Bill of Engineering Measurement and Evaluation (BEME)

Project: Arduino-based Smoke/Fire Alarm System with 6x6 Adaptable White Box

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| S/N | Description of Item | Specification/Size | Qty | Unit | Unit Cost ($/₦) | Total Cost ($/₦) |
| 1 | Arduino Nano microcontroller | ATmega328P, 5V | 1 | pcs |  |  |
| 2 | MQ-4 Smoke/Gas sensor | 5V, analog output | 1 | pcs |  |  |
| 3 | Flame sensor module | 5V, IR-based | 1 | pcs |  |  |
| 4 | ULN2803 transistor array | 8-channel, 500mA | 1 | pcs |  |  |
| 5 | DC Buzzer | 5V, 85–100 dB | 1 | pcs |  |  |
| 6 | 1N4007 Diode | 1A, 1000V | 2 | pcs |  |  |
| 7 | DC-DC Buck Converter | Input 7–35V → 5V/2A | 1 | pcs |  |  |
| 8 | Step-down Transformer | 220V → 12V AC, 1A | 1 | pcs |  |  |
| 9 | LEDs (Status Indicator) | 5mm, red/green | 2 | pcs |  |  |
| 10 | Resistors & Capacitors | For filtering/protection | 1 | set |  |  |
| 11 | 6x6 Adaptable White Box | PVC, with cover | 1 | pcs |  |  |
| 12 | Metal Mesh/Grille | For sensor vent | 1 | pcs |  |  |
| 13 | Nylon Cable Gland/Grommet | 10mm | 1 | pcs |  |  |
| 14 | PCB or Breadboard | 7x9 cm | 1 | pcs |  |  |
| 15 | Standoffs / Double-sided Tape | Plastic | 1 | set |  |  |
| 16 | Screws and Nuts | Stainless steel | 1 | set |  |  |
| 17 | Jumper wires / Connectors | 20cm assorted | 1 | set |  |  |
| 18 | Heat-resistant adhesive | Epoxy | 1 | tube |  |  |
| 19 | Ventilation Holes Drilling | 3–5mm | 1 | lot |  |  |
| 20 | Testing & Calibration | System validation | 1 | lot |  |  |

Notes:  
1. Qty can be adjusted based on the number of units to be produced.  
2. Unit Cost and Total Cost will vary depending on local market prices.  
3. Installation and testing may be considered part of labor cost if needed.  
4. PCB is optional if using a breadboard for prototyping.  
5. Transformer + Buck Converter ensures reliable 5V supply to Arduino and sensors.