**Ministry of Education**

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**Sector: Electro technology**

**Occupation**: **Industrial Electrical Machines and Drives L-II**

**Equipment and Tools**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Items | Qty | Unit | Specification |
| 1 | Flat and Philips screw drivers | 2 | Pcs | Any standard |
| 2 | Multi meter | 1 | Pcs | Standard type |
| 3 | Hammer | 1 | pcs | Any standard |
| 4 | Electrical board 20x20 | 1 | cm | Any standard |
| 5 | Cable track | 2 | m | Any standard |
| 6 | Ruler/tape  | 1 | pcs | 30cm |
| 7 | Cutter | 1 | pcs | Standard type |
| 8 | Pliers (assorted) | 1 | pcs | Standard type |
| 9 | Electrician Knife | 1 | pcs | Standard type |
| 10 | Cleaning brush | 1 | pcs | Standard type |

 Materials and Supplies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Items | Qty | Unit | Specification |
| 1 | Single phase Ac circuit breaker 230vac 10A | 1 | pcs | Any brand |
| 2 | Limit switch | 2 | pcs | Any brand |
| 3 | Sold wire 2.5 mm2  | 15 | m | Coper wire |
| 4 | Incandescent lamps | 3 | pcs | Philips/related |
| 5 | Start pushbutton | 2 | pcs | Any standard |
| 6 | Stop pushbutton | 1 | pcs | Any standard |
| 7 | 3phase Ac induction motor | 1 | pcs | 38ovac 1.5kw |
| 8 | Fuse 3ph/circuit breaker | 1 | pcs | 3800V, 25Amp |
| 9 | Over load relay | 1 | pcs | 3800V, 25Amp |
| 10 | Play wood table (1.20mx1m) | 1 | pcs | Any standard |
| 11 | Lamp holder | 3 | pcs | Surface mounted |

Note: Materials and tools may be modified by the assessor, depending on the actual job performed, and location & the standard installation practices of the country.

**Equipment and Tools**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Items | Qty | Unit | Specification |
| 1 | Flat and Philips screw drivers | 2 | Pcs | Any standard |
| 2 | Multi meter | 1 | Pcs | Standard type |
| 3 | Hammer | 1 | pcs | Any standard |
| 4 | Electrical board 20\*20 | 2 | cm | Any standard |
| 5 | Trucking conduit  | 1.50 | m | Any standard |
| 6 | Ruler | 1 | pcs | 30cm |
| 7 | Cutter | 1 | pcs | Standard type |
| 8 | Pliers (assorted) | 1 | pcs | Standard type |
| 9 | Electrician Knife | 1 | pcs | Standard type |
| 10 | Cleaning brush | 1 | pcs | Standard type |
| 11 | Long nose | 1 | pcs | Standard type |
| 12 | Electrical plaster | 1 | pcs | Standard type |
| 13 | Screw /pile | 15 | pcs | Any standard |

 **Materials and Supplies**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Items | Qty | Unit | Specification |
| 1 | three phase ac circuit breaker 380vac | 1 | pcs | 32Amp |
| 2 | Sold wire 2.5 mm2  | 35 | m | Coper wire |
| 3 | Single phase ac circuit breaker 230vac | 2 | pcs | 10Amp |
| 4 | Start pushbutton | 2 | pcs | Any standard |
| 5 | Stop pushbutton | 1 | pcs | Any standard |
| 6 | Fuse 380v  | 1 | pcs | 380V, 25Amp |
| 7 | Play wood table (1.20mx1m) | 1 | pcs | Any standard |
| 8 | Overload relay three phase | 1 | pcs | 380v,25Amp |
| 9  | Magnetic contactor | 2 | pcs | 380v,32Amp |
| 10 | Three phase induction motor | 2 | pcs | 380v/400v |

Note: Materials and tools may be modified by the assessor, depending on the actual job performed, and location & the standard installation practices of the country.

**Tools &equipments /instruments**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Item description** | **Quantity** | **Unit** | **Specification** |
| 1 | Stranded copper wire (any collor) | 25m |  | 2.5mm2, Ethiopia |
| 2 | Solid copper wire(Red) | 10m |  | 2.5mm2, Ethiopia |
| 3 | Solid copper wire(yellow) | 10m |  | 2.5mm2, Ethiopia |
| 4 | Solid copper wire(blue) | 10m |  | 2.5mm2, Ethiopia |
| 1 | Multi meter  | 1 |  | standard |
| 2 | Tachometer | 1 |  | standard |
| 3 | Clamp ammeter  | 1 |  | standard |
| 4 | Three phase induction motor, 2.2 kW | 1 |  | 380VY/∆ 220V  |
| 5 | Three phase circuit breaker | 1 |  | 380V, 20A ; original |
| 6 | Single phase circuit breaker | 1 |  | 220V, 16A; original |
| 7 | Contactor | 2 |  | 220Vac |
| 8 | Overload relay | 1 |  | standard |
| 9 | Stop push button | 1 |  | 1NC |
| 10 | Interlock start stop push button | 2 |  | 1NC+1NO |
| 11 | Lamps | 3 |  | pilot |
| 12 | Lamp holders | 3 |  | standard |
| 13 | Combination pliers | 1 |  | assorted |
| 14 | Side cutter  | 1 |  | assorted |
| 15 | Electrician knife  | 1 |  | assorted |
| 16 | Square head screw driver | 1 |  | medium |
| 17 | Flat head screw driver | 1 |  | medium |
| 18 | Rail for holding CB & contactor | 2 |  | 8cm each |

Note: Materials and tools may be modified by the assessor, depending on the actual job performed, and location & the standard installation practices of the country.

**Consumable materials to be used for projects**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Item description | Quantity | Unit | Specification |
| 1 | Stranded copper wire (any collor) | 10m |  | 2.5mm2, Ethiopia |
| 2 | Solid copper wire(Red) | 5m |  | 2.5mm2, Ethiopia |
| 3 | Solid copper wire(yellow) | 5m |  | 2.5mm2, Ethiopia |
| 4 | Solid copper wire(blue) | 5m |  | 2.5mm2, Ethiopia |
| **Tools &equipments /instruments to be used for projects** |
| **No.** | **Item description** | **Qty** | **Unit** | **Specification** |
| 1 | Multi meter  | 1 |  | standard |
| 2 | Tachometer | 1 |  | standard |
| 3 | Clamp ammeter  | 1 |  | standard |
| 4 | Three phase induction motor, 2.2 kW | 1 |  | 380VY/∆ 220V  |
| 5 | Three phase circuit breaker | 1 |  | 380V, 20A ; original |
| 6 | Single phase circuit breaker | 1 |  | 220V, 16A; original |
| 7 | Contactor | 2 |  | 220Vac |
| 8 | Overload relay | 1 |  | standard |
| 9 | Stop push button | 2 |  | 1NC |
| 10 | Start push button | 2 |  | 2NO |
| 11 | Siren  | 1 |  | 220 V |
| 12 | Lamp | 1 |  | pilot |
| 13 | Lamp holders | 1 |  | standard |
| 14 | Combination pliers | 1 |  | assorted |
| 15 | Side cutter  | 1 |  | assorted |
| 16 | Electrician knife  | 1 |  | assorted |
| 17 | Square head screw driver | 1 |  | medium |
| 18 | Flat head screw driver | 1 |  | medium |
| 19 | Rail for holding CB & contactor | 2 |  | 8cm each |

Note: Materials and tools may be modified by the assessor, depending on the actual job performed, and location & the standard installation practices of the country.

**Consumable mmaterials and Tools & equipment/ Instrument**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Item description | Quantity | Unit | Specification |
| 1 | VOM/Multie meter | 1  | pcs | Standard  |
| 2 | Three phase motor | 1  | pcs | Standard  |
| 1 | Plastic conduits | 2  | m | 16mm Ø |
| 2 | Flexible conduit | 1.5 | m | 16mm |
| 3 | Electrical cable  | 10 | m |  4x4mm  |
| 4 | Electrical wire | 12 | m |  1.5mm |
| 5 | Paper  | 2 | No  | A4 |
| 6 | Circuit breakers | 2  | pcs | 25SA, 16A, 10A |
| 7 | Electric motor | 1 | pcs | 5.5kw 11A, 380v/50Hz |
| 8 | Wood screw | 10 | Pcs |  |
| 9 | Electrician’s pliers | 1 | pcs | Standard |
| 10 | Long nose pliers | 1 | pcs | Standard |
| 11 | Set of screw drivers | 1 | set | Standard |
| 12 | Adjustable wrench | 1 | pcs | Standard |
| 13 | Hack saw with blade | 1 | pcs | Standard |
| 14 | Star-delta switch | 1 | pcs | Standard |
|  | 3 phase electric motor | 1 |  | 5.5kw |

**Note**: Materials and tools may be modified by the Assessor, depending on the actual job performed, and location & the standard installation practices of the country

**Consumable materials to be used: For Project 1,2, per candidate**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Item description | Quantity | Unit | Specification |
| 1 | Plastic conduits | 2  | m | 16mm Ø |
| 2 | Flexible conduit | 1.5 | m | 16mm |
| 3 | Electrical cable  | 10 | m |  4x4mm  |
| 4 | Electrical wire | 24 | m |  1.5mm |
| 5 | Paper  | 2 | No  | A4 |
| 6 | Circuit breaker enclosure | 3  | pcs | Plastic |
| 7 | Over load relay | 2 | pcs | 7.5- 14A range |
| 8 | contactor | 2 | pcs |  16A |
| 9 | Circuit breakers Single phase | 1 | pcs | 16A, 10A |
| 10 | Circuit breakers Three phase | 2 | pcs | 25A |
| 11 | three-phase induction motor  | 1 | pcs | 5.5kw 11A, 380v/50Hz |
| 12 | Indictor Lamp | 4 | pcs | 40w 220v/50Hz |
| 13 | Junction box | 2  | pcs | Plastic |
| 14 | Push button | 2 | pcs |  1 red NC & 1green NO  |
| 15 | Wire clip | 10 | pcs | Standard |
| 16 | Sub distribution board | 2 | pcs | Standard |
| 17 | Wood screw | 10 | Pcs | Standard  |
| 1 | single-phase induction motor | 1 | pcs | 1.5 Kw 6A 220v/50Hz |
| 2 | Winding coil 0.85mm2 | 3 | Kg | Standard |

**Tools & equipment/ Instrument**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Item description | Quantity | Unit | Specification |
| 2 | VOM | 1  | pcs | Standard  |
| 3 | Electrician’s pliers | 1 | pcs | Standard |
| 4 | Long nose pliers | 1 | pcs | Standard |
| 5 | Set of screw drivers | 1 | set | Standard |
| 6 | Adjustable wrench | 1 | pcs | Standard |
| 7 | Hack saw with blade | 1 | pcs | Standard |
| 8 | Electrician’s knife | 1 | pcs | Standard |
| 1 | Long nose pliers | 1  | pcs | Standard |
| 2 | Electrician’s knife | 1 | pcs | Standard |
| 3 |  Flat ranch | 1 | set | Standard |
| 4 | Plastic head hammer | 1 | pcs | Standard |
| 5 | Set of screw drivers | 1 | set | Standard |
| 6 | Multimeter | 1 | pcs | Standard  |

Note: Materials and tools may be modified by the Assessor, depending on the actual job performed, and location & the standard installation.