

WRITE ALL YOUR WORK ON THE ANSWER BOOK PROVIDED. EVERY ANSWER SHOULD INCLUDE ALL WORKINGS, NECESSARY DIAGRAMS AND FORMULAE.

START EACH ANSWER ON A FRESH PAGE.

Choose any FIVE questions.

1. Special requirements are in place for bathrooms and shower cubicles.
 - (a) Describe and define the three possible zone areas in a bathroom. (6 marks)
 - (b) What are the permitted switchgear in each of the three zones? (6 marks)
 - (c) Name or define the permitted current-using equipment in each of the three zones. (6 marks)

Other additional requirements are, for example, found in caravans or motor caravans.

 - (d) List at least two related regulations and aspects associated with these additional requirements. (2 marks)

2. Safety at the place of work is of the utmost importance. Every workman needs to know certain procedures when a fellow workman is injured in an accident. Show that you are prepared to cope with an accident situation by answering the following questions:
 - (a) You are faced with an accident where the victim is bleeding. State at least six things you would do to make the patient as comfortable as possible before the arrival of the ambulance. (6 marks)
 - (b) All accidents at a place of work need to be reported. If you are in charge of the situation, list down the points you would include in your report. (4 marks)
 - (c) State what type of fire-extinguisher you would use to smother the following types of fires: (10 marks)
 - i. Wood fires
 - ii. Oil, petrol or paint fires
 - iii. Electrical apparatus fires
 - iv. Electrical and small flammable-liquid fires
 - v. Metal and plastic fires

3. (a) Using diagrams describe: (6 marks)
 - i. a non-pressure type water heater
 - ii. a pressure type water heater

(6 marks)

In both cases indicate the applications for which they are most suited.

 - (b) Make a neat diagram of the pipe work associated with a pressure type water heater on the ground floor of a two-storey house. Cold water supply is from a storage tank on the roof. Hot water outlets are in the kitchen on the ground floor and the bathroom on the first floor. (8 marks)

4. (a)

Explain, with the aid of a diagram explain what is meant by the term **discrimination**. Explain how good discrimination is achieved in an electrical installation. (5 marks)

(b) How is the current demand of a final circuit determined. (5 marks)

(c) A small shop is to be supplied from a single phase 230 volts 50 Hz supply. The load connected to the installation comprises of the following items:

- i. 8 x 60 watts twin fluorescent fitting
- ii. 2 ring circuits
- iii. A 4 kW cooker controlled from a cooker unit combined with a 13 amperes socket outlet.

Calculate the assumed current demand for the installation by applying the diversity factor as provided in the table below and state what will it be your recommendation to the owner.

Purpose of the final circuit	Diversity to be applied
Lighting	90% of the total current demand
Cooking appliance	10 amperes + 30% full load of the connected cooking appliance in excess of 10 amperes + 5 amperes if a socket outlet is incorporated
Heating and Power	100% of total current demand up to 10 amperes + 50% of any current demand in excess of 10 amperes.

(10 marks)

5. (a) Give brief answers based on IET Regulations for the following:

i. In a kitchen there are two electrical cookers. Being a competent electrician what are your recommendations to the owner? (3 marks)

ii. What is the maximum distance at which an electric cooker may be positioned from the cooker control unit? (2 marks)

(b) State why the IET Regulations requires that every installation shall be divided into circuits. (5 marks)

(c) What is meant by Basic Protection (formerly known as Direct Contact) and Protection Under Fault Condition (formerly known as Indirect Contact)? (5 marks)

(d) The IET Regulations recommend that every electrical installation should be regularly inspected and tested. At what periodic intervals should the following installations be tested?

- i. Domestic dwelling (1 mark)
- ii. Commercial dwelling (1 mark)
- iii. Shops (1 mark)
- iv. Caravans (1 mark)
- v. Construction site (1 mark)

6. A sub-circuit in a kitchen feeds a 4.88 kW electric cooking appliance. The cable is PVC insulated in conduit.

Taking the run of cable to be 30 metres and the ambient temperature 30°C and that the circuit is run with two other circuits.

Choose a suitable size of cable.

Use the IET Regulation tables provided.

(20 marks)



EXAMINATION: AUTHORISATION A

February 2018

Paper II (Electrical Installation Technology)

Time Allowed - 3Hrs

END OF PAPER