This examination paper contains six questions. Candidates are requested to answer any FIVE (5) questions. Candidates are also requested to include all their work in the booklet provided. Every answer should include all workings, any necessary diagrams and formulae. Use a fresh page for each different question. Each question carries 20 marks.

1. a) Draw a complete circuit diagram showing how a 12V electric bell controlled by a simple push button can be supplied from a 230V, 50Hz A.C. supply. **(5 marks)**

   b) Why is a transformer required for a bell circuit? **(3 marks)**

   c) Can Extra-low voltage (ELV) circuits be passed through a conduit having other wires operating at 230V? **(5 marks)**

   d) With the aid of a simple diagram briefly describe how a **Closed-circuit** burglar alarm operates. In your diagram show two sensors. **(7 marks)**

2. a) What is the purpose of inspecting and testing a new installation? **(2 marks)**

   b) Explain the reason why Visual Inspection needs to be carried out before commencing testing on a new installation. **(5 marks)**

   c) List the points that need to be taken into consideration while performing a Visual Inspection on a new electrical installation. **(7 marks)**

   d) Explain how an insulation resistance test is carried out on an electrical installation. The answer must include the procedures that need to be followed from the time the supply to the installation is switched off. Show drawings how the instrument is connected to perform the tests and state the minimum acceptable value for each test. **(6 marks)**

3. a) State what is meant by Personal Protective Equipment (PPE). **(4 marks)**

   b) Make a list of any PPE which might be used at work. **(4 marks)**

   c) Describe the action to be taken upon finding a workmate apparently dead on the floor and connected to an electrical supply. **(5 marks)**

   d) To prevent people receiving an electric shock accidentally, all circuits must contain protective devices. List the protective devices commonly used and explain their purpose. **(4 marks)**

   e) There are also responsibilities that apply to an employee (or worker) in the electrotechnical industry, in order to assist their employer to obey the law. List the general responsibilities for both the employee and the employer. **(3 marks)**

4. a) With the aid of a diagram show the connections and equipment at a domestic service position. The diagram should be well labelled and include both the **Supply Authority Equipment** and the **Consumer's Equipment**. **(10 marks)**

   b) Explain why there is a need to inspect and test an electrical installation. **(6 marks)**

   c) Name the devices which offer protection against overcurrent. **(4 marks)**

5. a) Describe the construction and operation of a moving-coil instrument. **(8 marks)**

   b) Make a neat and well-labelled diagram of the instrument. **(6 marks)**

   c) Can the instrument be used in AC circuits? Give reasons for your answer. **(3 marks)**

   d) Is the scale of this instrument even or uneven? Give reasons for your answer. **(3 marks)**

6. a) What is the difference between a double-pole transformer and an auto-transformer? **(4 marks)**

   b) Show by a diagram the windings of a 240V/12V auto-transformer. Your drawing must show where the neutral must be connected and the positions where the transformer must be earthed. **(6 marks)**

   c) If the auto-transformer has 500 turns on the primary how many turns must it have on the secondary? **(2 marks)**

   d) What restrictions do the IET regulations impose on the use of auto-transformers? **(8 marks)**

END OF EXAMINATION PAPER

BLANK PAGE

DEPARTMENT OF EXAMINATIONS
THE MALL, SARRIA STREET, FLORIANA, MALTA

Examination for Authorisation A

Paper 2: Electrical Installation Technology

Date: July 2021

Time: 09:00 – 12:00 (Three hours)

freephone 153 e-mail myexams@gov.mt | www.myexams.gov.