# Unit 10 final assessment – Option 1

1. Using the problem statement for the design of a baby health monitoring system as a source of information, complete the following. Remember that basic functions are what a device or system does as it inputs and outputs information, energy, and materials with the surroundings while functional requirements are values that specify how well the device performs its basic functions.

* Identify 3 basic functions of the baby health monitoring system. (3 points)
  + Accept biometric data from infant bracelet (temperature, heart rate, etc.)
  + Output voice/music data from infant bracelet
  + Alert parent to infant status if need be
* Identify 1 secondary function of the baby health monitor system, and explain whether the secondary function is required or unwanted. (2 points)
  + Consumes electrical energy - REQUIRED
* For 2 of the 3 basic functions identified above, what are two functional requirements?   
  (2 points)
  + Alert parent to infant status: Alert transmission speed < 1 second
  + Output voice/music data: Maximum volume < 80 dB (infant-safe threshold)
* Identify 2 non-functional requirements for the baby health monitor system. (2 points)
  + Comfortable bracelet design (for both infant and parent)
  + Ease of setup and communication to and from bracelets
* Identify 2 constraint requirements for the baby health monitor system. (2 points)
  + Waterproof/Impact resistant bracelet design
  + Unaffected by RF interference from other devices
* Create an Engineering specification for the baby health monitor system that includes 2 functional requirements, 2 non-functional requirements and 2 constraint requirements. If additional information such as values or specifications are required that are not in the problem statement, use your best judgement to apply reasonable values for each requirement that are realistic and are consistent with the case. Include comments for all requirements to explain your values and assumptions. (9 points)

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Relationship (choose one) < = >** | **Value** | **Comments** |
| Infant bracelet maximum output volume | < | 80 dB | This is the considered the maximum safe volume threshold for infants and should not be able to exceed it. |
| Alert transmission speed | < | 1 second | The time from alert recognition (infant bracelet) to alert receipt (parent bracelet) must be sufficiently fast |
| Average time until removal from discomfort | > | 8 hours | From quality assurance testing, participants must be comfortable wearing the bracelet for at least 8 hours (full night’s sleep) |
| Average time from out of the box setup to first transmission | < | 10 minutes | Testing should show that out of the box, users can set up and communicate to and from devices quickly and with ease (proves effectiveness of documentation and UI) |
| Usability in water depth | > | 1 metres | Infant and parent devices should be able to communicate through water at depths of at least 1 metre (reasonably a bath tub, wading pool, etc., and sufficient for spills/messes) |
| Data loss from RF interference | < | 5% | Almost all communication integrity should be maintained in the presence of foreign RF interference. |