



END OF EXAMINATION PAPER

Examination for Authorisation B

Paper 2: Electrical Installation Technology

Date: 5 July 2019

Time: 09:00 – 12:00 (Three hours)

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 circuit diagram, showing how to connect two-watt meters to measure the total power consumed by a three-phase motor. (6 marks)
 - (b) Explain by means of a diagram how to read total power and power factor using two wattmeters. (5 marks)
 - (c) A supply cable is passing through the current transformer. The current transformer is connected to a meter to read the current. At some point the meter has to be removed for maintenance. Explain what precaution must be taken and why. (4 marks)
 - (d) Explain what to look for in a distribution board when carrying out visual inspection. (5 marks)
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2. (a) List **three** advantages of using XLPE cables instead of PVC steel wire armoured cables. (6 marks)
 - (b) With the aid of a diagram explain how a straight-through joint is made on a 600/1000 volts, three-core XLPE steel wire armoured cable. (8 marks)
 - (c) What precautions should be taken against corrosion when installing steel wire armoured cables underground. (6 marks)
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3. (a) Most small motors can be directly mounted in the most convenient position on walls, overhead girders etc. Larger motors, however, require a concrete foundation especially where rigidity and freedom from vibration are essential. Show by means of a clear and well-labelled diagram how such a foundation is prepared and how the motor is mounted. (7 marks)
 - (b) Show by means of a clear and well-labelled diagram how a motor is lined to a belt drive. (8 marks)
 - (c) List the precautions one should take when a small motor is coupled directly to the shaft of a machine. (5 marks)

4. (a) State what is meant by the term **electrode boiler** and state the advantages and disadvantages of an electrode boiler compared with an immersed element boiler. (10 marks)
 - (b) Describe how the electricity regulations provide for safety in the installation of electrode boilers. (5 marks)
 - (c) Draw a circuit diagram of an electrode boiler and its protection system. (5 marks)
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5. (a) Describe by means of a diagram, the construction of one form of split-phase, single-phase motor. (8 marks)
 - (b) Explain how this motor works and explain why phase-splitting is necessary. (6 marks)
 - (c) A 30 B.H.P, 240 volts, single-phase motor runs at full load at 0.72 pf lagging. If the efficiency of the motor at full load is 85%. Calculate the current taken from the supply. (6 marks)
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6. There are several different methods of providing **reduced-voltage starting** for electric motors. One of them is the autotransformer method.
 - (a) What is the purpose of the reduced voltage starting for a motor? (2 marks)
 - (b) Draw a neat full diagram for the above. (7 marks)
 - (c) Explain how it works. (5 marks)

Total: 100 marks