



ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE  
FACULTY OF ENGINEERING

SEMESTER II EXAMINATION, 2017/2018 ACADEMIC SESSION

COURSE TITLE: ELECTRICAL SERVICES DESIGN/DESIGN AND  
INSTALLATION OF ELECTRICAL & ICT SERVICES

COURSE CODE: EEE 530/ECT 528

EXAMINATION DATE: 3<sup>rd</sup> AUGUST, 2018

COURSE LECTURER: ENGR. OSHIN OLA AUSTIN

TIME ALLOWED: 2 HOURS

A rectangular box containing a handwritten signature in black ink, which appears to be 'O. O. Austin'.

HOD's SIGNATURE

**INSTRUCTIONS:**

1. ANSWER ANY 4 QUESTIONS
2. ANY INCIDENT OF MISCONDUCT, CHEATING, POSSESSION OF UNAUTHORIZED MATERIALS DURING EXAM SHALL BE SEVERELY PUNISHED.
3. YOU ARE **NOT** ALLOWED TO BORROW CALCULATORS AND ANY OTHER WRITING MATERIALS DURING THE EXAMINATION.
4. ELECTRONIC DEVICES CAPABLE OF STORING AND RETRIEVING INFORMATION ARE PROHIBITED.
5. DO **NOT** TURN OVER YOUR EXAMINATION QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

### QUESTION 1

- a. What is meant by stroboscopic effect? {3 marks}
- b. How can stroboscopic effect be eliminated in fluorescent tube lighting? {4 marks}
- c. Figure 1 shows four lamps in an electrical workshop. Each of the lamps is hung at a height of 8 metres from the floor in the corner of a square floor 20m by 20m. If each lamp is 600 Candle Power, calculate the illumination on the floor at the Centre of the square floor. {8 marks}

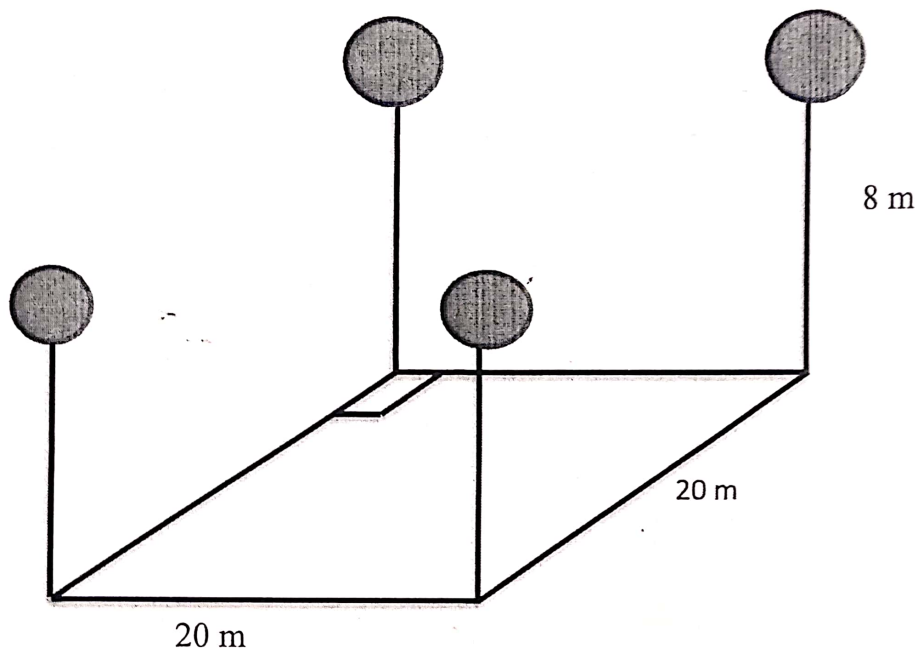


Figure 1

### QUESTION 2

- a. Explain the following terms in relation to Illumination Engineering
  - i. Luminous intensity {2 marks}
  - ii. Maintenance factor {2 marks}
  - iii. Coefficient of utilization {2 marks}
  - iv. Glare {2 marks}
- b. An outlet store 18m long, 15m wide and 4m up is to be illuminated to a level of 280 lux ( $\text{lumen}/\text{m}^2$ ). The utilization and maintenance factors are 0.72 and 0.86 respectively. Calculate the number of lamps required to illuminate the whole area if the lumen output of each lamp selected is 3400 lumens {7 marks}

### QUESTION 3

Using suitable diagram, illustrate the various parts of an underground cable and explain the function of each part {6 marks}

- a. State four advantages of aluminum sheath over lead sheath {4 marks}

- b. A, 3 phase, 3 core, 10 km long cable is connected to an 11kV, 50Hz bus bar. Calculate the kVA taken by the cable if the capacitance measured between any two cores is  $0.3 \mu\text{F}/\text{km}$  {5 marks}

#### QUESTION 4

- a. Explain the following electrical installation terms with two examples each {3 marks}
- Conduit {3 marks}
  - Trunking {2 marks}
  - Jointing
- b. i. Differentiate between a fuse and a fuse link {2 marks}
- ii. A 10 mm PVC sheath copper cable is short circuited when connected to a 400 V supply. The impedance of the short circuit path is  $0.12 \Omega$ . Determine the maximum operating permissible disconnection time required for a miniature circuit breaker installed for the protection of the distribution line. {5 marks}

#### QUESTION 5

- a. What is meant by the term contract? {2 marks}
- b. State three essential requirement for a contract under seal {3 marks}
- c. Prepare a single phase wiring diagram of distribution board consumer unit from the energy meter to the main distribution board {10 marks}

#### QUESTION 6

- a. What is the meaning of the term "BEME"? State its two importance in Electrical Services and Design {2 marks}
- b. Explain the term consulting {2 marks}
- c. State the meaning of the following two terms {2 marks}
- Steady state stability {2 marks}
  - Transient stability
- d. A 500 km long, 50 Hz transmission line with constants and parameters given below ties up to two large power areas

$$R = 0.11 \Omega/\text{km}, G = 0, L = 1.45 \text{ mH}/\text{km}, C = 0.009 \mu\text{F}/\text{km}$$

Its auxiliary line constants are:

$$A = 0.88 \angle 2.4^\circ, B = 221.76 \angle 77.2^\circ$$

If  $V_S = V_R = 220 \text{ kV}$ , Find the steady state stability limit

{ 7 marks }