



Sample Test Project

State Level Skill Competition

Skill- Water Technology

Category: Manufacturing and Engineering Technology

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Section - A

A. Preface

Skill Explained:

Water Technology skill is related to Water Supply & Wastewater Treatment Industry. Whether working with water supply or wastewater treatment, the role of the Water Technician is to observe, identify, protocol, report, maintain, control and repair equipment and processes throughout the plant and the networks. For this purpose, they must have knowledge and expertise in mechanics, chemistry, biology, electrical automation and environmental protection. Above all, health and safety matter the most.

Irrespective of where they work, and their particular responsibilities, the Water Technician's role is driven by the absolute requirement for quality in many respects, including:

- Continuity, consistency and safety of supply
- Safe removal, treatment and recycling of wastewater and Environmental protection.

Since water is the world's most critical resource, the importance of this occupation and the quality of those fulfilling it, is second to none. In the years to come, governments are expected to focus their efforts and resources on efficient water use and wastewater treatment, and thus to increase demand for environmental engineering technicians.

Eligibility Criteria (for India Skills 2020 and World Skills 2021):

Competitors born on or after 01 Jan 1996 are only eligible to attend the Competition.

Total Duration: 10 Hrs

Task 1 (Laboratory Work (Chemical/Biological – Quality Assurance))	180 Minutes
Task 2 (Mechanical Pump Maintenance)	120 Minutes
Task 3 (Electrical Automation)	120 Minutes
Task 4 (Documentation & Reporting)	90 Minutes
Task 5 (Presentation of a Wastewater Treatment Plant)	90 Minutes

Section - B

B. Test Project

TASK-1

Chemical/ Biological Quality Assurance

A. Determining pH of given Sample Solutions:

This task involves the competitor in estimating the pH of the given Sample solution using the provided equipment.

B. Titration Protocol:

The Competitor is required to perform titration procedure in triplicate as per the instructions to estimate an unknown parameter of the given water sample. The results are to be documented and calculate concentration using the given formula.

C. Preparation of Solutions: (Dilution method)

In this task, the competitor should be able to prepare solutions of required concentrations using the provided chemicals. This is to test the knowledge of the candidate in various dilution techniques and obtaining desired concentration.

D. TDS Estimation

The TDS (Total Dissolved Solids) of the given sample would be estimated by the candidate using the provided equipment. The student is required to adhere to the provided SOP.

TASK-2

Mechanical & Electrical Skill Test

Pump Maintenance/ repair

- Set up the system taking the safety precautions into consideration.
- Evaluate the pump performance? (Water jet)
- Decommission the system taking the safety regulations (electric disconnection, disconnection) into consideration
- Inspect the faults and carry out necessary maintenance steps.
- Commission & Restart the pump.

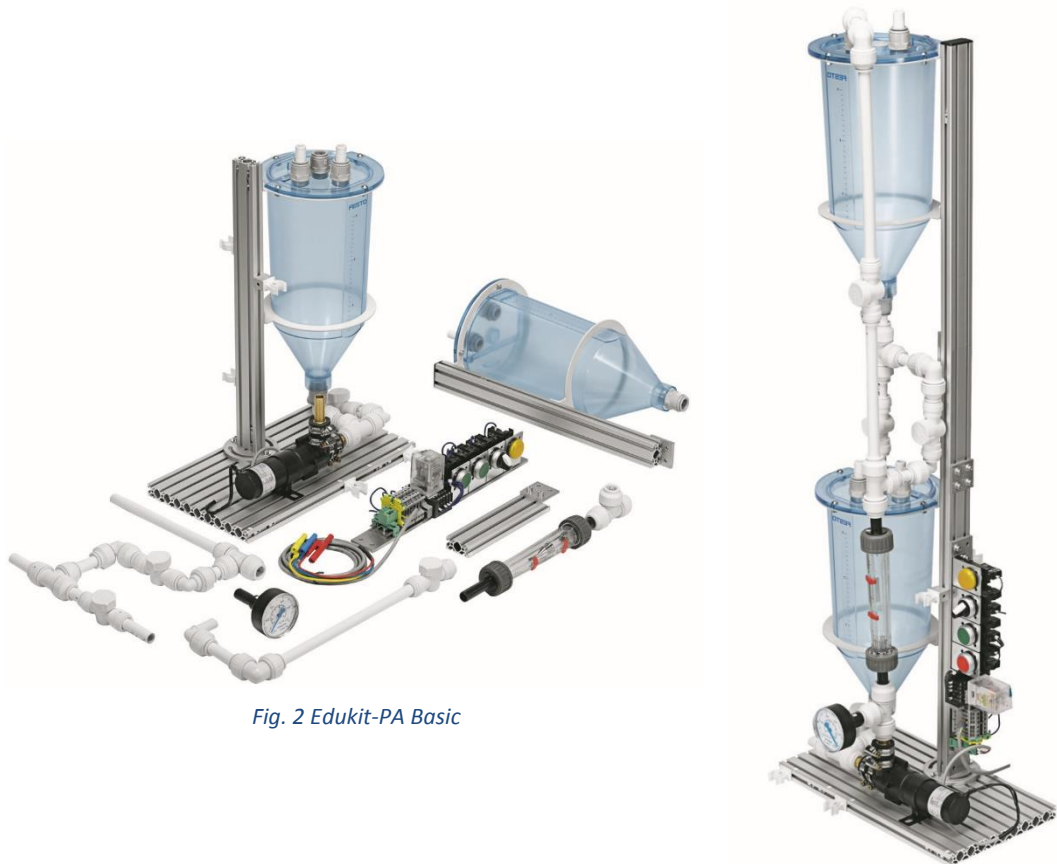


Fig. 1 The above image is for illustrative purposes only. The actual equipment may vary.

TASK-3
Automation & Documentation

Assembling and Commissioning a Test System (Edukit-PA Basic)

- The significance of material aware thinking and work is increasing constantly in all areas, as this saves energy and resources. Moving towards efficient production, individual steps need to be planned, processes understood and verified.
- Taking the following aspects into consideration, you are to set up and commission a functional EduKit PA Basic.
- Set up the EduKit PA Basic using the given drawings and lists of materials. Before beginning work, make sure that all of the required components are on hand by reviewing the included bills of materials.
 - Setup in accordance with drawings
 - Inspect the fittings (leaks, condition)
 - Straightness and angularity of the piping
 - Inspect the mechanical components for visible defects
 - Electrical Connection of the system
 - Commissioning the system



- Take the safety precautions & measures into consideration.

TASK-4 **Documentation**

You have to draft a monthly report and illustrate the trends for plant management/general management

- Draft the monthly report observing the trends from a treatment plant.
- Draw a line diagram from the given data.

TASK-5 **Presentation of a Wastewater Treatment Plant**

- Your task is to design a full wastewater treatment plant by using the provided magnetic cards and fulfil the requirements.
- Creating a flow diagram illustrating the functionalities of a wastewater treatment plant.
- Using appropriate colour codes complete the drawings.
- Perform the calculations and obtain results from the given data.



Section – C

C. Marking Scheme

Marking Scheme: The Assessment is done by awarding points by adopting two methods, Measurement and Judgments

- Measurement –One which is measurable
- Judgment-Based on Industry expectations

Aspects are criteria's which are judged for assessment.

Final marking will be based on the outcomes, such as;

- Candidate in must be able to perform laboratory work according to the provided SOP keeping in mind the Health & Safety measures and the best practices.
- Candidates have good knowledge of special tools and Mechanical operation.
- Candidate must be able to understand & answer questions based on Automation & PID symbols.
- Candidate should be able to answer questions based on basic Water treatment procedure & plant operation.

Assessment and Marking of Test Projects

The maximum marks for each project will be 100 for District/Zonal level. The same will be allocated under the heads of Measurement and Judgment. For Judgement, marks will be awarded from 3 for each aspect as under;

- 0: performance below industry standard
- 1: performance meets industry standard
- 2: performance mostly meets industry standard and exceeds industry standards sometimes
- 3: excellent or outstanding performance

Example-Judgment Marking

If maximum marks for Judgement criteria is 1 and if all 3 Experts (Juries) give 3 points to a candidate, the candidate will get 1 mark for that aspect. If 2 Experts give 3 and 1 Expert gives 2 points, then candidate will get $(3+3+2)/9*1 = 0.89$ marks for that aspect out of 1 mark.

Note:

The Test Projects and Marking Scheme will be decided by the Experts (jury members) prior to competition, based on actual resources being used in the competition.

The Marking Scheme of the mentioned Tasks is attached in Annexure - 1

Section - D

D. Infrastructure List

Infrastructure list will be updated prior to the competition.

Section – E

E. Instructions for candidates

The participating Competitors must ensure:

- Perform all tasks by wearing proper Personnel Protective Clothing.
- Candidate must report on given time at the Competition Venue
- Candidate will not get any additional time for completing the task.
- Candidates are not allowed to use any kind of unfair means during the test.
- All must follow the instruction given by examiner.
- No electronic devices like mobile, calculator permitted.
- Make sure all equipment is available are in proper condition before starting test.
- Candidates must be careful while handling chemicals and glassware.
- Handle the equipment & apparatus carefully.

Section – F

F. Health, Safety, and Environment

1. All accredited participants, and supporting volunteers will abide by rules and regulations with regards to Health, Safety, and Environment of the Competition venue.
2. All participants, technicians and supporting staff will wear the required protective personnel clothing.
3. All participants will assume liability for all risks of injury and damage to property, loss of property, which might be associated with or result from participation in the event. The organizers will not be liable for any damage, however in case of Injury the competitor will immediately inform the immediate organizer for medical attention.
4. Competitors could lose marks or excluded from the competition (as per Competition Rules & Health and Safety documents) if they are identified working in an unsafe manner or create an unsafe workplace condition.
5. Working clothes must comply with relevant best practices in industry.
6. All machinery and/or equipment must comply with the mandatory safety requirements.
7. Competitors must keep their work area clear of obstacles and their floor area clear of any material, equipment or items likely to cause someone to trip, slip or fall;
8. All Competitors must wear PPE at all times in the workshop area;
9. Experts will use the appropriate personal protective equipment when inspecting, checking or working with a Competitor's project.

The following table shows the minimum regulations for skill-specific Health, Safety, and Environment Personal Protective Equipment that must be worn for the itemized tasks carried out in the workshop:

SKILL-SPECIFIC SAFETY REQUIREMENTS

- While using chemicals, Lab Coat (Apron), safety glasses, and gloves are necessary;
- The use of knives is prohibited due to the risk of injury;
- Experts will use the appropriate personal safety equipment when inspecting, checking, or working with a Competitor's work;
- Competitors must wear normal working clothes and safety shoes. Shorts or other clothes which don't cover and protect the legs are not allowed

Annexure – 1

Skill Name: Water Technology

Competitor Name: _____

Task	Criteria	Mark
A		
B		
C		
D		
E		
	Grand Total	100.00