**TECHNICAL UNIVERSITY OF MOMBASA**

**Faculty of Engineering and Technology**
**Department of Mechanical & Automotive Engineering**
**UNIVERSITY EXAMINATION FOR:**
**Diploma in Mechanical Engineering (Plant Option, Y2S1)**
**EPL 2202 : Plant Electrical I (Paper 2)**
**SPECIAL/SUPPLEMENTARY EXAMINATION**
**SERIES: SEPTEMBER 2018**
**TIME: 2  HOURS**
**DATE:  Sep 2018**

**Instruction to Candidates:**
You should have the following for this examination
- *Examination Pass & Student ID Card*
- *Answer booklet*
- *Non-Programmable scientific calculator*

This paper consists of **FIVE** questions. Attempt any **THREE** questions.
Maximum marks for each part of a question are as shown.
**Do not write on the question paper.**

**Question ONE**

a)
  i.   Define flexible cable according to I.E.E regulation**.**              **(4 marks)**
  ii.  Mention FOUR essential requirements of an insulator and give TWO examples
       of insulators.                                                         **(6 marks)**

b) Briefly describe the following:                                           **(6 marks)**
  i.   Neoprene cable
  ii.  Multicore Cable
  iii. H.O.F.R cable

c) Compare copper and aluminium as conductors.                               **(4 marks)**

**Question TWO**

a) Describe the following terms as used in I.E.E Tables: *Ambient temperature, Rating
   factor,* and *Current density.*                                           **(6 marks)**

b) Define *resistivity* and *temperature coefficient of resistance.* **(4 marks)**

c) A piece of resistance wire, 100 m long and of cross sectional area 0.1 mm², at a temperature of 5 °C passes a current of 3 A when connected to a d.c., supply at 240 V. Calculate: *(i)* The resistivity of the wire, and *(ii)* the current which will flow when the temperature of the wire rises to 50 °C. The temperature coefficient of the material is 0.00029/°C. **(10 marks)**

**Question THREE**

a) Explain the Construction of *(i)* H.S.O.S. and *(ii)* P.V.C armoured cable **(10 marks)**

b) Describe TWO fittings that are used with Light Gauge Conduit. **(4 marks)**

c) Describe THREE Basic methods of fixing a conduit. **(6 marks)**

**Question FOUR**

a) Outline the main factors to be considered when planning the layout of an industrial installation. **(8 marks)**

b) What is a temporary installation? **(2 marks)**

c) What are the main factors against which an electrical installation must be protected? **(6 marks)**

d) Describe three Basic types of a catenary system. **(4 marks)**

**Question FIVE**

a) Explain what is meant by the following terms: *Illuminance, Luminous efficacy, and Luminous intensity.* **(6 marks)**

b) A light source of 900 candelas is situated 3 m above a working surface. (i) Calculate the illuminance directly below the source. (ii) What would be the illuminance if the lamp were moved to a position 4 m from the surface? **(4 marks)**

c) State the meanings of the following terms: *Maintenance factor* and *Coefficient of Utilization.* **(4 marks)**

d) A work area at bench level is to be illuminated to a value of 300 lx, using 85 W single fluorescent fittings having an efficacy of 80 lumens/watt. The work area is 10 m × 8 m, the MF is 0.8 and the CU is 0.6. Calculate the number of fittings required. **(6 marks)**