi)** Reactive Power
- (vii)** Apparent Power
- (viii)** Power Factor