

FINAL YEAR PROJECT REPORT  
DIPLOMA IN ELECTRONICS ENGINEERING  
SCHOOL OF ENGINEERING  
MARA INSTITUTE OF TECHNOLOGY  
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# **CAPACITANCE METER**

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## PREFACE

CAPACITANCE are among the most common components used in electronics today. The capacitance meter which I have constructed will be function well when all the construction is completed. Once the component is connected between the test terminal, the display will directly give the reading, without any help from external operator or switch apart from the power switch apart from the power switch.

It can be used to measure both electrolytic and non-electrolytic capacitor. The range which can be measured by this meter is 100pF for the minimum range and for the maximum range is 100mF.

## **ACKNOWLEDGMENT**

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## 1.0 INTRODUCTION

### 1.1.0 Theory

Consider a capacitance  $C$  charging through a resistor  $R$  from a supply voltage  $U_s$  as

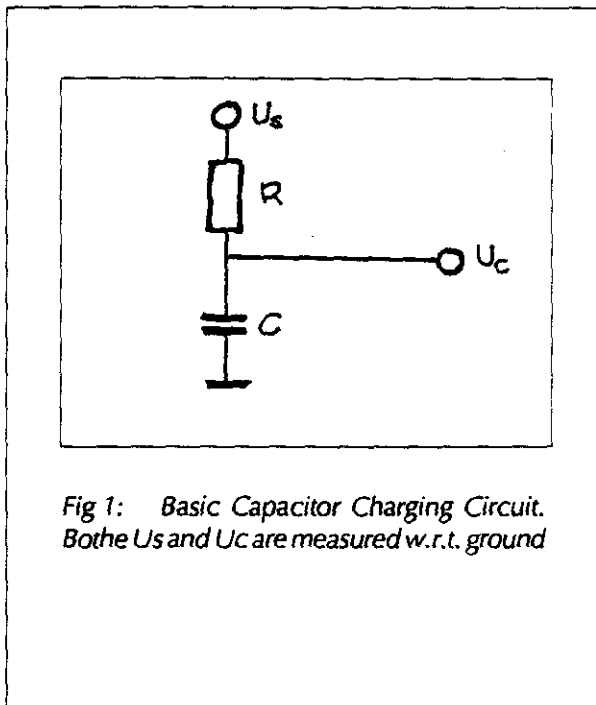


Fig 1: Basic Capacitor Charging Circuit. Bothe  $U_s$  and  $U_c$  are measured w.r.t. ground

shown. In Fig 1, the voltage on the capacitor,  $U_c$  may be written as

$$U_c = U_s (1 - e^{-t/RC})$$

where  $e$  is the base of natural logarithms or 2.718282.

Rearranging:-

$$\frac{U_s - U_c}{U_s} = \text{constant or } C = kt$$

Rearranging and taking natural logarithms

$$R \ln \left( \frac{U_s - U_c}{U_s} \right) = -t/C$$

If we make  $R$ ,  $U_c$  and  $U_s$  constants then the lefthand side of the equation becomes a constant term. So:-

$$\frac{t}{C} = \text{constant or } C = Kt$$