

EXAMINATION : AUTHORISATION B

April 2017

Practical Test

Time Allowed - 1Hr

Name & Surname \_\_\_\_\_  
(In Block letters)

Index No. \_\_\_\_\_

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Consider that a new vocational college laboratory workshop installation is to be carried out. You are free to assume the layout of the college laboratory workshop. However, it is expected that safety considerations are taken into account to safeguard the students. The college laboratory workshop consists of the following:

- Single-phase main switches.
- Three-phase machines which include a Pillar Drill (3-phase) and a Grinding Machine (3-phase).
- Socket outlets.
- Lighting luminaries and
- **Three educational working benches**, each equipped with **three Main Switches** and **two emergency stops** along each respective bench.
- **Seven other Emergency stops** are also installed around the laboratory workshop, two of which are installed adjacent to each of the 3-phase machines mentioned above i.e. the pillar drill and grinding machine.

The above is supplied from a 400/230 Volts, 50 Hz 4-wire system.

The following loads are installed:

1. **Nine** single-phase main switches rated 20 amps.
2. **Two** three-phase motors rated 7 amps each.
3. **Eighteen** fluorescent luminaries 58 watts each.

Questions:

- (a) Draw a circuit diagram of the emergency stop button circuit which is controlled from a 3-phase contactor. (7 marks)
- (b) State the requirements of the IEE regulations concerning emergency stopping. (4 marks)
- (c) Refer to the Figure 1 attached:  
Indicate on the attached Figure 1, the proposed conduit and trunking routes for the lighting luminaries from the distribution board. (6 marks)
- (d) Draw a layout for the above vocational college laboratory workshop installation. All diagrams must be neat, clear and fully labelled. (5 marks)
- (e) Draw a schematic diagram of the installation, showing the number of circuits required, the estimated rating of the protective devices, and the size of wires to be used. (18 marks)

**END OF PAPER**

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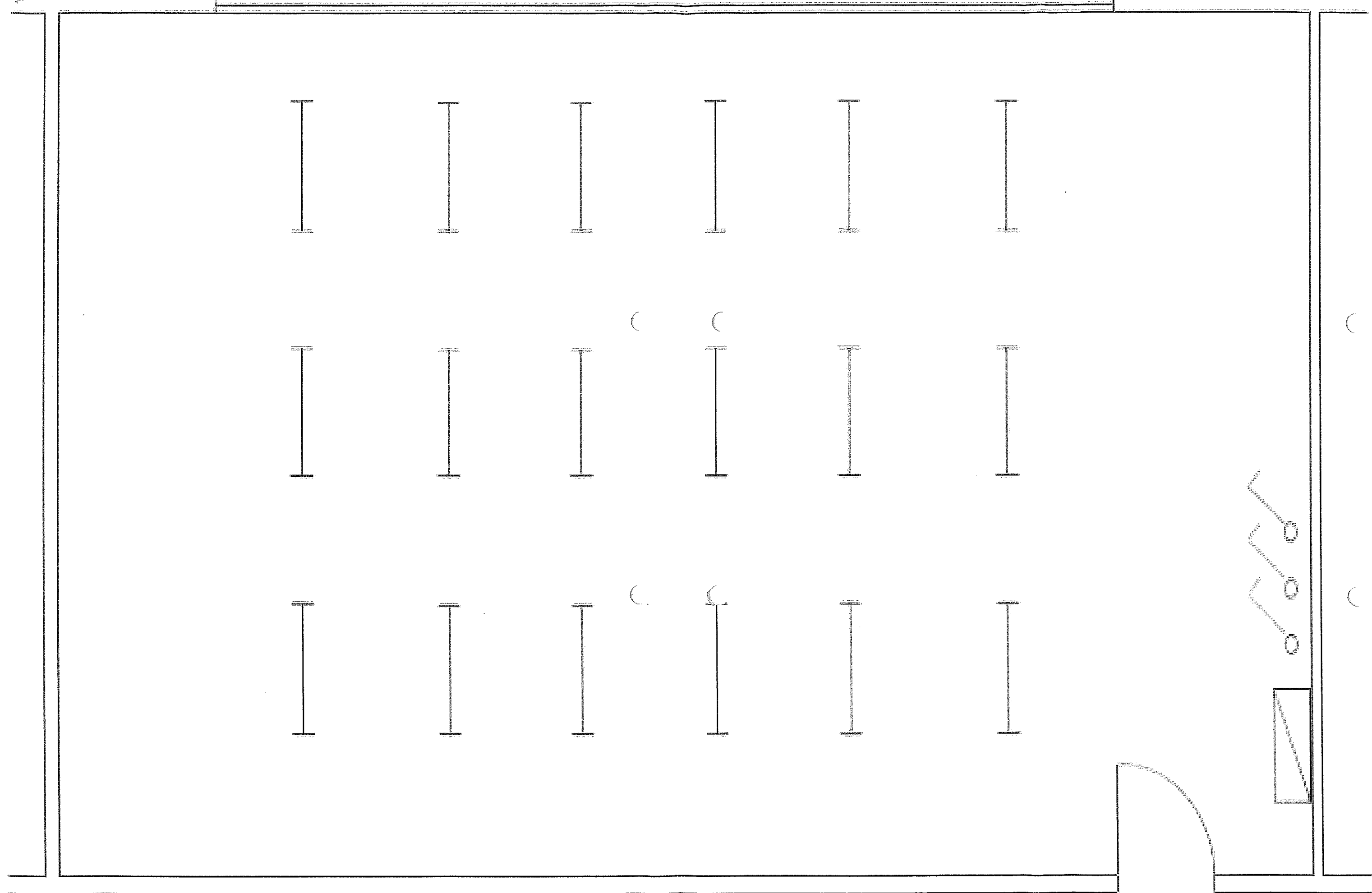


Figure 1.