XXI. Technology/Engineering, High School

High School Technology/Engineering Test

The spring 2016 high school Technology/Engineering test was based on learning standards in the Technology/Engineering content strand of the *Massachusetts Science and Technology/Engineering Curriculum Framework* (2006). These learning standards appear on pages 92–95 of the *Framework,* which is available on the Department website at www.doe.mass.edu/frameworks/current.html.

Technology/Engineering test results are reported under the following four MCAS reporting categories:

■ Engineering Design

■ Construction and Manufacturing

■ Fluid and Thermal Systems

■ Electrical and Communication Systems

The table at the conclusion of this chapter indicates each item's reporting category and the framework learning standard it assesses. In order to support future test development, items from the spring 2016 Technology/Engineering test are not included in this publication. The omission of these items will have no impact on the reporting of results.

Test Sessions

The high school Technology/Engineering test included two separate test sessions, which were administered on consecutive days. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

Each student taking the high school Technology/Engineering test was provided with a plastic ruler and a Technology/Engineering Formula Sheet. A copy of this formula sheet appears on the following page. An image of the ruler is not reproduced in this publication.

Each student also had sole access to a calculator with at least four functions and a square-root key.

During both Technology/Engineering test sessions, the use of bilingual word-to-word dictionaries was allowed for current and former English language learner students only. No other reference tools or materials were allowed.

Formulas

$$V = I \times R$$

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

$$P = I \times V$$

$$\text{Area of a circle} = \pi r^2$$

Variables

I = current

r = radius

P = power

R = resistance

V = voltage

Definitions and Abbreviations

AC = alternating current

psi = pounds per square inch

DC = direct current

$\pi \approx 3.14$

High School Technology/Engineering
Spring 2016 Items:
Reporting Categories and Standards

Item No.	Reporting Category	Standard
1	*Construction and Manufacturing*	2.5
2	*Fluid and Thermal Systems*	3.1
3	*Fluid and Thermal Systems*	3.5
4	*Fluid and Thermal Systems*	4.2
5	*Electrical and Communication Systems*	5.1
6	*Fluid and Thermal Systems*	4.3
7	*Fluid and Thermal Systems*	3.2
8	*Fluid and Thermal Systems*	4.4
9	*Engineering Design*	1.4
10	*Electrical and Communication Systems*	6.4
11	*Construction and Manufacturing*	7.3
12	*Fluid and Thermal Systems*	3.3
13	*Fluid and Thermal Systems*	4.3
14	*Construction and Manufacturing*	2.4
15	*Electrical and Communication Systems*	6.5
16	*Engineering Design*	1.3
17	*Construction and Manufacturing*	2.3
18	*Electrical and Communication Systems*	6.1
19	*Electrical and Communication Systems*	5.4
20	*Electrical and Communication Systems*	5.3
21	*Engineering Design*	1.4
22	*Electrical and Communication Systems*	6.3
23	*Fluid and Thermal Systems*	3.1
24	*Engineering Design*	1.1
25	*Electrical and Communication Systems*	5.2
26	*Construction and Manufacturing*	7.1
27	*Fluid and Thermal Systems*	3.2
28	*Fluid and Thermal Systems*	4.2
29	*Construction and Manufacturing*	2.2
30	*Construction and Manufacturing*	2.6
31	*Fluid and Thermal Systems*	3.5
32	*Fluid and Thermal Systems*	3.3
33	*Electrical and Communication Systems*	6.4
34	*Construction and Manufacturing*	2.1
35	*Engineering Design*	1.3
36	*Engineering Design*	1.1
37	*Electrical and Communication Systems*	5.5
38	*Construction and Manufacturing*	7.2
39	*Electrical and Communication Systems*	6.2

Item No.	Reporting Category	Standard
40	*Engineering Design*	1.5
41	*Fluid and Thermal Systems*	3.4
42	*Engineering Design*	1.2
43	*Fluid and Thermal Systems*	4.1
44	*Engineering Design*	1.2
45	*Electrical and Communication Systems*	5.4

354