

(a) Ability to apply knowledge of mathematics, science, and engineering

Outcome	4 Exemplary	3 Proficient	2 Apprentice	1 Novice
<i>an ability to apply knowledge of mathematics, science, and engineering</i>				
ability to apply mathematics, science, and engineering	Always uses the proper mathematical, and scientific formulation to solve problems	Uses the proper mathematical, and scientific formulation to solve problems most of the times	Uses the proper mathematical, and scientific formulation to solve problems some of the times	Rarely uses the proper mathematical, and scientific formulation to solve problems

(e) Ability to identify, formulate and solve engineering problems

Outcome	4 Exemplary	3 Proficient	2 Apprentice	1 Novice
Ability to identify, formulate, and solve engineering problems				
Applying concepts, governing math or physics equations and algorithms to solve a problem	Applies correct concepts, chooses correct governing equations and optimum algorithms (or methods) to solve a problem.	Applies correct concepts, chooses correct governing equations but use sub-optimum algorithms (or methods) to solve a problem.	Applies some correct concepts and chooses some correct governing equations but makes mistakes	Applies incorrect concepts and/or chooses incorrect governing equations → can not solve problems
Demonstrating effective open-ended problem solving techniques (including the debugging of a faulty design; hardware, software or both)	Always solves problems using step-by-step logical procedure and obtain correct solution	Mostly solves problems using step-by-step logical procedure. Sometimes he solves problems in an ad-hoc manner, but still he obtains correct solutions	Mostly solves problems using step-by-step logical procedure but some times makes minor procedural errors that lead to incorrect solution of the problem	Solves problems without logical step-by-step logical procedure and makes procedural errors resulting in incorrect solution