

**Electrotechnical Unit 304 Free
Information with answers**

Introduction from the publisher Britannia Training Ltd:

**Thank you for downloading this free sample assessment paper for the
Electrotechnical Technology award, level 3 part 4.**

**The following free question paper with answers has been produced to assist and
support the student studying for this exam.**

**This next stage has been developed as a result of feedback from students who
would like to practice for the practical assessment. Practice after all does make
perfect!**

To help you however, we need your feedback:

What questions do you struggle with?

What questions would you like to see us set and provide full working?

**The intention is to write a sample assessment paper for £3. This should prove
excellent value for money and give you practice.**

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Wishing you well in your studies.

Steve Burns
B. Eng Hons

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the condition that it shall not by way of trade or
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Training Limited.**

A. Using working practices that are effective, safe and efficient to carry out maintenance on electrical equipment and systems.

This free paper expand upon free information that should be provided by your college or training provider. It also includes relevant information as to what is expected by giving examples. We hope you find this of use.

The 304 unit covers the underlying principles and work methodologies which apply to:

- Maintaining electrotechnical systems
- Inspecting electrotechnical systems
- The testing of electrotechnical systems
- And the setting-to-work of electrotechnical systems

The unit will cover the standard operating methods of each of these so that the relevant legislation and regulatory body requirements are met.

In other words, you will have to show you can follow logical work procedures, with the correct equipment, in a safe manner that provides a high degree of surety that the result is a safe system.

The 304 unit has two main learning outcomes and expects you to be able to: maintain electrical systems in a safe, efficient and effective manner; to be able to select the appropriate tools, equipment, test instruments and a relevant work method for the inspection, testing and commissioning of a job.

The practical assessment will also have a short answer test where you must answer questions to show you have an understanding of the knowledge behind what you will do in the practical. You must show that you know and understand, for example:

- How to work safely: does the area need barriers, permits to work, PPE, isolation, direct and indirect contact (now called basic protection and fault protection) etc.
- Maintenance types, outcomes, factors, procedures, reporting: planned, motor maintenance, reduced downtime, efficient operation, times of access, relevant tools, estimates of cost, safety precautions, relevant recording, identification of components
- People concerned with maintenance: client, suppliers
- Regulatory requirements: HASAWA, building regs
- Be able to read a relevant drawing: layout, schematic
- Communication: customer and colleagues, effective
- Energies involved: transmission voltages, star and delta systems, line and phase currents and voltages, $\sqrt{3}$

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- Equipment and wiring: is it appropriate, MICC, trunking, correct termination – mechanical and electrical, conductor sizing etc, bonding and earthing, earth systems (TNC etc)
- How to do relevant calculations: Ohms law, volt drops, fuse or mcb rating requirements
- Equipment operation: mcbs, RCDs, motors
- Correct maintenance procedures for: switching, lighting.

This is not an exhaustive list, it is merely there to give examples of what is expected.

B. Be able to select and utilize the right tools, methods and test equipment to be able to inspect, test and commission an installation safely.

You must show that you know and understand, for example:

- ❑ The need for inspection and testing: complying with regulations, safety, information sources etc.
- ❑ Periodic inspection: relevant documentation, when needed
- ❑ Testing and commissioning: visual inspection, relevant instruments (NOT a megger ©), instrument calibration, correct test methods, expected and allowed test values
- ❑ Completing maintenance: documentation, EIC, fault reporting and action

This is not an exhaustive list, it is merely there to give examples of what is expected.

Your college should provide you with the sample questions supplied from the awarding body. Each centre will then have a question sheet and exercise that has been approved by the awarding body.

Finally.

Your college or training provider should be making you aware of the assessment process – what they will do and what they expect you to do. Hopefully this guide will give you a clearer idea of what is required.

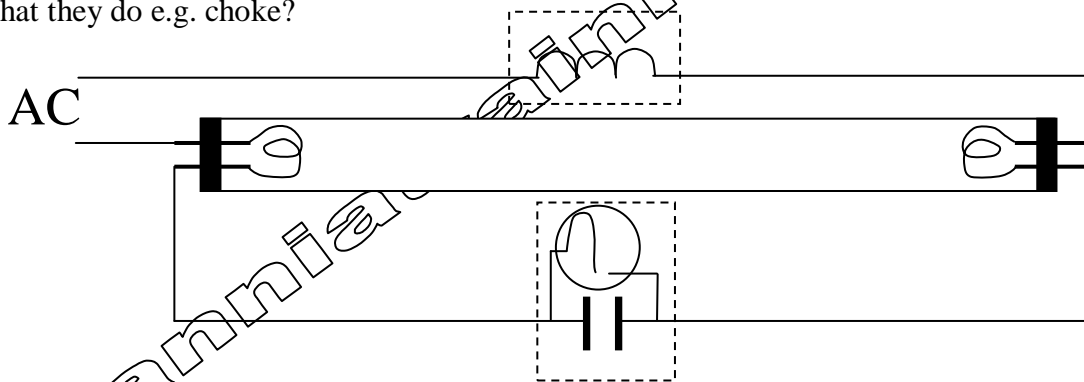
The awarding body provides worksheets and handouts for unit 4 which include: motor types, motor enclosures and connections for 3-phase motors http://tutor_courses/11202178594240/11202178594240_73.html http://tutor_courses/11202178594240/11223891695380.html. Your training provider or college should provide you with copies of these.

Example:

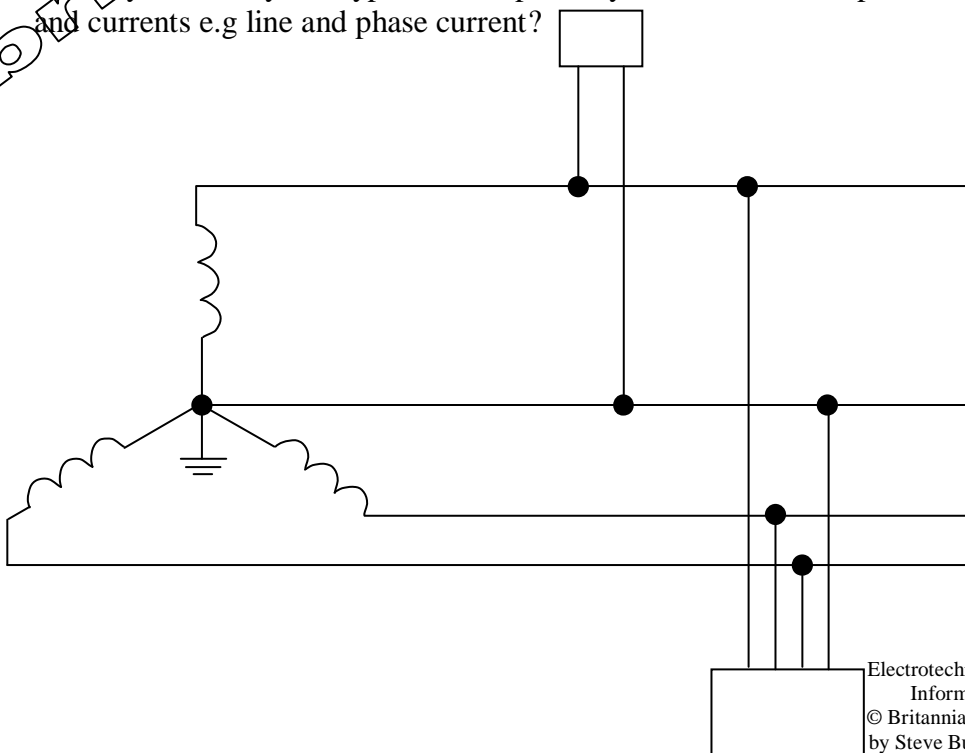
Q) 'My lecturer has told me that the 204 is about a fluorescent circuit and testing a three phase distribution system. (3 phase should be fun as the class has not covered this!!!), plus safe isolation, PPE, and tools list. It all sounds quite straight forward (apart from 3 phase). However I like to prepare for exams and our lecturers were not really forthcoming with what I need to do. An example would be, two lecturers have given us completely different advice on a circuit diagram we have to draw, and when asked to clarify which is expected from city and guilds, the reply was, don't worry if you do the wrong one it will only cost you a few points!!!'

A) Within the sample paper that we sell, we will give advice on common lighting circuits, how to test a 3-phase system, how to isolate a system safely, correct tools, correct test equipment and descriptions of the four types of electrical diagrams.

1. Here's a typical fluorescent lamp circuit, can you name all the components and what they do e.g. choke?

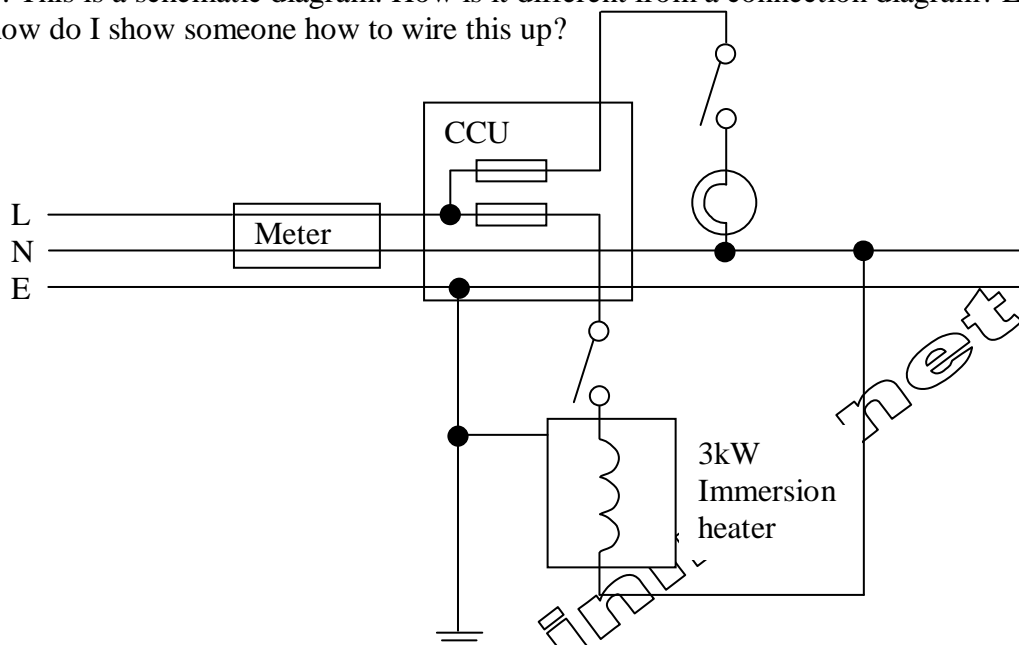


2. Can you identify this type of three-phase system and label all parts, the voltages and currents e.g. line and phase current?



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3. This is a schematic diagram. How is it different from a connection diagram? E.g. how do I show someone how to wire this up?



For further information, assessment examples etc, purchase the paper titled 'Sample electro-technical type practical assessment 304'

Note: If you have already purchased all the electrotechnical level 2 and level 3 papers, you will find quite a few questions which relate to this unit. Here are some examples of what you may be asked (what is covered in the unit and should be known as underpinning knowledge):

Calculate required cables sizes if supplied with equipment type and running current e.g. a 1-phase 1kW garage door opener

Identify useful sources of information that will help and advise in the installation process and relevant regulations that need to be adhered to e.g. use BS7671 to

Identification of results of maintenance activities e.g. improved productivity

List regular maintenance activities on electrical equipment e.g. check bearings on motors

Identify or describe common motor types, enclosures and starters from a short description e.g. The rotor consists of bars which are shorted at the ends and whose speed is always significantly slower than the synchronous speed (this is a cage rotor)

Show where the main earthing conductor should connect to e.g. in a TT system, it connects from the main earthing terminal (MET) to the main earth electrode

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Understand and explain why we have different procedures and documentation for the different parts of the life cycle of an installation e.g. why do we carry out an initial inspection

Calculations. Any formula used from level 2 and 3 may be asked for. E.g. RMS voltage, volt drops, current drawn etc.

Identify the main parts of a maintenance plan e.g. safe shutdown

List suitable types of wiring for particular installation e.g. conduit in a farm

How maintenance activities must meet regulatory requirements e.g. WEEE

Identify the four types of electrical drawing and components and their function and operation e.g. block diagram, RCD provides earth fault protection

List and describe the relevant tests and inspections at the various stages of inspection and testing, their expected outcomes and recommended remedial actions upon failure e.g. live testing of devices such as RCDs with an RCD tester, correct jointing of conduit systems by visual inspection

Describe commonly used technical words e.g. bonding and isolator

Here is a list of questions that will cover the underpinning knowledge needed to pass unit 304.

Level 2 Paper 1: Questions 4, 5, 8, 12, 13, 14, 15, 17 to 21, 24, 38, 39 to 44, 46, 47, 54, 59, 62, 65 to 77, 79 to 82, 85 to 87, 91, 97, 100.

Level 2 Paper 2: Questions 5, 8, 13 to 16, 18, 19, 21 to 23, 26 to 29, 31, 32 to 34, 37, 39, 45, 47, 48, 50, 51, 53, 55, 57 to 61, 65 to 78, 82, 85 to 90, 92, 94 to 97.

Level 2 paper 3: Questions 1 to 3, 6 to 10, 12 to 14, 18, 19, 24 to 26, 28, 29, 33, 34, 35, 38, 39, 44, 48, 51, 52, 53, 56, 57, 60, 61, 63, 66 to 74, 87, 92, 93 to 97, 99, 100.

Level 2 Paper 4: Questions 3, 8, 10, 11, 13, 16, 17, 23, 25, 27, 28, 30, 40, 46, 49, 52, 55, 58 to 60, 63, 68, 69, 72, 77, 78, 81, 83, 88, 89, 92, 97.

Level 3 Paper 1: Questions 6, 8, 9, 15, 16, 22, 32, 34, 37, 39 to 42, 46, 48 to 50, 53, 57, 58, 60, 64, 68, 71, 72, 73, 75, 79, 81, 84, 100.

Level 3 Paper 2: Questions 2, 3, 4, 6, 8, 11 to 14, 16, 18, 20, 25, 27, 32, 34, 35, 37, 39, 40, 45, 47, 48, 50, 52, 54, 60, 61, 62, 64, 65, 69, 72, 73, 76, 83, 85, 86, 87, 94, 96, 97, 98, 99,

Level 3 Paper 3: Questions 4, 5, 6, 16, 17, 18, 21, 22, 24, 26, 27, 29, 30, 31, 39, 40, 41, 46, 48, 50, 52, 53, 54, 55, 58, 59, 60, 61, 70, 76, 78, 79, 81, 84, 85, 86, 87, 88, 93, 97, 98, 99.

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Level 3 Paper 4: Questions 1, 2, 13, 17, 21, 33, 35, 38, 40, 41, 43, 45, 55, 56, 57, 63, 70, 71, 75, 78, 79, 80, 82, 84, 87, 91, 94, 95, 99.

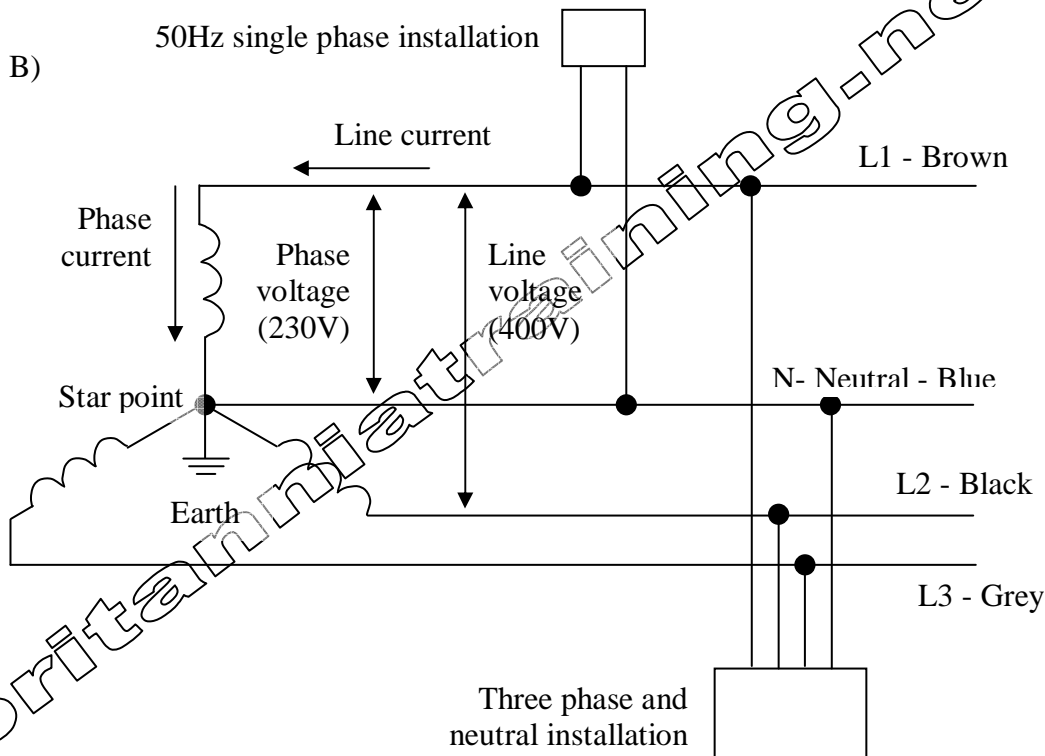
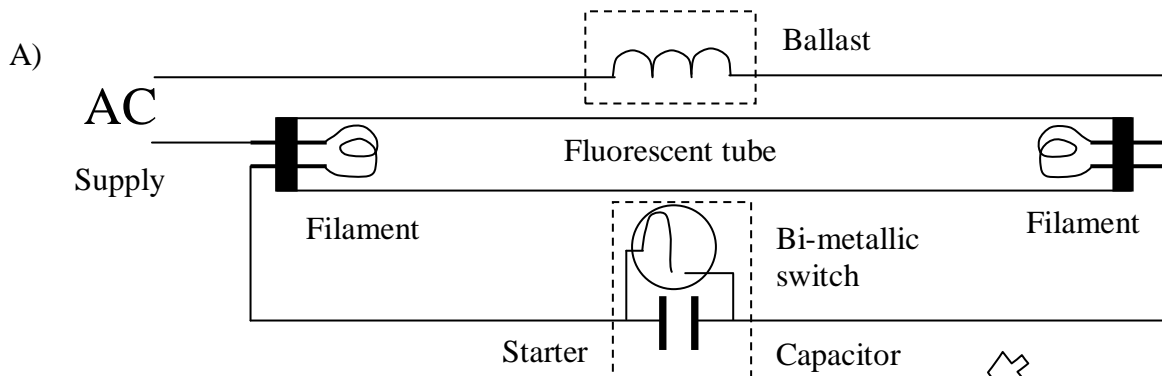
If you have bought all 8 papers, that's gives you at least 330 questions to check your knowledge against. Whilst they are not set out the same way as the assessment and also the assessment is not multiple choice, they will be an invaluable revision aid.

Answers to A, B and C follow on the next page.

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Answers:



Now, I don't think the awarding body will want you to show how a wattmeter is connected, I think they want you to be able to do commissioning tests as you would for a single phase system (IR etc.). The other differences being that there are line and phase voltages present, so you will need to know which is which.

A long time ago, in a galaxy far, far away we used to call L1, L2 and L3 'lines'. Then some idiot thought the word 'live' would be so much better (totally ignoring the fact the neutral was live!). Then common sense prevailed and the current IEE reg's (17th edition) now call them lines. Thus it is now easy to remember the voltage between two lines is a 'line' voltage.

C) A connection diagram would have additional information including the labels to be found on the light switches (L1, L2, Earth), lamps (L, N, Loop In, Earth), the Immersion heater could be marked A, B and C and would need reference to the

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manual to know which is Live, Neutral and Earth although most modern appliances are marked L, N and E (or the earth symbol).

Note:

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You are advised that it is unlawful under the Electricity at Work Regulations 1989 to work on any electrical installation in the UK unless you are a 'competent person' as follows:

The Electricity at Work Regulations 1989 requires persons to be competent to prevent danger and injury. No person should be engaged in any work activity unless he or she possesses such technical knowledge or experience, or is supervised as appropriate for the work.

The Memorandum qualifies technical knowledge or experience as being:

- 1 Adequate knowledge or experience;
- 2 Adequate experience of electrical work;
- 3 Adequate understanding of the system being worked on and practical experience of that class of system;
- 4 Understanding of the hazards that may arise during the work and the precautions that should be taken;
- 5 Ability to recognise at all times whether it is safe for work to continue.