**R1 Document**

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### Department : Electronics and Communication Engineering

### Discipline : Electronics,Instrumentation,Electrical,Marine,Automobile

### Name of the Lab : Basic Electronics Lab/Hybrid Electronics Lab

### Name of experiment : 1. Evaluating the AC/DC Signal parameters using function generator

### and CRO.

### FOCUS AREA : 1.Signal Measurement and Analysis

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**About the Experiment:** The experiments opens up the introduction to types of signal and their representations.

In Experimentno 1, the students can visualize the signal and measure their parameters,namely peak-peak value, rms value,average value, period, frequency.They can also analyse the signal behavior.

### 1. Learning Objectives and Cognitive Level:

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### Experiment 1

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Learning Objectives** | **Cognitive level** | **Action Verb** |
| 1. | *Students will be able to* choose appropriate type of signal for their requirement | Understand | Select |
| 2. | *Students will be able to* use Function Generator as signal source | Understand | Select |
| 3. | *Students will be able to* use Cathode ray oscilloscope(CRO) as display and measuring device. | Understand | Select |
| 4. | *Students will be exposed* to handling ofFunction Generator and CRO | Recall | State |
| 5. | *Students will be able to* identify and set the appropriate signal in the source and display it in CRO. | Apply | Observe |
| 6. | *Students will be able to* measure the signal parameters | Analyse | Measure |
| 7. | *Students will be able to* analyse the behaviour of the signal based on the measurements done | Analyse | Analyse |
| 8. | *Students will be able to* evaluate the various types of signals based on the analysis done. | Evaluate | Evaluate |

**2. Instructional Strategy:**

**2. 1 Instructional Strategy**: Expository**(**Online Manual/Trial and error of working, learning and analysis)

**2.2 Assessment Method** **:** Formative assessment

**2.3 Description of section** : Provided as instructions

* Detailed theory is provided to help understanding of basic concepts, example on signal analysis and understanding will be provided for further clarity.

• A detailed stepwise procedure will be provided which helps the students to perform the entire experiment on VLAB platform.

• Implementing the procedure,provides the student, a feel of real laboratory experience.

• Pre-quiz and post-quiz will be provided, that helps student to test their understanding.

• Assignment questions will be provided to the students for extended learning.

• Once the students go through the virtual lab experiments, they can perform those experiments in real lab effectively.

**3.Task & Assessment Questions:**

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| --- | --- | --- | --- |
| **Sr. No.** | **Instructions given   by the**  **Teacher** | **Tasks to be done by the**  **Students** | **Assessment questions aligned to the task** |
| 1. | Define signal parameters | Display of signal and study of parameters | Q1, Q4 |
| 2. | Signal Analysis | Click on the various portions of the signal and to analyze parameter with another parameter | Q3 |
| 3. | Procedure of signal measurement | Click on the various portions of the signal and take measurements. | Q2, Q5 |

1.) How do you calculate the RMS voltage of a Sine Wave?

**a. Peak Voltage / √2**

b. Peak Voltage / √7

c. Peak Voltage / 2

d. Peak Voltage / √3

2.) If the peak-to-peak voltage value of sine wave is 60V what is the RMS value?

a. 42.42V

b. 60V

c. 30V

**d. 21.21V**

3.) If frequency = 10Hz what is the time period?

a. 10s

b. 20s

c. 0.2s

**d. 0.1s**

4.) The total area under the complete sine wave curve divided by the distance of the curve is known as?

a. Peak-to-peak value

b. RMS value

**c. Average value**

d. Effective value

5.) What is the RMS value of sawtooth wave if the peak value is 20V?

a. 20V

b. 5.77V

c. 23.09V

**d. 11.54V**

### 4. Simulator Interactions:

### Experiment 1:

|  |  |  |  |
| --- | --- | --- | --- |
| Sr. No | What students will do? | What Simulator will do? | Purpose of the task |
| 1 | Study the objectives and apparatus used then click on next button | Display objective and apparatus used | Recall the experiment |
| 2 | Study of equipments | Open up equipment front panel details | Study of panel details |
| 3 | Click the button to switch on the equipment and  to set the initial values in source and measuring devices | Fix up the needed functions in source and display the selected functions as waveform in CRO. | To study how to select functions and observe them. |
| 4 | Identify signal behaviour and carry out measurements | Display values of signal parameters | Study and analysis |
| 5 | Click on various functions in Function Generator | Functions will vary and get displayed accordingly | Varied parameters and behaviour could be observed. |
| 6 | Do changes in values and functions | Variations are shown in the display | To record Observations |