

Advanced Diploma of Industrial Automation

(DIA – 52886WA)

Written Assessment Paper A

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| --- | --- | --- | --- | --- |
| **Student full name:** |  | | | |
| I certify that the attached assessment is my own work and that any material drawn from other sources has been acknowledged.  Copyright in assessments remains my property, however  I grant permission to the Engineering Institute of Technology (EIT) to make copies of assessments for assessment, review and/or record keeping purposes.  I note that the EIT reserves the right to check my assessment for plagiarism.  Should the reproduction of all or part of an assessment be required by the EIT for any purpose other than those mentioned above, appropriate authorisation will be sought from me on the relevant form. | | | | |
| 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**       **DATE:** | | | | |
|  | | | | |
| 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](https://moodle.eit.edu.au/course/view.php?id=1054) on Moodle for referencing guides.
5. 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.
6. 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.
7. When saving your document (must be Word format), ensure you include your name in the title: COURSECODE\_MODULE#\_ASSESSMENTTYPE\_VERSION#\_YOURNAME

**E.g. DIA\_DIAPPL605\_WrittenAssessment\_PaperA\_v1\_JohnSmith**

|  |  |
| --- | --- |
| **Module no. and name:** | **DIAPPL605: Process Plant Layout and Piping Design** |
| **Assessment type:** | **Written Assessment Paper A** |
| **Total marks:** | **70** |

**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.

**Module 4 Critical Questions:**

* Question 9 & Question 12.
* These questions are mandatory to assess Module competency.
* Questions must be answered completely correctly to be assessed as competent with a score for this module.

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| --- | --- | --- | --- | --- | --- |
| **Q1** | Describe the difference between unit process and unit operation? | | | **(2 marks)** | |
| **A1** | Student answer | | | | |
| **F1** | Assessor feedback: | | | **(marks awarded)** | |
|  |  | | | | |
| **Q2** | List each of the following as unit processes or unit operations:   1. Oil filter 2. Ion exchange vessel 3. Combustion Gas Turbine 4. Caustic stripping tower 5. Reverse Osmosis system | **(5 marks)** | | | |
| **A2** | Student answer | | | | |
| **F2** | Assessor feedback: | | | **(marks awarded)** | |
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| **Q3** | Below is an isometric drawing created during the tendering phase of a project as a concept design of the plant.    What key information can you derive from this isometric model?  *Remember, this is just a concept design. Therefore, you should refer to the basic information that you can gather quickly from this drawing.* | | | | **(4 marks)** |
| **A3** | Student answer | | | | |
| **F3** | Assessor feedback: | | | **(marks awarded)** | |
|  |  | | | | |
| **Q4** | A flange is used for instrument connection for a system with a design temperature of 316C (600F) and a design pressure of 1000 kPa (145 psi). What is the class rating of the flange to be used for this application? Explain your answer. | | **(4 marks)** | | |
| **A4** | Student answer | | | | |
| **F4** | Assessor feedback: | | | **(marks awarded)** | |
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| **Q5** | You have been asked to design a set of pumps to transfer liquid from a storage tank into a distillation column. What design issues do you have to consider? Which other engineering disciplines do you need to involve? | | | | **(6 marks)** |
| **A5** | Student answer | | | | |
| **F5** | Assessor feedback: | | | **(marks awarded)** | |
|  |  | | | | |
| **Q6** | Different types of valves have different functions. Describe the function of the following types of valve:   1. Butterfly valve 2. Globe Valve 3. Check Valve / NRV / One-Way valve 4. Knife gate valve 5. Needle valve | | | | **(5 marks)** |
| **A6** | Student answer | | | | |
| **F6** | Assessor feedback: | | | **(marks awarded)** | |
|  |  | | | | |
| **Q7** | List the drawings used in the development of plant layouts. | | | | **(4 marks)** |
| **A7** | Student answer | | | | |
| **F7** | Assessor feedback: | | | **(marks awarded)** | |
|  |  | | | | |
| **Q8** | Specify four (4) layout & design considerations for pumps and pump piping. | | **(8 marks)** | | |
| **A8** | Student answer | | | | |
| **F8** | Assessor feedback: | | | **(marks awarded)** | |
|  |  | | | | |
| **Q9** | List at least six (6) items of information for each equipment item that should be shown on a bill of materials, and/or instrument list.  *Remember, you need to mention the items that are specifically related to electrical, mechanical, and instrumentation disciplines as it applies to the equipment, connections, and also parameters such as pressure and temperature.*  **Note: This question is mandatory. It should be answered and students are expected to get this question completely right to be assessed as competent with a score for this module.** | | | | **(6 marks)** |
| **A9** | Student answer | | | | |
| **F9** | Assessor feedback: | | | **(marks awarded)** | |
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| **Q10** | You have been asked to select pipe for use within a chemical processing plant.   1. What information do you need to know from the process engineering department to select suitable pipe ? 2. What information do you need to know from the civil structural engineering department to select suitable pipe ? 3. What information do you need to know from the procurement department to select suitable pipe ? | | | | **(9 marks)** |
| **A10** | Student answer | | | | |
| **F10** | Assessor feedback: | | | **(marks awarded)** | |
|  |  | | | | |
| **Q11** | Describe how the temperature is controlled in the product stream of the PID sketch, make specific reference to pump and control valve operation. | | | | **(5 marks)** |
| **A11** | Student answer | | | | |
| **F11** | Assessor feedback: | | | **(marks awarded)** | |
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| **Q12** | When undertaking the isometric routing of pipe, what are four (4) main considerations to ensure you will achieve a perfect isometric routing on a sample pipe work?  *Hint:*  *Consider vertical vs. horizontal design and its relation to elevations, also designating different engineering disciplines (such as electrical, instrumentation, mechanical, etc.) to the piping installation to get more clear roles and definitions for different pipe racks and supports, also consider the role of gaskets and flanges and the way they are normally employed in a piping system, etc.*  **Note: This question is mandatory. It should be answered and students are expected to get this question completely right to be assessed as competent with a score for this module.** | | | | **(4 marks)** |
| **A12** | Student answer | | | | |
| **F12** | Assessor feedback: | | | **(marks awarded)** | |
|  |  | | | | |
| **Q13** | Name and explain at least three (3) features and advantages for piping 3D models? | | | | **(6 marks)** |
| **A13** | Student answer | | | | |
| **F13** | Assessor feedback: | | | **(marks awarded)** | |

**END OF ASSESSMENT**