

Advanced Diploma of Applied Electrical Engineering

(DEE – 52883WA)

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| **Student full name:** | Ryan Anthony Wilkins |
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| Please place a tick (☑) in the box below to indicate that you have read, understood, and certify the above statement.  Please include this page in/with your submission.  Any electronic responses to this submission will be sent to your Moodle account.  **AGREEMENT**     ✓image2.pdf  **DATE:** 03/09/2025 | |

|  |  |  |  |
| --- | --- | --- | --- |
| Marks (%) |  | Satisfactory / Not Satisfactory | |
| Assessor: |  | Date: |  |
| Overall feedback: |  | | |

Guidelines for Students

**How is this module assessed?**

After completion of this assessment, you will be given a result of ‘Satisfactory’ or ‘Not Satisfactory’. The assessor will give you feedback via Moodle and you will have an opportunity to submit additional evidence, if you have received a ‘Not Satisfactory’ result.

You will be allowed one (1) opportunity to resubmit the same assessment task, if required.

For a ‘Satisfactory’ result in this assessment, all questions must be answered to a satisfactory standard and you must achieve an overall mark of 60% or above.

Once all assessment tasks for this module have been completed, you will be given a final module result of ‘Competent’ or ‘Not Yet Competent’. If you are deemed ‘Not Yet Competent’ in a module after all resubmission attempts, you will be required to re-sit the module.

**How is this assessment task assessed?**

For a result of ‘Satisfactory’ in this assessment task, all module assessment criteria (as indicated on page 4) must be completed to a satisfactory standard.

Where a **critical question** is identified, you must receive a mark of 100% for these questions before a ‘satisfactory’ result can be awarded, regardless of the overall mark achieved.

At Advanced Diploma level, a ‘satisfactory’ standard, as stipulated by the Australian Qualifications Framework, means that you will demonstrate the application of knowledge and skills:

* with depth in areas of specialisation, in contexts subject to change
* with initiative and judgment in planning, design, technical or management functions with some direction
* to adapt a range of fundamental principles and complex techniques to known and unknown situations
* across a broad range of technical or management functions with accountability for personal outputs
* personal and team outcomes within broad parameters

Assessors also make decisions based on the following considerations:

* all parts of this assessment have been completed to a standard that satisfactorily meets the requirements set out in the assessment criteria (as per the module outline).
* the assessment evidence provided is the student’s own work, except as appropriately acknowledged by the use of referencing.
* the evidence is recent and the student’s knowledge is up-to-date

**Assessment Instructions:**

1. You **must** answer ALL questions.
2. Please ensure you complete your answers in a **blue** font (not red or black).
3. The best marks can be earned by giving concise, brief answers that address the questions.
4. You must reference all content used from other sources including course materials, slides, diagrams, etc. Do not directly copy and paste from course materials or any other resources.   
   Refer to the referencing section of the EIT eLibrary on Moodle for referencing guides.
5. Work submitted may be subjected to a plagiarism detection process. If this process is used, then copies of this work would be retained and used as source material for conducting future plagiarism checks.
6. Use this document for completing your answers by typing the answers after each question without deleting the question. Make sure that you preserve the original question number format.
7. Do not add extra pictures, etc. as annexures; instead, paste them directly into this answer sheet. Hand-drawn sketches can be inserted after scanning but please ensure that the file size does not become big (more than 10 MB). You must refer to all diagrams and pictures, etc. that you have drawn or pasted in.
8. When saving your document (must be Word format), ensure you include your name in the title: COURSECODE\_MODULE#\_ASSESSMENTTYPE\_VERSION#\_YOURNAME

**E.g. DEE\_DEEESW612\_AssessmentType\_PaperB\_v1\_JohnSmith**

|  |  |
| --- | --- |
| **Module no. and name:** | **DEEESW612: Electrical Safety and Wiring Regulations** |
| **Assessment type:** | **Written Assessment Paper B** |
| **Version:** | **1** |
| **Total marks:** | **130** |

Assessment Points:

* Supply the required answers below in a blue font (not red or black).
* You must submit this assessment along with the practical component.
* Answer all the questions.

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| --- | --- | --- | --- |
| **Q1** | List the two (2) main hazards that arise from working with/on electrical equipment. | | **(2 marks)** |
| **A1** | Student answer  Electric shock, can cause burns, nerve damage, or death  Arc flash, sudden explosion of heat and light that can lead to severe burns or blindness | | |
| **F1** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q2** | What are three (3) conditions that can lead to or cause Electric shock. | **(3 marks)** | |
| **A2** | Student answer  Damaged or exposed wiring  Wet or damp environments  Faulty or ungrounded equipment | | |
| **F2** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q3** | Using a body weight of 70kg in the empirical relation what will be the safe value(s) of current through the body for a time period(s) 0.3 and 3 seconds. | | **(2 marks)** |
| **A3** | Student answer  Using the empirical formula:  I = 116 / √t (for body weight 70kg, I in mA, t in seconds)  For 0.3 sec:  I = 116 / √0.3 = 116 / 0.547 = 212 mA  For 3 sec:  I = 116 / √3 = 116 / 1.732 = 67 mA  So, safe currents:  212 mA at 0.3 sec  67 mA at 3 sec | | |
| **F3** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q4** | What is the purpose of Electrical equipment earthing which is primarily concerned with connecting conductive metallic enclosures of the equipment. | **(2 marks)** | |
| **A4** | Student answer  Earthing helps direct fault current safely to the ground if a live wire touches the metal body. It prevents electric shock by keeping the enclosure at ground potential | | |
| **F4** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q5** | Briefly explain the 2(two) essential ways of minimizing hazard from indirect contact. | | **(4 marks)** |
| **A5** | Student answer  Use earthing and protective devices like circuit breakers to cut power during faults.  Apply double insulation so live parts don’t touch the outer casing, even if one layer fails | | |
| **F5** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q6** | How does class II equipment eliminate the danger of indirect contact? | | **(2 marks)** |
| **A6** | Student answer  Class II equipment uses double or reinforced insulation, so there’s no exposed metal that can become live. This removes the need for earthing and stops electric shock from indirect contact | | |
| **F6** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q7** | An Separated Extra Low Voltage (SELV) system is defined as one which has: | | **(3 marks)** |
| **A7** | Student answer  A SELV system has a low voltage supply that’s isolated from higher voltages and has no connection to earth. It’s designed to prevent dangerous voltages from appearing under normal or fault conditions | | |
| **F7** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q8** | List the two (2) conditions that must be fulfilled for easy detection of fault. | **(2 marks)** | |
| **A8** | Student answer  The system must be earthed properly and have effective fault protection like fuses or breakers to quickly detect and disconnect faults | | |
| **F8** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q9** | Define an Arc-flash hazard and Arc-flash current respectively. | | **(4 marks)** |
| **A9** | Student answer  Arc-flash hazard is the risk of injury from heat, light, and pressure caused by an electric arc  Arc-flash current is the actual current that flows through air during the arc fault | | |
| **F9** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q10** | What factors determine the severity/scale of hazards due to an electric arc? | | **(2 marks)** |
| **A10** | Student answer  Severity of an arc hazard depends on the arc current, voltage level, distance from the arc, duration of the arc, and how confined the space is | | |
| **F10** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q11** | What are (4) four possible scenarios that could lead to an arc flash? | | **(4 marks)** |
| **A11** | Student answer  Loose connections  Accidental contact with live parts  Faulty or damaged insulation  Tools or metal dropped in live equipment | | |
| **F11** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q12** | Describe five (5) of the major hazards of arcing faults. | | **(5 marks)** |
| **A12** | Student answer  Severe burns from intense heat  Fire from ignition of nearby materials  Eye damage from bright flash  Hearing loss from blast pressure  Shrapnel injuries from exploding parts | | |
| **F12** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q13** | What are the activities or conditions that can increase the likelihood of an arc flash? | | **(5 marks)** |
| **A13** | Student answer  Working on live equipment  Using metal tools near exposed parts  Wearing improper PPE  Poor maintenance or damaged gear  Loose or corroded connections | | |
| **F13** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q14** | List three (3) ways in which exposure to arc flash can be eliminated. | | **(3 marks)** |
| **A14** | Student answer  De energize equipment before work  Use remote operation tools  Design systems with arc-resistant gear | | |
| **F14** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q15** | Which procedures, used correctly, can reduce arc flash accidents? | **(5 marks)** | |
| **A15** | Student answer  Lockout/tagout (LOTO)  Proper PPE use  Following safe work practices and permits | | |
| **F15** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q16** | What are the four (4) ways of reducing incident energy on an existing system. | **(4 marks)** | |
| **A16** | Student answer  Lower fault current  Shorten arc duration with fast breakers  Increase working distance  Use current-limiting devices | | |
| **F16** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q17** | Describe the hazards that occur due to high temperature in electrical equipment. | **(3 marks)** | |
| **A17** | Student answer  High temps can cause insulation breakdown, leading to short circuits. They can also start fires, damage components, and create shock or arc flash risks | | |
| **F17** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q18** | What basic safety aspects need to be addressed when designing electrical equipment? | | **(6 marks)** |
| **A18** | Student answer  Proper insulation  Effective earthing  Overcurrent protection  Safe enclosure design  Clear labeling and warnings | | |
| **F18** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q19** | Describe the conditions that can lead to Insulation failures. | **(4 marks)** | |
| **A19** | Student answer  Aging and heat damage  Moisture or chemical exposure  Mechanical stress or abrasion  Overvoltage or electrical surges | | |
| **F19** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q20** | To prevent failures during voltage surges that occur due to lightning strike or switching, what type of design approach should be implemented? | **(3 marks)** | |
| **A20** | Student answer  Use surge protection devices, ensure proper grounding, and design with voltage withstand margins to handle spikes safely | | |
| **F20** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q21** | List the criteria that must be fulfilled for parts used as an obstacle. | | **(3 marks)** |
| **A21** | Student answer  Must be securely fixed  Strong enough to resist displacement  Prevent direct contact from any angle  Allow only limited access without tools | | |
| **F21** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q22** | Describe the general considerations for interlocks. | | **(3 marks)** |
| **A22** | Student answer  Interlocks should be reliable, hard to bypass, and disconnect power before access is possible. They must match the risk level of the equipment and be easy to test and maintain | | |
| **F22** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q23** | What are the five (5) common rules for selection and erection of equipment. | | **(5 marks)** |
| **A23** | Student answer  Correct for the environment  Suitable for voltage and current  Proper insulation and protection  Easy to maintain and access  Complies with safety standards | | |
| **F23** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q24** | Describe six (6) of the guidelines that should form the basis of any safety measures being implemented in the workplace. | **(6 marks)** | |
| **A24** | Student answer  Identify and assess risks  Use proper protective equipment  Train staff regularly  Follow lockout/tagout procedures  Keep work areas clean and labeled  Maintain and inspect equipment often | | |
| **F24** | Assessor feedback: | | **(marks awarded)** |
|  |  | | |
| **Q25** | What are four (4) situations that indicate unsafe or dangerous conditions may be developing or are present in an electrical installation? Describe them. | | **(8 marks)** |
| **A25** | Student answer  Burnt smell, may signal overheating or insulation failure  Tripping breakers, could mean short circuits or overloads  Visible damage, like cracked sockets or exposed wires  Flickering lights, might point to loose connections or voltage drops | | |
| **F25** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q26** | Which types of notices must be installed in any substation to warn the public of the danger of live equipment? Identify three (3). | | **(4 marks)** |
| **A26** | Student answer  Danger , High Voltage signs  No Unauthorised Access signs  Live Equipment, Keep Out warnings | | |
| **F26** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q27** | Which special precautions is necessary when working on switchgear? | | **(2 marks)** |
| **A27** | Student answer  Isolate and lockout power  Discharge stored energy  Use insulated tools and PPE  Test for voltage before touching anything | | |
| **F27** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q28** | Describe the common hazards posed by battery installations. | | **(6 marks)** |
| **A28** | Student answer  Electric shock from terminals  Fire or explosion from sparks or short circuits  Chemical burns from leaking acid  Toxic gas buildup in poorly ventilated areas | | |
| **F28** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q29** | How can shock hazards and arc flash be prevented in battery systems? | | **(1 marks)** |
| **A29** | Student answer  Use insulated tools and covers  Wear proper PPE  Follow lockout/tagout procedures  Ensure good ventilation and clear labeling | | |
| **F29** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q30** | Describe the general rules of proper maintenance for battery systems. | | **(4 marks)** |
| **A30** | Student answer  Inspect regularly for leaks or damage  Clean terminals and check connections  Test voltage and capacity  Keep area ventilated and free of clutter  Follow manufacturer’s service schedule | | |
| **F30** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q31** | What are the different forms that safety and health legislation can take? | | **(4 marks)** |
| **A31** | Student answer  Acts (laws passed by government)  Regulations (detailed rules under the acts)  Codes of practice (guidelines for compliance)  Standards (technical specs for safety) | | |
| **F31** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q32** | What must be covered in the safety policy of the employer with a number of employees? | | **(4 marks)** |
| **A32** | Student answer  Clear statement of intent  Roles and responsibilities  Risk assessment and control measures  Training and supervision plans  Emergency procedures  Review and update process | | |
| **F32** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q33** | Indentify the inclusions legally required for accident reporting. | | **(3 marks)** |
| **A33** | Student answer  Date, time, and place of the accident  Details of the person(s) injured  Description of the incident and injuries  Witnesses and statements  Action taken and who reported it | | |
| **F33** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q34** | Aside from formulating the safety policy, what are the other major safety related responsibilities of the employer? | | **(6 marks)** |
| **A34** | Student answer  Provide safe work environment  Conduct risk assessments  Supply proper tools and PPE  Train and supervise employees  Report and investigate incidents  Maintain equipment and safety systems | | |
| **F34** | Assessor feedback: | | **(marks awarded)** |
|  | | | |
| **Q35** | Name the types of workers directly impacted by the Code of Practice for Electrical Work. | | **(3 marks)** |
| **A35** | Student answer  Electricians  Apprentices  Electrical engineers  Technicians  Linesmen  Inspectors | | |
| **F35** | Assessor feedback: | | **(marks awarded)** |

**END OF ASSESSMENT**