**Assessments**

**Quizzes Modules 4**

**Answer Key**

Q1: Who developed the first urban metabolism study, when and for which city?

A1-a: Abel Wolman developed the first urban metabolism study in 1965 for a hypothetical US city.

A1-b: Peter Baccini developed the first urban metabolism study in 1991 for Brussels.

A1-c: Chris Kennedy developed the first urban metabolism study in 1850 for a model city in France.

A1-d: Hanya and Ambe developed the first urban metabolism study in 1978 for Hong Kong.

Q2: What is the origin of “emergy” and what are its units of measurement?

A2-a: Emergy is embodied entropy measured in degrees of disorder of a system.

A2-b: Emergy is embodied environ measured in units of environmental pollution.

A2-c: Emergy is emergent energy measured in units of primary direct energy.

A2-d: Emergy is embodied energy measured in solar energy units.

Q3: How many steps are involved in a Material Flow Analysis and what is the first step in this methodology?

A3-a: 2 steps; the first is identifying the boundary of the city or urban region.

A3-b: 5 steps; the first is a definition of the scope and purpose of the study.

A3-c: 2 steps; the first is choosing the method of analysis, either emergy or material flow analysis.

A3-d: 5 steps; the first is data collection.

Q4: Which of these is not considered an impact category for life cycle assessments?

A4-a: Acidification

A4-b: Recycling

A4-c: Global warming

A4-d: Eutrophication

Q5: What is Scope 1, Scope 2 and Scope 3, respectively, within the context of greenhouse gas emissions?

A5-a: Direct emissions, indirect energy emissions, other indirect emissions.

A5-b: City emissions, energy emissions, out-of-boundary emissions.

A5-c: CO2 (carbon dioxide) emissions, CH4 (methane) emissions, other greenhouse gas (GHG) emissions.

A5-d: Emissions from buildings, emissions from neighborhoods, emissions from cities.