



# **MACHAKOS UNIVERSITY**

**University Examinations for 2020/2021 Academic Year**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**SECOND YEAR SECOND TERM EXAMINATION FOR**

**CERTIFICATE IN ELECTRICAL AND ELECTRONICS ENGINEERING**

**1601/205/ET: ESTIMATING AND TENDERING**

**DATE: 11/6/2021**

**TIME: 8.30-11.30 AM**

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## **INSTRUCTIONS**

**ANSWER ALL FIVE QUESTIONS.**

1. Draw the BS 3939 graphical symbols for the following,
  - a) Single pole, one way Switch
  - b) Switched Socket outlet
  - c) Two-way switch
  - d) Bell
  - e) Fuse
  - f) Capacitor
  - g) Link
  - h) Battery
  - i) Rectifier
  - j) Signal lamp
  
2.
  - a) Define the term “contract” (2 marks)
  - b) State any four types of a contract (4 marks)
  - c) Explain any four essentials of a contract (8 marks)
  - d) Explain any Three methods of discharging a contract (6 marks)

3. a) Define the following terms used in illumination engineering,
- i. Space- height ratio
  - ii. Luminous flux
  - iii. Utilization factor (6 marks)
- b) i Using a diagram derive the expression for the cosine law of illumination. (4 marks)
- ii A light source of intensity 500 candela is 4M directly above a point on a horizontal bench. Determine the illumination:
- I. On the point
  - II. On a second point on the bench which is 5M from the first point (4 marks)

4. a) Fill in the quantity symbol and units (10 marks)

Quantity	symbol	units
Luminous flux		
Luminous intensity or candle power		
Illumination/illumince		
Luminance/brightness		
Luminous exitance		

- b) With the aid of diagrams, explain the laws of illumination (10 marks)
5. a) Define the term “Tort” (2 marks)
- b) State any two types of tort (2 marks)
- c) Stage the stages in tendering process. (12 marks)
- d) Explain any three types of tendering methods (6 marks)