# Level: 3

## Utilities Engineering Technician

## Pathway: Instrumentation Control and Automation

## Paper Code: PRACTICE PAPER

This examination consists of 40 multiple-choice questions.
The Pass mark is 28 correct answers.
The duration of this examination is 60 minutes.
You must use a pencil to complete the answer sheet - pens must NOT be used.
When completed, please leave the examination answer sheet and question paper on the desk.

For this paper the use of a scientific calculator (non programmable) is permitted.

For each question, fill in ONE answer ONLY.

If you make a mistake, ensure you erase it thoroughly.

You must mark your choice of answer by shading in ONE answer circle only. Please mark each choice like this:

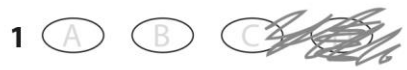

**ANSWER COMPLETED CORRECTLY**

**Examples of how NOT to mark your examination answer sheet. These will not be recorded.**


**DO NOT** partially shade the answer circle
**ANSWER COMPLETED INCORRECTLY**


**DO NOT** use ticks or crosses
**ANSWER COMPLETED INCORRECTLY**


**DO NOT** use circles
**ANSWER COMPLETED INCORRECTLY**




**DO NOT** shade over more than one answer circle
**ANSWER COMPLETED INCORRECTLY**

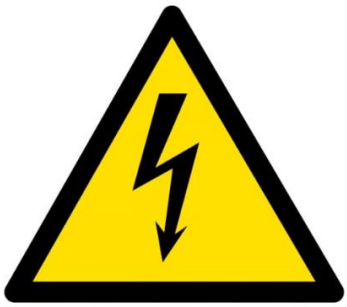
**This paper must be returned to EUIAS with the apprentice answer sheets.**

ENERGY & UTILITIES INDEPENDENT ASSESSMENT SERVICE

You may use this page for rough work

| Question 1 | |
|---|---|
| How regularly should electrical safety equipment be inspected? | |
| **Possible Answers** | |
| a) | Daily |
| b) | Weekly |
| c) | Monthly |
| d) | Prior to use |

| Question 2 | |
|---|---|
| What procedure is used to inform employees about health and safety? | |
| **Possible Answers** | |
| a) | Risk assessment |
| b) | Isolation |
| c) | Toolbox talk |
| d) | Site audit |

| Question 3 | | |
|---|---|---|
| What type of safety sign is shown below? | | |
| **Possible Answers** | | |
| a) | Mandatory |  |
| b) | Warning | |
| c) | Prohibition | |
| d) | Emergency | |

| Question 4 | |
|---|---|
| According to Health, Safety and Environment (HSE) guidelines which ONE of the following controls is the least effective? | |
| **Possible Answers** | |
| a) | Elimination |
| b) | Engineering |
| c) | PPE |
| d) | Substitution |

| Question 5 | |
|---|---|
| What is the first action that should be taken when assessing a potentially hazardous substance? | |
| **Possible Answers** | |
| a) | Provide appropriate PPE (Personal and Protective Equipment) |
| b) | Check the MSDS (Material Safety Data Sheet) |
| c) | Check that there is space to store it safely |
| d) | Conduct a risk assessment |

| Question 6 | |
|---|---|
| State ONE purpose of completing a Control of Substances Hazardous to Health Regulations (COSHH) assessment in the workplace. | |
| **Possible Answers** | |
| a) | To decide how heavy chemical containers are |
| b) | To collect information about employees' health |
| c) | To decide how often to check chemical stock levels for re-ordering |
| d) | To identify the potential for exposure to harmful substances |

| Question 7 | |
|---|---|
| A gas test has been completed within a confined space. Which oxygen reading would allow safe entry into the confined space? | |
| **Possible Answers** | |
| a) | 19.5% - 23.5% |
| b) | 14% - 19% |
| c) | 6% - 14% |
| d) | < 6% |

| Question 8 | | |
|---|---|---|
| What does this green sign mean? | | |
| **Possible Answers** | | |
| a) | Prohibited behaviour |  |
| b) | Warning | |
| c) | Mandatory behaviour | |
| d) | Information | |

| Question 9 | |
|---|---|
| Which ONE of the following regulations provide guidance on the use of handheld tools? | |
| **Possible Answers** | |
| a) | Control of Substances Hazardous to Health (COSHH) |
| b) | Provision and Use of Work Equipment Regulations 1998 (PUWER) |
| c) | Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) |
| d) | Control of Major Accident Hazards Regulations 2015 (COMAH) |

| Question 10 | |
|---|---|
| Which ONE of the following is commonly classed as safety-critical? | |
| **Possible Answers** | |
| a) | Fuse |
| b) | Control valve |
| c) | Steam trap |
| d) | Drain valve |

| Question 11 | |
|---|---|
| In accordance with Health and Safety Executive (HSE) guidelines, which ONE of the following can apply isolations? | |
| **Possible Answers** | |
| a) | Experienced people |
| b) | Skilled people |
| c) | Lead technicians |
| d) | Authorised people |

| Question 12 | |
|---|---|
| In accordance with Health and Safety Executive (HSE) regulations, how would you know if a substance was regarded as hazardous? | |
| **Possible Answers** | |
| a) | The substance will give off a strong odour |
| b) | The substance will have a label identifying the hazard |
| c) | The substance will be contained in a glass receptacle |
| d) | The substance will be in a red container |

| Question 13 | |
|---|---|
| What type of information is provided on the coloured tag on a piece of rigging equipment? | |
| **Possible Answers** | |
| a) | Certification period |
| b) | Safe working load |
| c) | Maximum working load |
| d) | Safe to use |

| Question 14 | |
|---|---|
| What type of document should be fixed to a scaffold before use? | |
| **Possible Answers** | |
| a) | Risk assessment |
| b) | Safety certificate |
| c) | Permit to work |
| d) | Approved Scafftag |

| Question 15 | |
|---|---|
| Which ONE of the following must be tested before entering a confined space? | |
| **Possible Answers** | |
| a) | Number of people wanting access |
| b) | Oxygen content |
| c) | Size of area |
| d) | Noise levels |

| Question 16 | |
|---|---|
| When working in these locations which one does NOT require a Confined Space Entry Permit? | |
| **Possible Answers** | |
| a) | Refrigeration unit |
| b) | Trench |
| c) | Vessel |
| d) | Ceiling void |

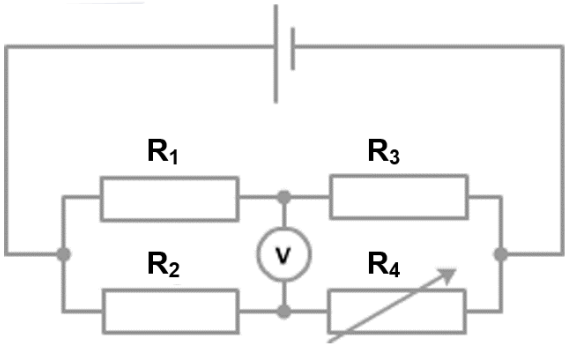
| Question 17 | |
|---|---|
| An operative is asked to carry out a task that will create dust.<br><br>What will they need to do? | |
| **Possible Answers** | |
| a) | Dust is not a hazardous substance, so no safety measures are required |
| b) | Wait until the wind is strong so it will blow the dust away |
| c) | Wear the PPE identified on the permit or risk assessment |
| d) | Only work for short periods and take regular breaks |

| Question 18 | |
|---|---|
| Which ONE of the following manual handling statements is accurate? | |
| **Possible Answers** | |
| a) | Correct manual handling prevents all accidents |
| b) | Correct manual handling prevents damage to equipment |
| c) | Correct manual handling should only be applied in the workplace |
| d) | Correct manual handling reduces the risk of human injury |

| Question 19 | |
|---|---|
| What is the correct order of working at height control measures? | |
| **Possible Answers** | |
| a) | 1. Fall prevention<br>2. personal fall protection<br>3. avoid work at height<br>4. collective fall protection |
| b) | 1. Avoid work at height<br>2. fall prevention<br>3. collective fall protection<br>4. personal fall protection |
| c) | 1. Avoid work at height<br>2. collective fall protection<br>3. fall prevention<br>4. personal fall protection |
| d) | 1. Personal fall protection<br>2. collective fall protection<br>3. fall prevention<br>4. avoid work at height |

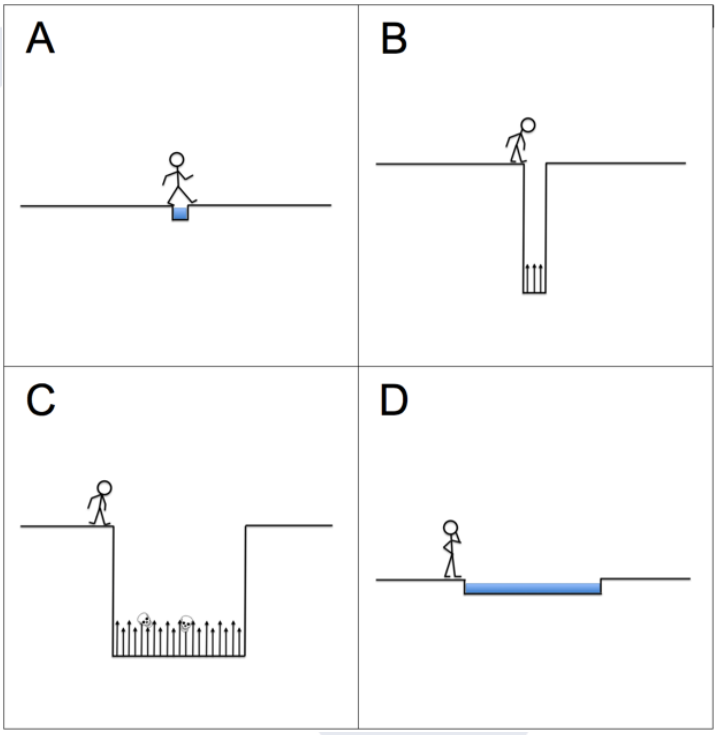
| Question 20 | |
|---|---|
| Assuming an emergency shower is close by, what should a technician do if they come into contact with hazardous substances whilst wearing a protective suit? | |
| **Possible Answers** | |
| a) | Remove all clothing and douse down under the shower |
| b) | Stand under the shower immediately and douse down under the shower |
| c) | Complete the task and then douse down under the shower |
| d) | Stop work and immediately report to the first aid room |

| Question 21 | |
|---|---|
| Which ONE of the following definitions best fits the terminology 'specification'? | |
| **Possible Answers** | |
| a) | The capacity to withstand continuous force |
| b) | The standard when measured against another object of similar design |
| c) | A detailed description of the design and materials of an object |
| d) | The specified point beyond which certification is invalid |

| Question 22 | |
|---|---|
| In the image below the bridge circuit is balanced.<br><br>If R1 = 200 Ω, R2 = 550 Ω and R4 = 100 Ω, what is the value of R3?<br><br>  <br> | |
| **Possible Answers** | |
| a) | 2000 Ω |
| b) | 500 Ω |
| c) | 450 Ω |
| d) | 250 Ω |

| Question 23 | |
|---|---|
| What is the formula for Ohms law? | |
| **Possible Answers** | |
| a) | I = R × V |
| b) | I = R ÷ V |
| c) | I = V ÷ R |
| d) | I = V × R |

| Question 24 | | |
|---|---|---|
| Looking at the image provided and taking into consideration risk, which task is low probability and low in impact? | | |
| **Possible answers** | | |
| a) | A | |
| b) | B | |
| c) | C | |
| d) | D | |



| **Question 25** | |
|---|---|
| A technician is working on a flow transmitter with a linear feedback signal of 4-20 mA. The transmitter has a range of 0-1600 L/per min. The measured feedback signal is 14 mA.<br><br>What is the flow rate? | |
| **Possible Answers** | |
| a) | 1400 L/per min |
| b) | 1200 L/per min |
| c) | 1000 L/per min |
| d) | 800 L/per min |

| **Question 26** | |
|---|---|
| An operative is working on a 4-20 mA pressure transmitter with a working range of 0-160 mbar. The pressure is set at 100 mbar.<br><br>What would the expected feedback signal be? | |
| **Possible Answers** | |
| a) | 14 mA |
| b) | 12 mA |
| c) | 10 mA |
| d) | 8 mA |

[Please turn over for Question 27]

| **Question 27** | |
|---|---|
| Which device measures a change in process conditions? | |
| **Possible Answers** | |
| a) | Sensor |
| b) | Microprocessor |
| c) | PLC (programmable logic controller) |
| d) | Convertor |

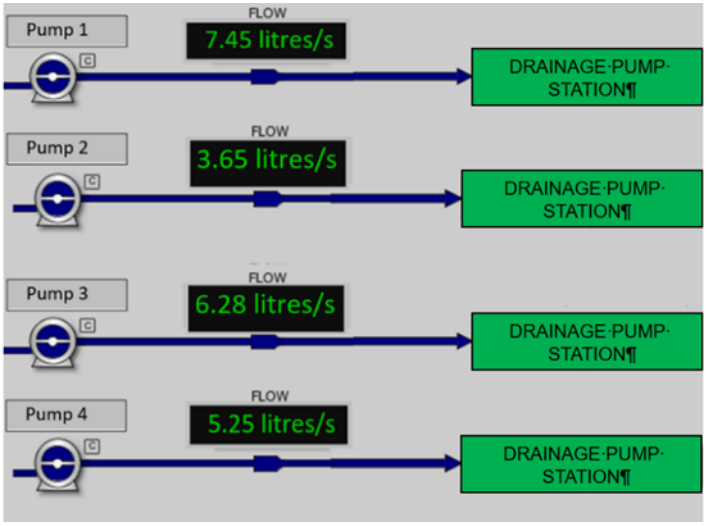
| **Question 28** | |
|---|---|
| What is the most common output range of a pneumatic transmitter? | |
| **Possible Answers** | |
| a) | 0 to 1.9 bar |
| b) | 0 to 15 bar |
| c) | 0.2 to 1.0 bar |
| d) | 2 to 20 bar |

| **Question 29** | |
|---|---|
| In a control system, what does the transducer do? | |
| **Possible Answers** | |
| a) | Changes a digital signal to a data packet |
| b) | Converts a physical measurement into an electrical signal |
| c) | Stores information and sends it to the site Supervisory Control and Data Acquisition (SCADA) system |
| d) | Enables the equipment to work on 110V or 230V input voltages |

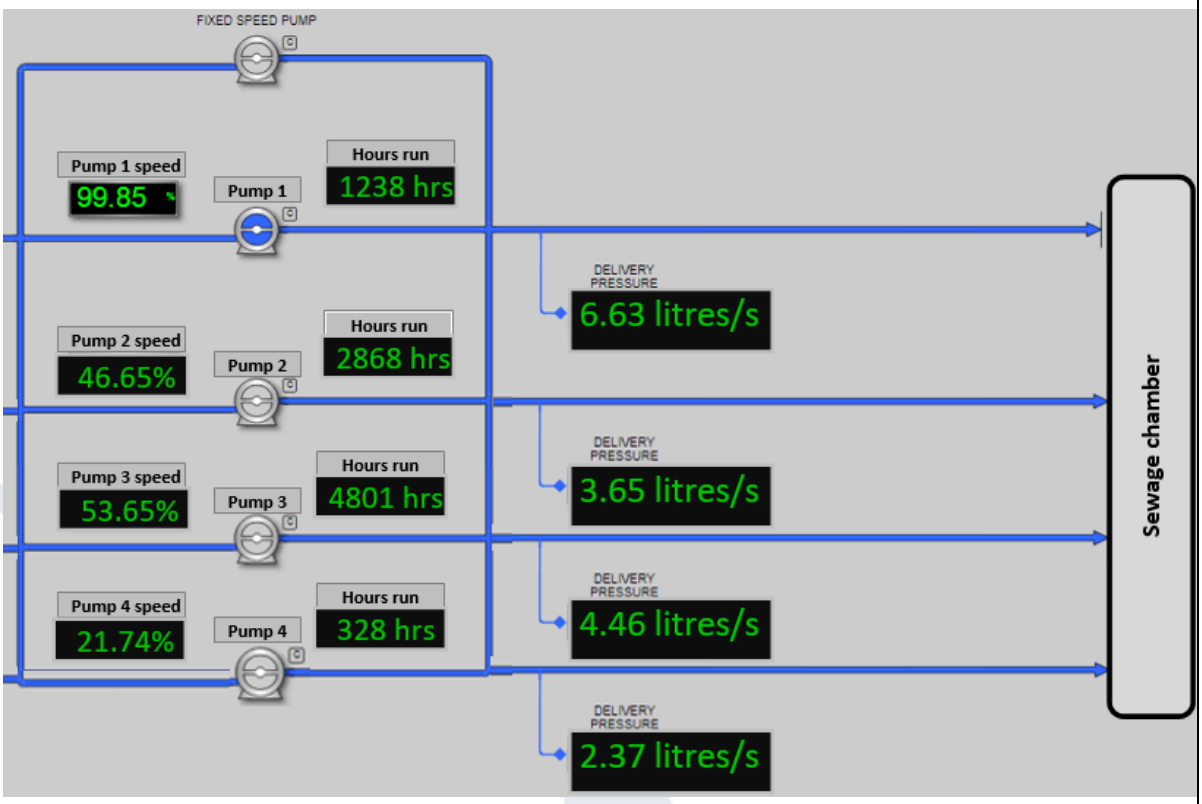
| Question 30 | |
|---|---|
| What is the metric SI (International System of Units) unit for torque? | |
| **Possible Answers** | |
| a) | Mn |
| b) | Nm |
| c) | Tq |
| d) | N |

| Question 31 | |
|---|---|
| What type of maintenance is root cause analysis? | |
| **Possible Answers** | |
| a) | Preventative |
| b) | Reflective |
| c) | Planned |
| d) | Reactive |

| Question 32 | | |
|---|---|---|
| What does the symbol below represent when seen on a British Standard convention drawing? | | |
| **Possible Answers** | | |
| a) | Electrical signal |  |
| b) | Instrument signal | |
| c) | Hydraulic line | |
| d) | Pneumatic line | |

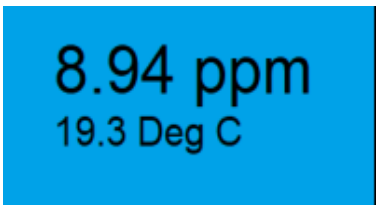
| Question 33 | |
|---|---|
| Refer to the diagram below.<br><br>Calculate the difference between the flow rates of pump 1 and pump 4.<br><br>  <br> | |
| **Possible Answers** | |
| a) | 2.05 litres per second |
| b) | 2.20 litres per second |
| c) | 2.25 litres per second |
| d) | 3.25 litres per second |

[Please turn over for Question 34]

| **Question 34** |
|---|
| Refer to the display below.<br><br>Identify the average hours run time on the pump sets.<br><br>  <br> |

| **Possible Answers** | |
|---|---|
| a) | 3196.00 hours |
| b) | 2308.80 hours |
| c) | 55.47 hours |
| d) | 4.27 hours |

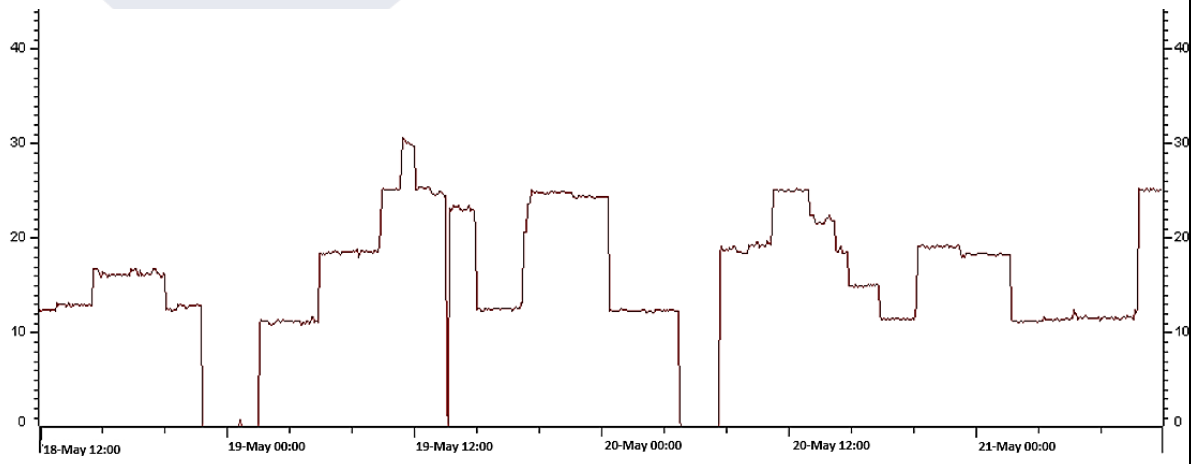
| **Question 35** | |
|---|---|
| Refer to the image below.<br><br>Which ONE of the following instruments would display this information? | |
| **Possible Answers** | |
| a) | Dissolved oxygen analyser |
| b) | Temperature transmitter |
| c) | Human Machine Interface |
| d) | pH probe |




**Question 36**

Refer to the trend analysis snapshot below of a pumping station.

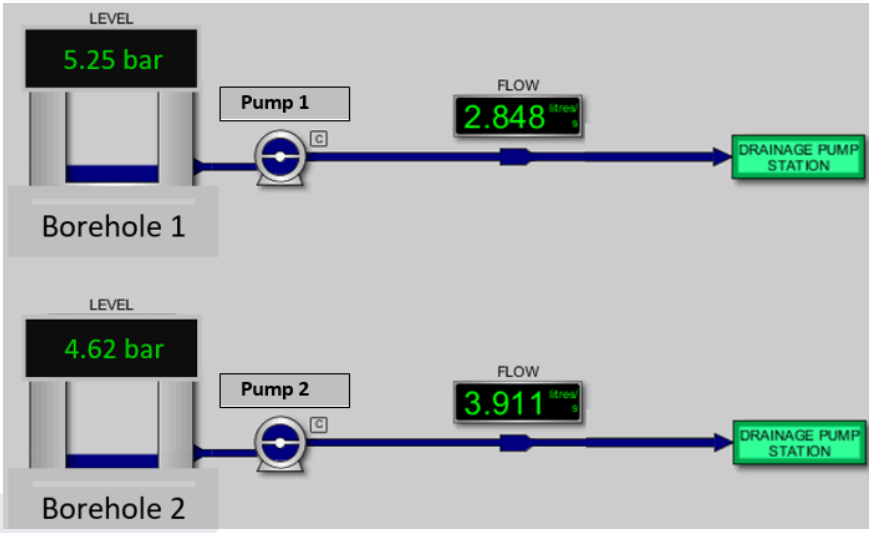
On what day did the maximum flow rate occur?




| **Possible Answers** | |
|---|---|
| a) | 18 May |
| b) | 19 May |
| c) | 20 May |
| d) | 21 May |

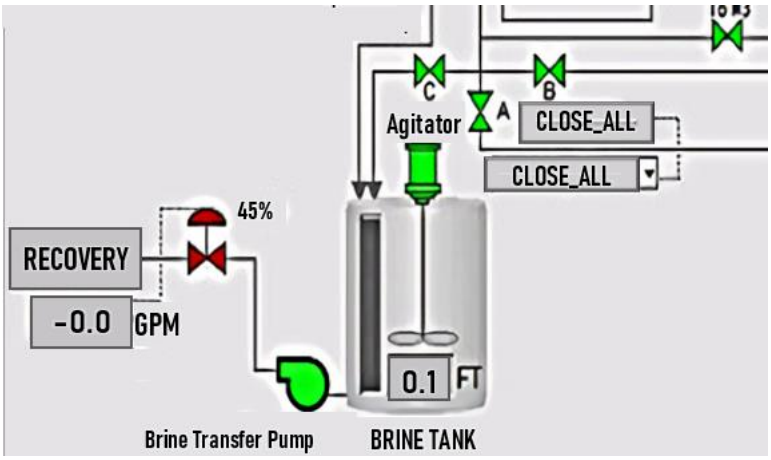
| **Question 37** | |
|---|---|
| Refer to the image below.<br><br>What measurement is the reading displaying? | |
| **Possible Answers** | |
| a) | Signal velocity |
| b) | Viscosity of a liquid |
| c) | Capacitance Probe (RF) |
| d) | Turbidity |


[Please turn over for Question 38]

| **Question 38** |
|---|
| Refer to the display below.<br><br>If 1.0 bar of pressure equals approximately 10.1972 mH2O, what is the current level in mH2O of bore hole 1<br><br>  <br> |

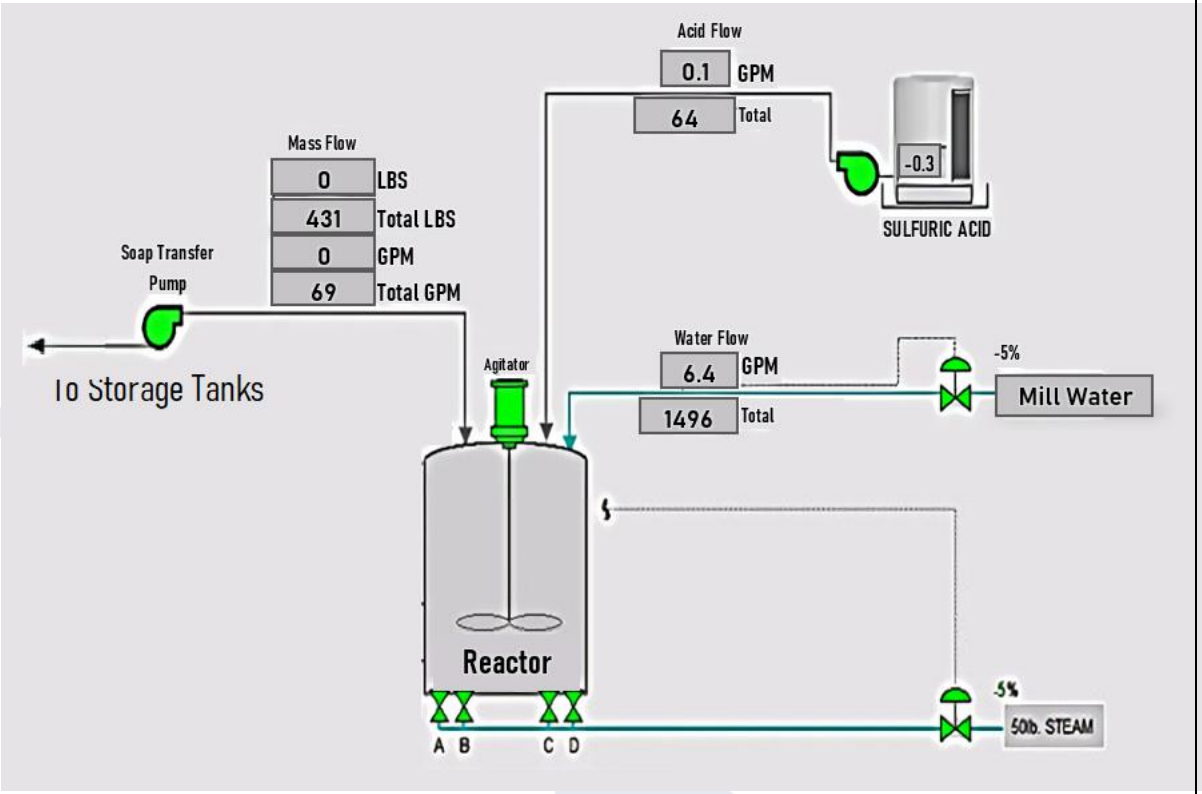
| **Possible Answers** | |
|---|---|
| a) | 29.04 mH2O |
| b) | 39.9 mH2O |
| c) | 47.1 mH2O |
| d) | 53.5 mH2O |

[Please turn over for Question 39]

| **Question 39** | |
|---|---|
| Refer to the extract from a SCADA display.<br><br>Which ONE of the following figures is the flowrate from the brine tank to the Recovery?<br><br>  <br> | |
| **Possible Answers** | |
| a) | -0.0 Gallons Per Minute |
| b) | The information is not in the display |
| c) | 0.1 FT |
| d) | 45% |

[Please turn over for Question 40]

| **Question 40** |
|---|
| Refer to the extract from a SCADA display. There is no flow rate being measured from the mill tank to the reactor.<br><br>What could prevent the water flow reaching the reactor? |




| **Possible Answers** | |
|---|---|
| a) | High levels in the storage tank |
| b) | Open pneumatic valve |
| c) | Blockage from the West Storage |
| d) | Closed pneumatic valve |

End of Questions

## Answers

| Question | Answer | Question | Answer | Question | Answer |
|---|---|---|---|---|---|
| **1** | D | **15** | B | 29 | B |
| **2** | C | **16** | D | 30 | B |
| **3** | B | **17** | C | 31 | D |
| **4** | C | **18** | D | 32 | D |
| **5** | B | **19** | B | 33 | B |
| **6** | D | **20** | B | 34 | B |
| **7** | A | **21** | C | 35 | A |
| **8** | D | **22** | C | 36 | B |
| **9** | B | **23** | C | 37 | D |
| **10** | A | **24** | A | 38 | D |
| **11** | D | **25** | C | 39 | A |
| **12** | B | **26** | A | 40 | D |
| **13** | A | **27** | A | | |
| **14** | D | **28** | C | | |