



# 2019-20

## Technical Skills Assessment

### Pre-Engineering

## Results by Standard

Legend (%)		
0-50%	51-75%	76-100%

Assessment: Pre-Engineering Number tested: 112	% Correct 17-18	% Correct 18-19	% Correct 20-21
<b>CONTENT STANDARD 1.0: LAB ORGANIZATION AND SAFETY PROCEDURES</b>	83.15%	84.99%	79.94%
<b>Performance Standard 1.1: General Lab Safety Rules and Procedures</b>	86.77%	88.90%	84.91%
1.1.1 Describe general shop safety rules and procedures.	86.64%	87.69%	84.03%
1.1.2 Demonstrate knowledge of OSHA and its role in workplace safety.	92.24%	97.69%	94.12%
1.1.3 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities (i.e., personal protection equipment, (PPE)).	89.22%	91.54%	88.66%
1.1.4 Operate lab equipment according to safety guidelines.	85.92%	86.15%	79.83%
1.1.6 Utilize proper ventilation procedures for working within the lab/shop area.	99.14%	98.46%	96.64%
1.1.7 Identify marked safety areas and safety signage.	89.66%	90.77%	93.28%
1.1.8 Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.	73.28%	81.54%	74.79%
1.1.9 Identify the location and use of eye wash stations.	94.83%	99.23%	95.80%
1.1.10 Identify the location of the posted evacuation routes.	99.14%	100.00%	97.48%
1.1.11 Identify and wear appropriate clothing for lab/shop activities.	96.12%	96.54%	94.54%
1.1.12 Secure hair and jewelry for lab/shop activities.	97.41%	99.62%	97.90%
1.1.13 Understand knowledge of the safety aspects of low and high voltage circuits.	35.78%	41.15%	30.25%
1.1.14 Locate and interpret safety data sheets (SDS).	88.79%	90.00%	88.24%
1.1.16 Follow verbal instructions to complete work assignments.	99.14%	99.23%	94.96%
1.1.17 Follow written instructions to complete work assignments.	95.69%	98.08%	93.70%
<b>Performance Standard 1.2: Hand Tools</b>	86.78%	83.85%	75.35%
1.2.3 Demonstrate the proper techniques when using hand tools.	87.07%	73.08%	58.82%
1.2.4 Demonstrate safe handling and use of appropriate tools.	86.64%	89.23%	83.61%
<b>Performance Standard 1.3: Power Tools and Equipment</b>	64.31%	67.69%	59.83%
1.3.3 Demonstrate the proper techniques when using power tools and equipment.	60.63%	65.13%	54.06%

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1.3.4 Demonstrate safe handling and use of appropriate power tools and equipment.	69.83%	71.54%	68.49%
<b>CONTENT STANDARD 2.0: IMPACT OF ENGINEERING</b>	85.34%	90.77%	90.76%
<b>Performance Standard 2.3: Ethics in Engineering</b>	85.34%	90.77%	90.76%
2.3.1 Knowledge of current professional engineering codes of ethics.	85.34%	90.77%	90.76%
<b>CONTENT STANDARD 3.0: ENGINEERING DESIGN PROCESS</b>	93.23%	91.98%	91.24%
<b>Performance Standard 3.1: Design Process</b>	93.23%	91.98%	91.24%
3.1.1 Identify and understand the common elements of a design process, including define the problem, generate concepts, develop a solution, develop a design proposal, construct and test a prototype, refine the design, evaluate a solution and communicate the processes and results.	94.25%	94.10%	93.00%
3.1.2 Apply the steps of the design process to solve a design problem.	92.46%	90.38%	89.92%
<b>CONTENT STANDARD 4.0: ENGINEERING DOCUMENTATION</b>	76.24%	78.60%	76.25%
<b>Performance Standard 4.2: Measuring and Scaling Techniques</b>	79.31%	81.46%	79.74%
4.2.1 Identify industry standard units of measure.	78.45%	81.92%	79.83%
4.2.2 Convert between industry standard units of measure.	77.59%	80.38%	82.77%
4.2.3 Determine appropriate engineering and metric scales.	69.83%	72.31%	68.91%
4.2.4 Measure speed, distance, object size, area, mass, volume, and temperature.	76.08%	76.54%	75.00%
4.2.5 Determine and apply the equivalence between fractions and decimals.	89.48%	89.85%	89.75%
4.2.6 Demonstrate proper use of precision measuring tools.	73.28%	79.62%	71.85%
<b>Performance Standard 4.4: Technical Drawings</b>	61.64%	65.00%	59.66%
4.4.3 Identify industry standard symbols.	65.23%	66.41%	62.75%
4.4.4 Describe and construct various types of drawings (i.e., part, assembly, pictorial, orthographic, isometric, and schematic) using proper symbols.	50.86%	60.77%	50.42%
<b>CONTENT STANDARD 5.0: MATERIAL PROPERTIES</b>	65.30%	70.96%	67.65%
<b>Performance Standards 5.2: Materials Strength</b>	65.30%	70.96%	67.65%
5.2.1 Describe the various forms of stress (i.e., compression, tension, torque, and shear).	65.30%	70.96%	67.65%
<b>CONTENT STANDARD 6.0: FUNDAMENTAL POWER SYSTEMS AND ENERGY PRINCIPLES</b>	75.39%	73.23%	73.88%
<b>Performance Standard 6.1: Power Systems and Energy Forms</b>	71.38%	68.67%	69.97%
6.1.1 Define terms used in power systems (e.g., power, work, horsepower, watts, etc.).	62.07%	58.46%	57.98%
6.1.2 Identify the basic power systems.	65.95%	68.85%	70.17%
6.1.3 List the basic elements of power systems.	81.90%	73.85%	68.07%
6.1.4 Summarize the advantages and disadvantages of various forms of power.	75.00%	58.46%	77.31%
6.1.6 Define energy.	71.84%	72.82%	70.03%
6.1.7 Define potential energy and kinetic energy.	86.64%	83.85%	88.24%

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6.1.8 Identify forms of potential energy and kinetic energy.	89.66%	86.92%	93.28%
6.1.10 Identify units used to measure energy.	55.17%	53.08%	52.10%
<b>Performance Standard 6.2: Basic Mechanical Systems</b>	94.83%	88.46%	92.44%
6.2.4 Calculate mechanical advantage and drive ratios of mechanisms.	94.83%	88.46%	92.44%
<b>Performance Standard 6.3: Energy Sources and Applications</b>	80.91%	78.57%	77.43%
6.3.3 Measure circuit values using a multimeter.	70.98%	65.38%	66.39%
6.3.6 Compute values of current, resistance, and voltage using Ohms law.	91.38%	88.85%	89.50%
6.3.7 Solve series and parallel circuits using basic laws of electricity including Kirchhoffs laws. Test and apply the relationship between voltage, current, and resistance relating to a	85.34%	88.08%	81.93%
<b>Performance Standard 6.4: Machine Control Systems</b>	58.84%	60.96%	57.14%
6.4.3 Select appropriate input and output devices based on system specifications and constraints.	70.69%	68.46%	69.75%
6.4.4 Differentiate between the characteristics of digital and analog devices.	46.55%	45.38%	39.50%
6.4.5 Compare and contrast open and closed loop systems.	59.05%	65.00%	59.66%
<b>Performance Standard 6.5: Basic Fluid Systems</b>	83.94%	81.35%	84.14%
6.5.1 Define fluid systems (e.g., hydraulic, pneumatic, vacuum, etc.).	93.10%	89.23%	95.80%
6.5.5 Explain the difference between gauge pressure and absolute pressure.	79.31%	74.42%	79.83%
6.5.6 Discuss the safety concerns of working with liquids and gases under pressure.	87.07%	87.95%	85.99%