



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

SEMESTER II EXAMINATION, 2018/2019 ACADEMIC SESSION

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

COURSE CODE: EEE 530/ECT 528

EXAMINATION DATE: 11TH JULY, 2019

COURSE LECTURER: ENGR. OSHIN OLA AUSTIN

TIME ALLOWED: 2 HOURS 30 MINUTES

A rectangular box containing a handwritten signature in blue ink. The signature is stylized and appears to be 'O. O. Austin'.

HOD's SIGNATURE

INSTRUCTIONS:

1. ANSWER ANY 4 QUESTIONS, QUESTION 1 IS COMPULSORY
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. Explain the following terms in relation to Illumination Engineering
- i. Luminous intensity 2 marks
 - ii. Maintenance factor 2 marks
 - iii. Glare 2 marks
- b. Figure 1 shows the plan of a residential office supplied to you from a client. You are required carry out the electrical installation of the building and prepare the electrical installation wiring diagram of the building under the following electrical specifications:
- i. Installation of 3 phase, 4 wire system supply from the 415V, 28 feet, distribution pole through the cut out, 3 phase meter, 100 A circuit breaker up to the distribution board 6 marks
 - ii. You are required to demonstrate using a suitable wiring diagram, a socket and lighting installation of the building using 2 way switches 2 marks
 - iii. You are also required to demonstrate using a suitable wiring diagram, a socket and lighting installation of the building using 1 way switch 2 marks
 - iv. Your client also requested that you should install a 3 phase changeover switch to alternate electric power from the utility company, Benin Electricity Distribution Company (BEDC) to a separate A.C Generator or a solar powered A.C inverter. Using a separate electrical installation diagram, show the electrical wiring of the 3 phase change over switch 5 marks

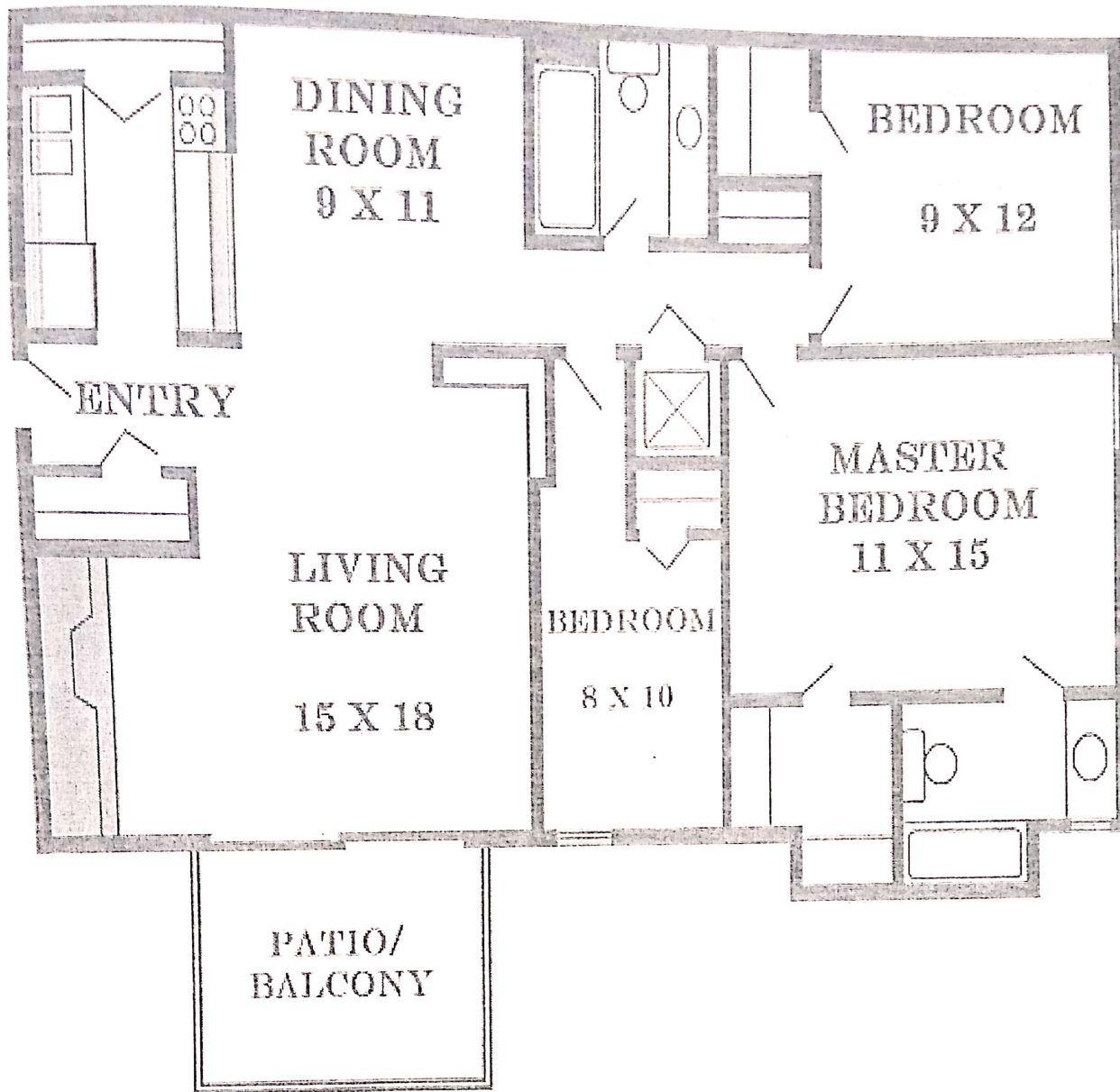


Figure 1

QUESTION 2

- What is meant by stroboscopic effect? 2 marks
- Describe a method through which stroboscopic effect be eliminated in fluorescent tube lighting? 4 marks
- An outlet store 20 m long, 18 m wide and 8 m up is to be illuminated to a level of 340 lux (lumen/m^2). The utilization and maintenance factors are 0.74 and 0.88 respectively. Calculate the number of lamps required to illuminate the whole area if the lumen output of each lamp selected is 3500 lumens 7 marks

QUESTION 3

- a. Using suitable diagram, illustrate the various parts of an underground cable and explain the function of each part 6 marks
- b. State two advantages of aluminum sheath over lead sheath 2 marks
- c. Figure 2 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 22m by 24m. If each lamp is 720 Candle power, calculate the illumination on the floor at the centre of the square floor 4 marks

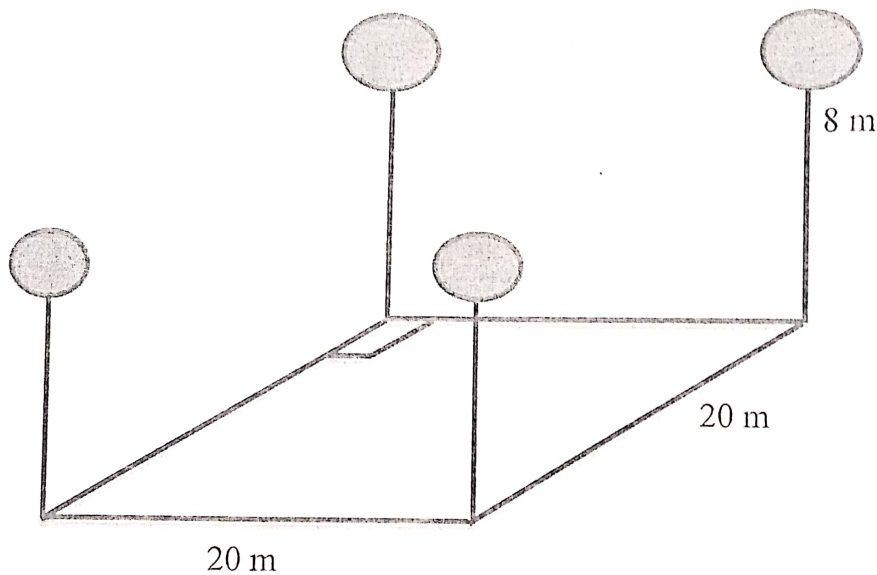


Figure 2

QUESTION 4

- a. Explain the following electrical installation terms with two examples each
- i. Conduit 2 marks
 - ii. Trunking 2 marks
 - iii. Jointing 2 marks
- 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 415 V supply. The impedance of the short circuit path is 0.08Ω . Determine the maximum operating permissible disconnection time required for a miniature circuit breaker installed for the protection of the distribution line. Take constant K as 115. 5 marks

QUESTION 5

- a. What is meant by the term contract? 1.5 marks
- b. State three essential requirements for a contract under seal 1.5 marks
- c. What is meant by the term consulting? State 2 types of consulting 2 marks
- d. Prepare a single phase electrical installation diagram of a building from the 415V, 28 feet distribution pole through the energy meter, main distribution board and other electrical installation devices to the junction boxes, lighting accessories, switches and sockets. Using a suitable diagram, install a single phase change over switch for the building

8 marks

QUESTION 6

- a. What is meant by the term Bill of Engineering Measurement and Evaluation "BEME"?
- b. State two importance of Bill of Engineering Measurement and Evaluation "BEME" in Electrical Services and Design 4 marks
- c. State the meaning of the following two terms
- i. Steady state stability 2 marks
 - ii. Transient stability 2 marks
- d. A 500 km long, 50 Hz transmission line with constants and parameters given below ties up to two large power areas

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

Its auxiliary line constants are:

$$A = 0. \angle 88.24^\circ, B = 221.76 \angle 77.2^\circ$$

If $V_S = V_R = 220 \text{ kV}$, Find the steady state stability limit 5 marks