



UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

END OF SEMESTER II EXAMINATIONS

DEPARTMENT : ICT

YEAR : TWO

SEMESTER : TWO

PROGRAM : DIPLOMA IN ELECTRICAL & ELECTRONICS ENGINEERING

COURSE : ELECT. INSTALLATION DESIGN AND PRACTICE

COURSE CODE : ELT2204

DATE : JUNE 28, 2024

TIME : 02:00 PM – 05:00 PM

DURATION : 3 Hours

INSTRUCTIONS

- ❖ The paper consists of two Sections A and B
- ❖ Answer **ALL** questions in Section A and **ANY THREE** questions in Section B
- ❖ Credit will be given to relevant examples and illustrations
- ❖ Don Not Write anything on this question paper

SECTION A – COMPULSORY (40%)

1. (a) Define grid supply system as applied to electrical supply. (02 marks)
(b) Mention any two advantages of transmitting electrical power at high voltages. (02 marks)
2. Explain the function of each of the following in earthing:
 - (i) Charcoal (02 marks)
 - (ii) Earth electrode. (02 marks)
3. Assuming it was reported to you that a fault occurred in one final circuit and tripped off the main circuit breaker leaving the whole installation in the black out. Outline **two** possible causes you would suspect. (04 marks)
4. (a) Define **fusing factor** as applied to protective devices. (02 marks)
(b) Draw the symbol of a three gang one way switch and a bell. (02 marks)
5. Differentiate between electrically and mechanically sound joint in an installation. (04 marks)
6. Explain **two** factors upon which the fusing current of a fuse depend on. (04 marks)
7. Besides Hydro - Electric Power Station, outline **four** other generating power stations. (04 marks)
8. Explain **four** roles of Electricity Regulatory Authority in Uganda. (04 marks)
9. Differentiate between Earthing and Earth. (02 marks)
10. Define the following as applied to protection;
 - (i) Earth leakage current
 - (ii) Equipotential bonding
 - (iii) Direct contact
 - (iv) Indirect contact. (08 marks)

SECTION B (*Attempt any three numbers – 60%*)

Question One

- (a) Explain three components of electrical installation design (06marks)
- (b) Mention four tests carried on an electrical installation after installation but before commissioning. (04marks)
- (c) Draw the following symbols as normally used in electrical installations designs

- (i) 2way switch
- (ii) Intermediate switch
- (iii) Normally open switch
- (iv) 5flourescent lamps
- (v) Distribution centre with 5 conduits. (10marks)

Question Two

A main hall having two entrances originally had two lighting points controlled from the two entrances. During the modification of the hall, one entrance was created which required are following the modifications to be made in the electrical installation;

- Two lighting points to be added plus another control point
 - All the lights are expected to operate simultaneously at a time
 - Three socket outlets connected in form of a ring and two non – fused spurs to be added
- (a) Assuming you are contracted to carry out the modifications, with the aid of a;
- (i) Wiring diagram, show the original circuit. (06 marks)
 - (ii) Block diagram, show the modified lighting circuit. (05 marks)
 - (iii) Line diagram; show how the ring circuit would be installed. (05 marks)
- (b) Outline any **four** IEE regulations you would observed when installing the ring circuit in 2(a)(iii). (04 marks)

Question Three

- (a) Write the meaning of the following abbreviations as related to cable size selection :-
- (i) C_a
 - (ii) C_i
 - (iii) C_g
 - (iv) C_f (1 mark @)
- (b) Outline the procedures of selecting the best size of cable for a particular installation. (05 marks)
- (c) A 230V single phase load of 20kW operates at a power factor of 0.7 lagging and is fed from a distribution board located 30m away by a two core PVC insulated and armored cable with aluminum conductors. The cable is to be clipped directly to a cable try and spaced which also carries two similar cables. The ambient temperature is 45⁰c and the circuit is to be protected by BS 88part 2 fuse. As a student of DEEE and you have been taught cable sizing, determine the following;
- (i) Load current. (02 marks)
 - (ii) The correction factors. (02 marks)
 - (iii) The rating of the fuse. (01 mark)
 - (iv) The maximum permissible voltage drop. (01 mark)
 - (v) Minimum size of the cable required. (01 mark)
 - (vi) Check for the actual voltage drop. (02 marks)

Question Four

Assuming it was reported to you that after commissioning and installation the socket outlet and the ring circuit could not receive power.

- a. Suggest the test that you think was not done to reveal this fault. (02mrks)
- b. Name the equipment that you would use to carry out the test (02mrks)
- c. With the aid of diagram illustrate how you can perform the test in (a) above (10mrks)
- d. Write down the expected results of the test in (c) above (02mrks)
- e. Explain the purpose of carrying out the test in (c) stating two other ways it could be carried out. (04mrks)

Question Five

- (a) Define the following as applied to electrical installation;
 - (i) Final circuit
 - (ii) Diversity
 - (iii) Diversity factor. (6marks)
- (b) State **four** categories of final circuits of an electrical installation. (04 marks)
- (c) Outline **two** IEE regulation requirements governing final circuits. (04 marks)
- (d) Determine the current rating of a fuse suitable for protecting the circuit supplying a cooker with the following loads. The supply voltage to the cooker is 240V;
 - (i) A 4kW large plate
 - (ii) A 2.5KW grill
 - (iii) A 2KW medium plate
 - (iv) A 2kW oven element
 - (v) A 1.5kW small plate. (06 marks)

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