



KISI-KISI



BIDANG LOMBA :

ELECTRICAL INSTALATION

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
DIREKTORAT JENDERAL PENDIDIKAN DASAR DAN MENENGAH
DIREKTORAT PEMBINAAN SEKOLAH MENENGAH KEJURUAN
Jalan Jenderal Sudirman, Senayan, Jakarta 10270 Gedung E Lantai 12 – 13
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**LOMBA KOMPETENSI SISWA SMK
TINGKAT NASIONAL (LKS)–XXIV
2016
KELOMPOK TEKNOLOGI**



**KISI – KISI DAN INFORMASI LOMBA KOMPETENSI SISWA SMK
TINGKAT NASIONAL XXIV - 2016
BIDANG LOMBA: *ELECTRICAL INSTALLATION***

1. Peserta :

Peserta lomba berasal dari seluruh wilayah Propinsi di Indonesia. Lomba Ketrampilan Siswa Tingkat Nasional sudah berjalan selama 24 tahun, kegiatan ini dimaksudkan untuk mengukur kompetensi siswa SMK sesuai dengan bidang keahliannya masing masing.

2. Nama Bidang Lomba

Pemasangan Instalasi Listrik Tenaga dan Penerangan

3. Kisi – Kisi

| No | Kompetensi/Sub kompetensi | Tujuan | Uraian Materi | Kriteria unjuk kerja | Praktik |
|----|--|---|--|--|---------------|
| 1 | Memasang komponen rangkaian utama dan kontrol diatas <i>base plate</i> | Dapat merangkai rangkaian utama dan kontrol sesuai standart PUIL 2000 | Perakitan rangkaian utama | Fungsi rangkaian utama dan rangkaian kontrol sesuai lembar perintah kerja | <i>Post A</i> |
| | | | Perakitan rangkaian kontrol | Kekuatan sambungan dan pengawatan rangkaian sesuai standart PUIL 2000 | |
| 2 | Memasang Instalasi tenaga motor 3 phasa pada papan Instalasi | Dapat memasang Instalasi tenaga motor 3 phasa sesuai standart PUIL 2000 | Pemasangan Instalasi tenaga motor 3 phasa kerja putar kanan kiri | Fungsi rangkaian Instalasi tenaga motor 3 phasa, kekuatan sambungan, kelurusan dan rapat pemasangan kanal serta ukuran dalam menginstal sesuai dengan gambar kerja dan semua hantaran terlindungi. | <i>Post A</i> |



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| | | | | | |
|---|---|---|--|---|-----------------|
| 3 | Memasang Instalasi penerangan pada papan Instalasi | Dapat memasang Instalasi penerangan lima titik sesuai standart PUIL 2000 | Instalasi penerangan lima titik. Satu titik dilayani dari tiga tempat, satu titik dilayani dari sensor gerak dan satu titik lampu taman serta dua titik lagi untuk kotak kontak satu phasa | Fungsi rangkaian Instalasi penerangan, kekuatan sambungan, kelurusan dan rapat pemasangan kanal serta ukuran dalam menginstal sesuai dengan lembar perintah kerja dan semua hantaran terlindungi. | <i>Post B</i> |
| 4 | Melakukan pemrograman system kontrol terprogram pada Instalasi tenaga motor 3 phasa maupun Instalasi penerangan dengan Smart Relay. | Dapat melakukan pemrograman peralatan system control terprogram untuk Instalasi tenaga motor 3 phasa dan penerangan sesuai perintah kerja | Melakukan pemrograman pada Smart Realy untuk rangkaian Instalasi tenaga motor 3 phasa dan penerangan | Fungsi rangkaian Instalasi tenaga dan penerangan sesuai lembar perintah kerja | <i>Post A-B</i> |

4. Module A tentang Instalasi Tenaga

- o Waktu pemasangan maksimum 7 Jam.
- o Bahan Instalasi tenaga disediakan oleh panitia.
- o Komponen khusus dengan (tanda “*”) didalam daftar bahan) harus dibawah dan dipersiapkan oleh peserta lomba masing-masing.
- o Gambar layout dan instruksi kerja diedarkan tiga bulan sebelum lomba.

5. Module B tentang Instalasi Penerangan

- o Waktu pemasangan maksimum 7 Jam.
- o Bahan Instalasi penerangan disediakan oleh panitia.
- o Komponen khusus seperti (tanda “*”) didalam daftar bahan) harus dibawah dan dipersiapkan oleh peserta masin-masing.
- o Gambar layout dan instruksi kerja diedarkan tiga bulan sebelum lomba.



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6. Module A dan B tentang Pemrograman

- Waktu pemrograman modul A dan modul B maksimum 2 Jam.
- Peralatan khusus seperti laptop harus dibawa dan dipersiapkan oleh peserta masing-masing.
- Software untuk pemrograman harus sudah terinstal di masing masing labtop.
- Design pemrograman sesuai instruksi kerja.

7. Petunjuk umum untuk semua modul

Spesifikasi uji:

- Tahanan Isolasi yang diijinkan antar penghantar fasa dan penghantar pembumian tidak boleh kurang dari $1\text{ M}\Omega$ yang diukur dengan alat ukur insulation tester dengan tegangan kerja yang dipilih 500 V DC
- Tahanan pentanahan dari saluran masuk pada terminal ground terhadap penghantar yang ditanahkan besarnya tidak boleh lebih dari $0,5\ \Omega$
- Urutan fasa pada kotak kontak tiga fasa harus searah jarum jam. Terminal fasa berada disebelah kiri untuk kontak kontak satu fasa.

8. Petunjuk untuk peserta lomba

- Tes proyek modul A maupun modul B peserta lomba harus bekerja sesuai dengan gambar layout dan lembar perintah kerja sesuai persyaratan yang sudah ditentukan.
- Peserta lomba harus melakukan pengecekan bahan dan komponen. Mereka dapat meminta bahan pengganti kepada panitia sebelum lomba dimulai jika ada yang rusak.
- Semua istilah teknis dan deskripsi yang digunakan dalam proyek mengikuti standar SNI / PUIL 2000 dan persyaratan lain yang masih berlaku.
- Semua ukuran harus berpatokan pada garis referensi.
- Pengukuran untuk kabel dan pipa dilakukan pada garis tengah dari diameter bahan tersebut.
- Pengukuran posisi kabel duct dan posisi komponen dilakukan sesuai gambar kerja.
- Standar radius untuk tekukan pipa logam dan pipa PVC tidak boleh kurang dari enam kali diameter luarnya. Radius bengkokan kabel tidak boleh kurang dari tiga kali diameternya.
- Toleransi ukuran adalah $\pm 2\text{ mm}$ untuk ukuran panjang 0 – 500 mm, dan $\pm 4\text{ mm}$ untuk ukuran panjang diatas 500 mm.
- Selama pertandingan berlangsung peserta harus membaca sendiri gambar kerjanya. Tidak boleh berdiskusi satu sama lain.
- Dilarang menghubungkan rangkaian instalasi ke sumber listrik sebelum melakukan komisioning.



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- o Setelah selesai commissioning lakukan pemrograman selama 2 jam dan laptop sebelumnya harus bersih dari data program modul A maupun B serta flash disk maupun alat penyimpanan data bentuk lain dilarang berada didalam area lomba.
- o Kebersihan di area kerja harus diperhatikan setiap melakukan aktivitas
- o Manajemen peralatan dan bahan harus diperhatikan pada saat bekerja.
- o Jika pekerjaan sudah selesai, peserta harus meninggalkan ruang lomba dan Instalasi tenaga maupun penerangan dalam kondisi siap di lakukan penilaian oleh team penguji.

9. Alat Pelindung Diri (APD)

| | Kacamata safety | Penutup telinga | Safety Shoes | Masker | Clemek | Sarung tangan dari karet | Sarung tangan dari kulit | Helem | Pakaian kerja |
|----------------------|-----------------|-----------------|--------------|--------|--------|--------------------------|--------------------------|-------|---------------|
| Pengunjung | R | R | R | | | | | | |
| Teknisi | Y | Y | Y | | | | | | |
| Jury Lomba | Y | Y | Y | | | | | | |
| Peserta Lomba | Y | Y | Y | | | Y | | | Y |

Catatan:

Y = Wajib

R = Dianjurkan

10. Penilaian

Penilaian berdasarkan bobot dari masing-masing bidang garapan. Setiap pos memiliki bobot maksimal, berdasarkan hasil penilaian dari team juri secara profesional. Meliputi:

| | | | |
|--------------|-------------------------------------|--------------|------------|
| A | Safety | Score | 15 |
| B | Uji coba / Commissioning | Score | 15 |
| C | Fungsi dan Pemrograman | Score | 20 |
| D | Pengukuran / Layout | Score | 20 |
| E | Pemasangan Komponen & Saluran Kabel | Score | 20 |
| F | Sambungan Terminal | Score | 10 |
| Total | | Score | 100 |



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11. Jadwal kegiatan:

| Waktu/Hari | I | II | III | IV |
|--------------------|-------------------------|--------------------|--------------------|--------------------|
| 08.00-10.00 | Persiapan/ Informasi | Modul A mulai | Modul B mulai | Penilaian |
| 10.00-10.15 | <i>Coffe Break</i> | <i>Coffe Break</i> | <i>Coffe Break</i> | <i>Coffe Break</i> |
| 10.15-12.00 | <i>Farmiliarization</i> | Melanjutkan | Melanjutkan | Selesai Penilaian |
| 12.00-13.00 | Isoma | Isoma | Isoma | Isoma |
| 13.00-15.30 | <i>Farmiliarization</i> | Modul A selesai | Modul B selesai | Rekap nilai |
| 15.30-15.45 | <i>Coffe Break</i> | <i>Coffe Break</i> | <i>Coffe Break</i> | <i>Coffe Break</i> |
| 15.45-16.30 | | | | Penutupan |

(Tentative)



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12. DAFTAR BAHAN

Tanggung jawab: **PANITIA** kecuali yang bertanda ***)**

| No. | Deskripsi Material | Spesifikasi | Qty | Unit | Ket |
|-----------------|-------------------------------------|---|-----|------|-------------------|
| MODULE A | | | | | |
| 1 | Box Panel | Box Panel Logam 600 x 400 x 200 | 1 | SET | |
| 2 | Box PVC | Box PVC lubang 3 @ Dia 22 mm | 1 | SET | |
| 3 | Box metal | Box metal lubang 2 @ Dia 22 mm | 1 | SET | |
| 4 | Pilot lamp putih | Pilot Lamp Dia.22 mm / 220 V LED | 1 | PC | |
| 5 | Pilot lamp merah | Pilot Lamp Dia.22 mm / 220 V LED | 2 | PCS | |
| 6 | Pilot lamp kuning | Pilot Lamp Dia.22 mm / 220 V LED | 2 | PCS | |
| 7 | Pilot lamp hijau | Pilot Lamp Dia.22 mm / 220 V LED | 2 | PCS | |
| 8 | ELCB 3 fasa 4 pole | ELCB 3 fasa 4 pole 30 mA/25A | 1 | PC | *) |
| 9 | MCB 3 fasa 16 A | MCB 3 fasa 16 A | 1 | PC | *) |
| 10 | MCB 1 fasa 2 A | MCB 1 fasa 2 A | 3 | PCS | *) |
| 11 | Kontaktor 3 Main NO + 1 NO Aux | SCH LP1-D1810 (exp. Telemecanique) | 2 | PCS | *) |
| 12 | Auxillary contact 2 NO dan 2 NC | Aux 2 NO/ 2 NC (exp. Telemecanique) | 2 | PCS | *) |
| 13 | Thermal Overload Relay 1,6 - 2,5A | SCH TOR LR2-D1307 (exp. Telemecanique) | 2 | PCS | *) |
| 14 | Smart Relay | Smart Relay AC (exp. Zelio SR3 B 26 1FU, 26 input/Output) / OMRON, SIEMENS, ZEN (Typical) | 1 | SET | *) Note |
| 15 | Push Button Kuning | Push Button 22 mm 1NO-1NC (XB5-AW33B5) | 2 | PCS | |
| 16 | Push Button Hijau | Push Button 22 mm 1NO-1NC (XB5-AW34B5) | 2 | PCS | |
| 17 | Emergency stop NO/NC | Emergency stop 22 mm NO/NC | 1 | SET | |
| 18 | Pipa Galvanis | Metal Conduit PG 19 | 3 | M | |
| 19 | Adapter pipa metal | Metal adapter PG 19 | 2 | PCS | |
| 20 | Kabel Gland PG 13.5 | Kabel Gland PG 13.5 | 4 | PCS | |
| 21 | Kabel Gland PG 16 | Kabel Gland PG 16 | 2 | PCS | |
| 22 | Skrup Kepala setengah bulat Obeng + | Plus half cone screw 15 mm | 200 | PCS | |
| 23 | Skrup Kepala setengah bulat Obeng + | Plus half cone screw 25 mm | 4 | PCS | |
| 24 | Skrup Kepala setengah bulat Obeng + | Plus half cone screw 35 mm | 4 | PCS | |
| 25 | Kabel NYM 3 x 1.5 mm ² | Kabel NYM 3 x 1.5 mm ² | 4 | M | |
| 26 | Kabel NYM 4 x 1.5 mm ² | Kabel NYM 4 x 1.5 mm ² | 6 | M | |



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|-----|---|--|-----|------|-----|
| 27 | Klem kabel NYM | Klem kabel NYM No. 9 | 12 | PCS | |
| 28 | PVC Kabel Duct Polos | PVC Kabel Duct Polos 45 x 45 mm (WH) | 1 | Bar | |
| 29 | PVC Kabel Duct sirip | PVC Kabel Duct Polos 30 x 45 mm (WH) | 1 | Bar | |
| 30 | Pipa PVC | PVC Conduit Clipsal 20 mm | 1 | Bar | |
| 31 | Flexible Pipa PVC | Flexible pipa PVC 20 mm | 1 | M | |
| 32 | PVC Adaptor Pipa 22 mm | PVC Conduit Adaptor 22 mm Clipsal | 5 | PCS | |
| 33 | Klemp Pipa PVC 20 mm | PVC Sadle 20 mm Clipsal | 14 | PCS | |
| 34 | Klemp Pipa galvanis PG 19 | Klem pipa galvanis | 6 | PCS | |
| 35 | Rel Ω C | DIN Rell C Omega | 1 | M | |
| 36 | Terminal legrand | Terminal 2,5 mm ² (exp. Legrand) | 40 | PCS | *) |
| 37 | Tutup Terminal legrand | Tutup Terminal (exp. legrand) | 2 | PCS | *) |
| 38 | Pengunci Terminal Legrand | Pengunci Terminal (Legrand - End Section) | 4 | PCS | *) |
| 39 | Kotak Kontak 3 fasa 5 pin 16 A | Kotak kontak 3 fasa 5 pin 16 A (exp.Legrand) | 1 | PCS | *) |
| 40 | Kotak Kontak | Square box stop contact 1 phase Outbow 16 A (Exp. Clipsal) | 1 | PC | |
| 41 | Sepatu kable NYAF | Cable shoes End Sleeve 1,5 mm | 150 | PCS | |
| 42 | Terminal Blok | Terminal Blok (STB 25/ 6 P 30 A) | 1 | Bar | |
| 43 | Kabel NYA 1.5 mm ² merah | Kabel NYA 1.5 mm ² merah | 10 | M | |
| 44 | Kabel NYA 1.5 mm ² kuning | Kabel NYA 1.5 mm ² kuning | 5 | M | |
| 45 | Kabel NYA 1.5 mm ² hitam | Kabel NYA 1.5 mm ² hitam | 5 | M | |
| 46 | Kabel NYA 1.5 mm ² hijau/kuning | Kabel NYA 1.5 mm ² hijau/kuning | 5 | M | |
| 47 | Kabel NYAF1.5 mm ² merah | Kabel NYAF1.5 mm ² merah | 10 | M | |
| 48 | Kabel NYAF1.5 mm ² kuning | Kabel NYAF1.5 mm ² kuning | 10 | M | |
| 49 | Kabel NYAF1.5 mm ² hitam | Kabel NYAF1.5 mm ² hitam | 10 | M | |
| 50 | Kabel NYAF1.5 mm ² biru | Kabel NYAF1.5 mm ² biru | 10 | M | |
| 51 | Kabel NYAF 1.5 mm ² hijau/kuning | Kabel NYAF 1.5 mm ² hijau/kuning | 5 | M | |
| 52 | Kable Tie | Kable Tie 3 x 150 mm | 20 | PCS | |
| 53 | Tie Mount | Tie Mount 30 x 30 mm | 5 | PCS | |
| 54 | Spiral kabel | Spiral kabel Dia 10 mm | 1 | M | |
| 55 | Labeling | Labeling paper (Exp. Tom Jerry) | 2 | LB | |



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| No. | Deskripsi Material | Spesifikasi | Qty | Unit | Ket |
|-----------------|--|---|-----|------|-----|
| MODULE B | | | | | |
| 1 | Box Panel | Box panel PVC 250 x 140 x 100 mm + Din Rell C Omega (exp. MCB Box 8 Grup HAGER VS108TVA) | 1 | SET | |
| 2 | Push Button completed Box | Square Push Button Outbow (Exp. Clipsal) | 3 | PCS | |
| 3 | Kotak Kontak | Square box stop contact 1 phase Outbow 16 A (Exp. Clipsal) | 1 | PCS | |
| 4 | Sensor Gerak (moving sensor) | Moving Detektor , motion detector | 1 | PC | *) |
| 5 | PVC Kabel Duct Polos | PVC Kabel Duct Polos 45 x 45 mm (WH) | 1 | BAR | |
| 6 | PVC Kabel Duct Polos | PVC Kabel Duct Polos 60 x 40 mm (WH) | 2 | BAR | |
| 7 | Pipa PVC | PVC Conduit Clipsal 20 mm | 2 | BAR | |
| 8 | PVC Adaptor Pipa 22 mm | PVC Conduit Adaptor 22 mm Clipsal | 11 | PCS | |
| 9 | Kabel Gland PG 13.5 | Kabel Gland PG 13.5 | 2 | PCS | |
| 10 | Klemp Pipa PVC 20 mm | PVC Sadle 20 mm Clipsal | 21 | PCS | |
| 11 | Kabel NYM 3 x 1.5 mm ² | Kabel NYM 3 x 1.5 mm ² | 3 | M | |
| 12 | Klem kabel NYM | Klem kabel NYM No. 9 | 1 | PACK | |
| 13 | Kabel NYA 1.5 mm ² merah | Kabel NYA 1.5 mm ² merah | 10 | M | |
| 14 | Kabel NYA 1.5 mm ² biru | Kabel NYA 1.5 mm ² biru | 10 | M | |
| 15 | Kabel NYA 1.5 mm ² hijau/kuning | Kabel NYA 1.5 mm ² hijau/kuning | 5 | M | |
| 16 | Fitting duduk | Square lamp socket (exp. Broco) | 2 | PCS | |
| 17 | Lampu TL | Lamp TL 220 V / 15 W | 1 | PCS | |
| 18 | Lampu | Lapmpu Pijar 220 Volt / 40 Watt | 2 | PCS | |
| 19 | Roset kayu | Roset kayu (Persegi sesuai fitting lampu) | 2 | PCS | |
| 20 | Terminal legrand | Terminal 2,5 mm ² (exp. Legrand) | 25 | PCS | *) |
| 21 | Tutup Terminal legrand | Tutup Terminal (exp. legrand) | 1 | PCS | *) |
| 22 | Pengunci Terminal Legrand | Pengunci Terminal (Legrand - End Section) | 2 | PCS | *) |

Catatan :

Smart Relay (bukan PLC) adalah komponen utama, tanpa komponen tersebut peserta tidak dapat melakukan pekerjaan pada **Module A** dan **Module B**.



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13. DAFTAR ALAT TANGAN

Disiapkan oleh : Panitia kecuai yang bertanda *)

| No. | Deskripsi peralatan | Spesifikasi | QTY | Unit | Ket |
|-----|--|---|-----|------|-----|
| 1 | Obeng / Screwdriver (Minus) | 3 mm s/d 6 mm | 1 | SET | *) |
| 2 | Obeng / Screwdriver (Plus) | 3 mm s/d 6 mm | 1 | SET | *) |
| 3 | Kunci Inggris / Adjustable or set ring pas | Suitable for Hexagon set Screw M5 | 1 | SET | *) |
| 4 | Palu / Hammer | 0,3 Kg | 1 | PC | *) |
| 5 | Ragum pipa / Universal Vice / Pipe Vice | Standard | 1 | SET | *) |
| 6 | Gergaji / Hack saw frame with blade | 24 TPI | 1 | SET | *) |
| 7 | Spiral / Pir / PVC Bending Spring | 20 mm | 1 | PC | *) |
| 8 | Tang pemotong kabel / Cutting Pliers | Standard | 1 | PC | *) |
| 9 | Tang kombinasi /Combination Pliers | Standard | 1 | PC | *) |
| 10 | Tang pengupas kabel / Wire Stripper | Standard | 1 | PC | *) |
| 11 | Tang pres sepatu kabel / Crimping Tools | 1,5 mm s/d 4 mm | 1 | PC | *) |
| 12 | Pisau pengupas kabel / Universal Cable Knife | Medium size | 1 | PC | *) |
| 13 | Mata bor / Drill Bits | 3 mm s/d 10 mm | 1 | SET | *) |
| 14 | Bor pelubang pelat / Hole Saw | 20 mm s/d 24 mm | 1 | SET | *) |
| 15 | Kikir datar / Flat file | 3 x 150 mm | 1 | PC | *) |
| 16 | Kikir bulat / Round file | 3 x 150 mm | 1 | PC | *) |
| 17 | Meter Roll | 3 meter | 1 | PC | *) |
| 18 | Bor listrik / Electric Hand Drill Machine | Drill chuck 10mm, 0-2500 rpm, 350W, 220 V 50 Hz. | 1 | UNIT | *) |
| 19 | Pemanas / Heater gun | 220V/50Hz/1800 Watt | 1 | UNIT | *) |
| 20 | Bor dengan tenaga baterai /Cordless Drill | Rechargeable Battery 9,6 V,1,5 AH, 400-10.000 rpm | 1 | UNIT | *) |
| 21 | Tool Box | Standard | 1 | UNIT | *) |
| 22 | Meja kerja / Work Table | Wood Table (LWH) 120x70x80 cm | 1 | UNIT | |
| 23 | Keranjang sampah / Basket | 40 x 40 x 60 cm | 1 | PC | |
| 24 | Tangga / Step Leader | H 100 cm | 1 | UNIT | |
| 25 | Pembengkok pipa metal / Metal Bending Pipe | Stand Bending Pipe for Metal conduit 20 mm | 1 | UNIT | |
| 26 | APD / PPE (personal protective equipment) | Standard | 1 | SET | *) |
| 27 | Multimeter | Multimeter Digital / Analog | 1 | SET | *) |
| 28 | Insulation Tester | Digital / Analog insulation tester | 1 | SET | *) |



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**PAPAN KERJA PESERTA LOMBA
Untuk 1 Peserta**

Bidang Lomba: *Electrical Installation*
(Dipersiapkan oleh Panitia Lomba)

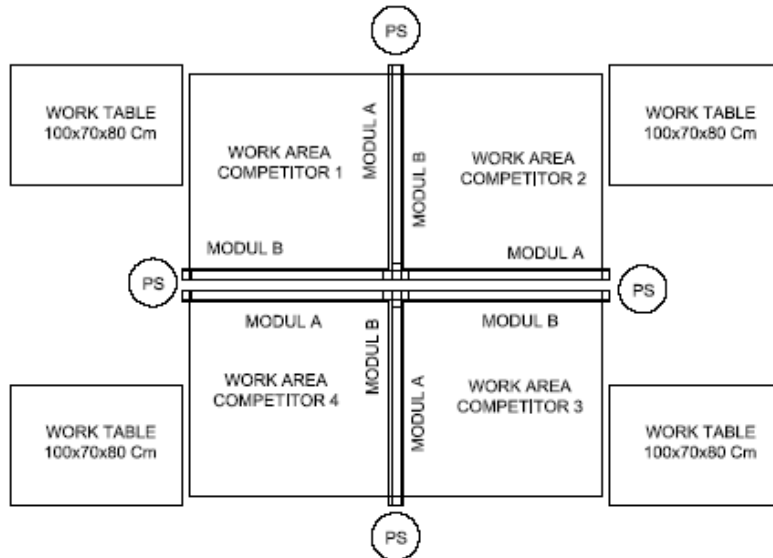
| No. | Deakripsi Materials | Spesifikasi | Qty | UNIT |
|-----|-----------------------------------|-----------------------------------|-----|-------|
| 1 | Plywood | 18 x 1200 x 2400 mm | 2,5 | SHEET |
| 2 | Square wood | 5 x 5 x 400 cm | 4 | PCS |
| 3 | Nails | 3 Inch | 0,5 | KG |
| 4 | Nails | 2 Inch | 0,5 | KG |
| 5 | NYM Cable | 4 x 1,5 mm ² | 5 | M |
| 6 | NYM Cable | 2 x 1,5 mm ² | 5 | M |
| 7 | Single Switch | 1 | 1 | PC |
| 8 | Socket Outlet / Terminal | 1 phase (3 pin) / 16 A | 1 | UNIT |
| 9 | Socket Outlet / Terminal | 3 phase (5 pin) / 16 A | 1 | UNIT |
| 10 | MCB | 1 phase 4 A | 1 | PC |
| 11 | MCB | 3 phase 16 A | 1 | PC |
| 12 | MCB Box | Adjust requirements | 1 | PC |
| 13 | Work Table | Wood Table (LWH) 120x70x80 cm | 1 | UNIT |
| 14 | Cable Clamp for NYM Cable | Standard | 1 | PACK |
| 15 | Cabin Lighting | Lighting TL 40 Watt / 220 V | 1 | UNIT |
| 16 | Electric Motor 3 Phase ≤ 1 KW | Standard | 6 | Unit |
| 17 | Tusuk kontak 3 phase 5 pin / 16 A | Tusuk kontak 3 phase 5 pin / 16 A | 6 | Unit |



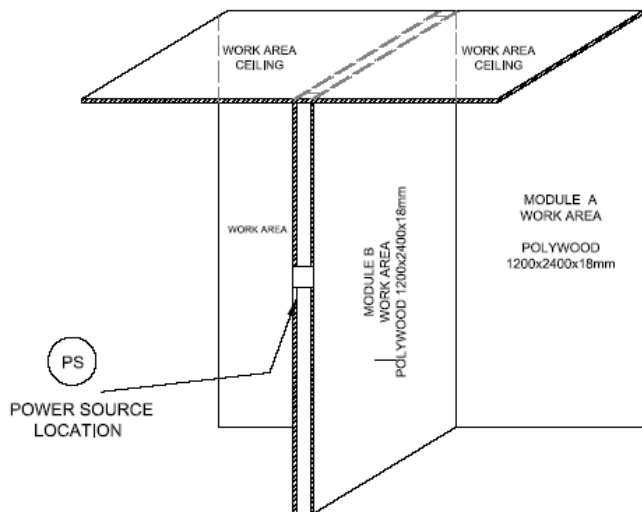
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14. Papan Kerja

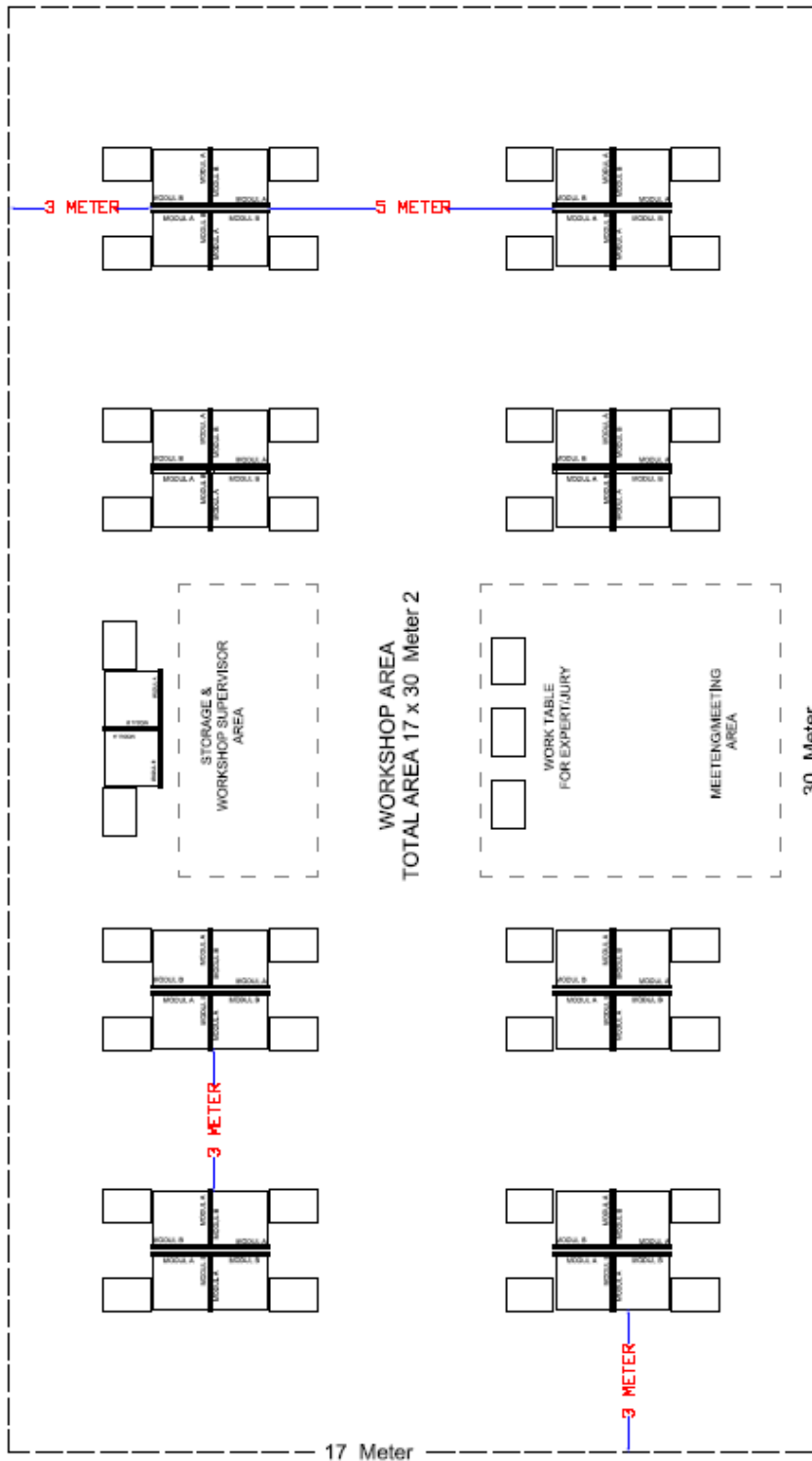


LAY OUT WORK AREA
(TYPICAL)





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Lay-out Workshop Competition Area 17 x 30 m²
(for 34 competitors)



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15. Module A

Three Phase Motor installation

Description of Forward–Reverse Motor Installation :

The function is for open and closed a door.

Push button S-2 operated the motor as open the door, and closed by push button S-3. The door able to operated from S-4 and S-5 also.

Limits switch as stopper of the door.

The system completed with pilot lamp indicators, green light as indication when the door open or closed normally, yellow light as indication if the over load and red light as indication if the motors in emergency and trip.

System has to be programmed by smart relay.

The installation completed with protection device ELCB, MCB and emergency stop system S-1 for emergency even.



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16. Module B

Lighting Installation

Description of the Installation

The installation consists of 5 node of lighting.

All lighting controlled by smart relay.

First is lamp L3, that be operated by T-1, T-2, and T-3.

Second node L2, is lighting for yard.

Third node is lamp L1 that be operated by moving detector.

Fourth and fifth nodes are single phase socket outlet as independent and multipurpose power supply.

The circuits systems are protected by electrical over current, short circuit device and current leakage device



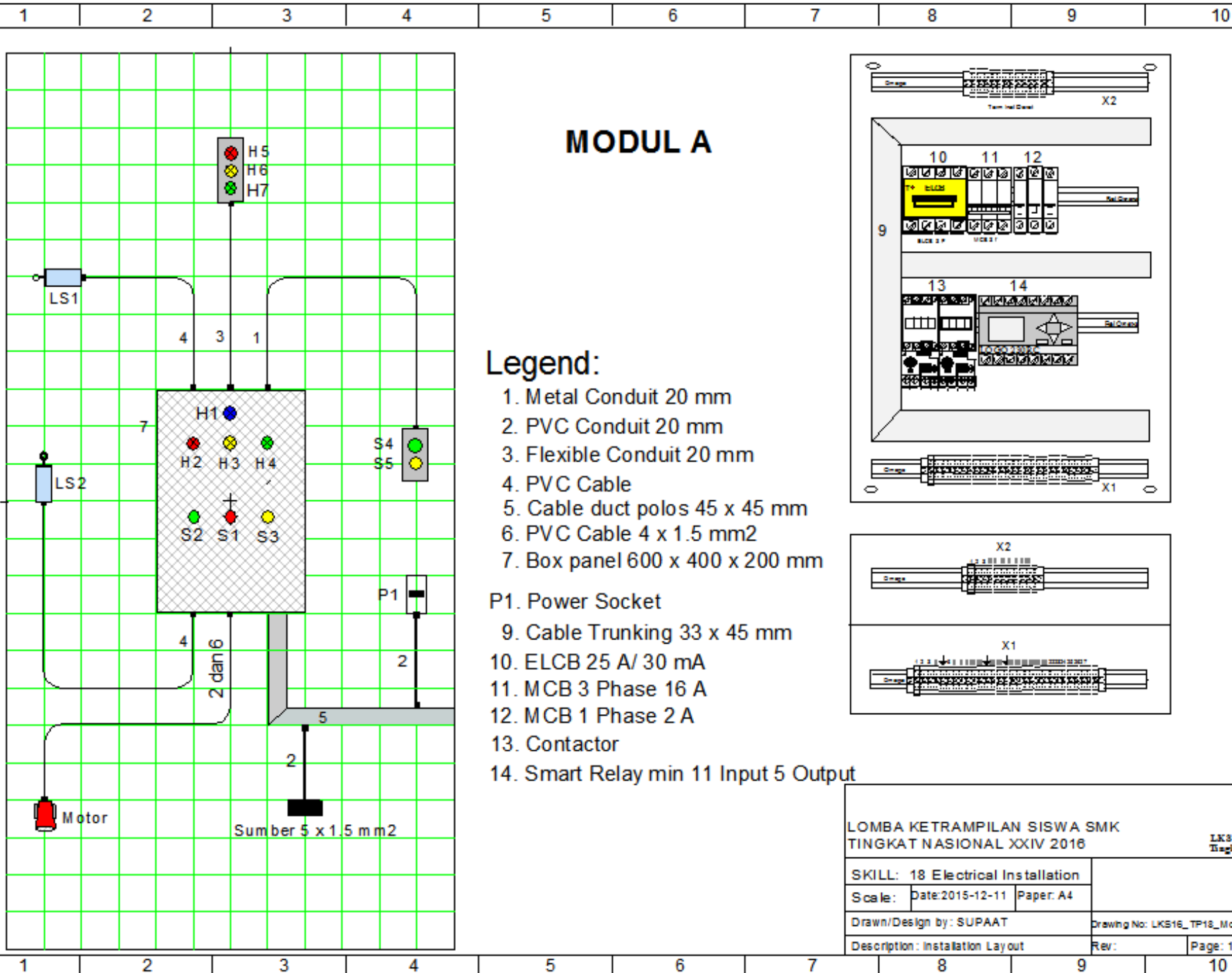
SOAL



BIDANG LOMBA :

ELECTRICAL INSTALATION

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
DIREKTORAT JENDERAL PENDIDIKAN DASAR DAN MENENGAH
DIREKTORAT PEMBINAAN SEKOLAH MENENGAH KEJURUAN
Jalan Jenderal Sudirman, Senayan, Jakarta 10270 Gedung E Lantai 12 – 13
Telepon (021) 5725477 (Hunting) , 5725466-69, 5725471-75
Website: <http://psmk.kemdikbud.go.id>

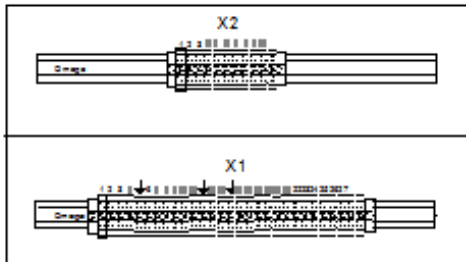
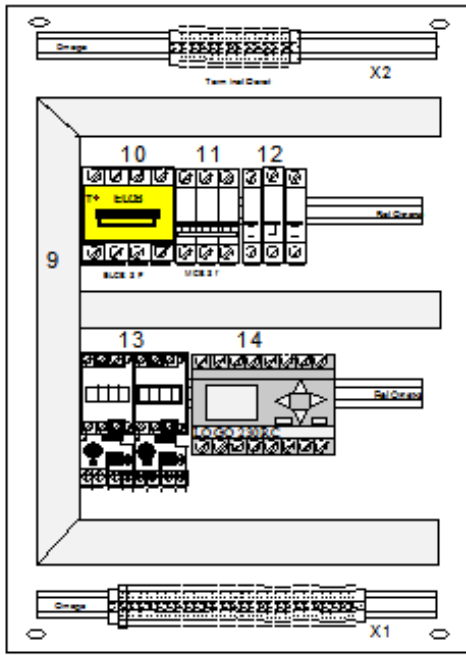



MODUL A

Legend:

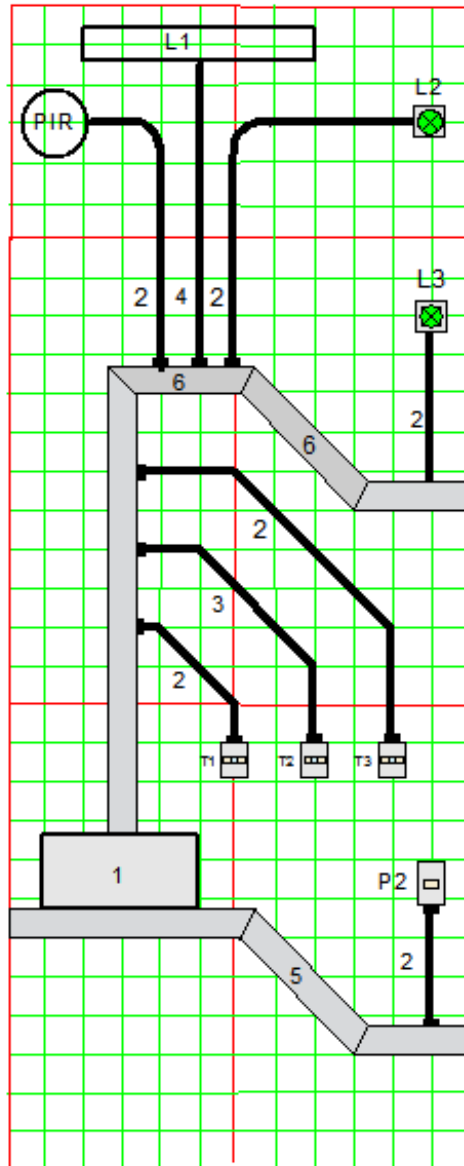
- 1. Metal Conduit 20 mm
- 2. PVC Conduit 20 mm
- 3. Flexible Conduit 20 mm
- 4. PVC Cable
- 5. Cable duct polos 45 x 45 mm
- 6. PVC Cable 4 x 1.5 mm²
- 7. Box panel 600 x 400 x 200 mm

- P1. Power Socket
- 9. Cable Trunking 33 x 45 mm
- 10. ELCB 25 A/ 30 mA
- 11. MCB 3 Phase 16 A
- 12. MCB 1 Phase 2 A
- 13. Contactor
- 14. Smart Relay min 11 Input 5 Output




| | | | | |
|---|------------------|-----------|---|----------|
| LOMBA KETRAMPILAN SISWA SMK TINGKAT NASIONAL XXIV 2018 | | |  | |
| SKILL: 18 Electrical Installation | | | | |
| Scale: | Date: 2015-12-11 | Paper: A4 | | |
| Drawn/Design by: SUPAAT | | | Drawing No: LKS16_TP18_Modul A | |
| Description: Installation Layout | | | Rev: | Page: 15 |

MODUL B



Legend:

- 1. Box terminal input output
- 2. PVC Conduit 20 mm
- 3. Flexible Conduit 20 mm
- 4. PVC Cable
- 5. PVC Trunking 45 x45 mm
- 6. PVC Trunking 60 x 40 mm
- L1. Fluorescent Light
- L2 - 3. Light Fittings for Bulbs
- PIR. Motion Detector
- P1 - 2. Power Sockets
- T1 - 3 Tombol tekan

| | | | |
|--|------------------|--------------------------------|---|
| LOMBA KETRAMPILAN SISWA SMK TINGKAT NASIONAL 2016 | | |  |
| SKILL: 18 Electrical Installation | | | |
| Scale: | Date: 2015-12-11 | Paper: A4 | |
| Drawn/Design by: SUPAAT | | Drawing No: LKS16_TP18_Modul B | |
| Description: Installation Layout | | Rev: | Page: 16 |



FORMAT PENILAIAN



BIDANG LOMBA :

ELECTRICAL INSTALATION

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
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Objective Marking Form

24th National Skills Competition

A

Trade : Electrical Installation

Competitor Name : _____

Competitor No : _____

Sub Criterion : Module A - Function

| Aspect ID | Max Mark | Aspect of Criterion - Description | Requirement or Nominal Size | Result or Actual Value | Mark Awarded |
|-----------|----------|--|-----------------------------|------------------------|--------------|
| 1 | 3 | Motor function correct operation be operate by push button | | | |
| 2 | 3 | Blink function | | | |
| 3 | 3 | Emergency sytem function properly | | | |
| 4 | 2 | Corect setting Overload | | | |
| 5 | 2 | Protection device function properly | | | |
| 6 | 2 | Sequen indicator function perfectly | | | |
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15 Maximum Mark for Sub Criterion

Mark Awarded _____

Malang, June 2016

Signatures confirming the accuracy of this result

EXPERT 1

EXPERT 2

EXPERT 3

Objective Marking Form 24th National Skills Competition

| |
|---|
| A |
|---|

Trade : Electrical Installation

Competitor Name : _____

Competitor No : _____

Sub Criterion : Module A - Safety

| Aspect ID | Max Mark | Aspect of Criterion - Description | Requirement or Nominal Size | Result or Actual Value | Mark Awarded |
|-----------|----------|--|-----------------------------|------------------------|--------------|
| 1 | 5 | All Health and Safety requirements met at all times | | | |
| | | 1 mark deducted for each breach of Safety (Up to maximum allocation) | | | |
| | | Work Area clear of hazards | | | |
| | | Personal Protective Equipment prepare and used correctly | | | |
| | | Circuits correctly and clearly identified | | | |
| | | Correct Personal Protective Equipment used for Commissioning | | | |
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5 Maximum Mark for Sub Criterion

Mark Awarded _____

Malang, June 2016

Signatures confirming the accuracy of this result

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| EXPERT 1 |
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| EXPERT 2 |
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| EXPERT 3 |
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Objective Marking Form 24th National Skills Competition

B

Trade : Electrical Installation

Competitor Name : _____

Competitor No : _____

Sub Criterion : Module B - Safety

| Aspect ID | Max Mark | Aspect of Criterion - Description | Requirement or Nominal Size | Result or Actual Value | Mark Awarded |
|-----------|----------|---|-----------------------------|------------------------|--------------|
| 1 | 5 | All Health and Safety requirements met at all times | | | |
| | | 1 mark deducted for each breach of Safety (Up to maximum allocation) | | | |
| | | PPE used as describe in the health and safety regulation | | | |
| | | No pieces of pipe and cable, lying down on the floor. The competitor must keep these in a safe area or in the bin box | | | |
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5 Maximum Mark for Sub Criterion

Mark Awarded _____

Malang, June 2016

Signatures confirming the accuracy of this result

EXPERT 1

EXPERT 2

EXPERT 3

Objective Marking Form

24th National Skills Competition

A

Trade : Electrical Installation

Competitor Name : _____

Competitor No : _____

Sub Criterion : Module A - Wiring and Termination

| Aspect ID | Max Mark | Aspect of Criterion - Description | Requirement or Nominal Size | Result or Actual Value | Mark Awarded |
|-----------|----------|--|-----------------------------|------------------------|--------------|
| 1 | 5 | Equipment or accessory terminals correctly terminated | | | |
| | | The marking team must identify the items that are to be inspected by lottery. | | | |
| | | Terminations must have no copper visible at the termination when viewed at 90 degrees. | | | |
| | | Terminations must have no plastic inside the termination and be a good electrical and mechanical joint. | | | |
| | | Terminals correctly terminated at distribution board | | | |
| | | 0 mistakes = 5 | | | |
| | | 1 mistakes = 3 | | | |
| | | 2 mistakes = 1 | | | |
| | | 3 mistakes = 0 | | | |
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5 Maximum Mark for Sub Criterion

Mark Awarded _____

Malang, June 2016

Signatures confirming the accuracy of this result

EXPERT 1

EXPERT 2

EXPERT 3

Objective Marking Form

24th National Skills Competition

B

Trade : Electrical Installation

Competitor Name : _____

Competitor No : _____

Sub Criterion : Module B - Wiring and Termination

| Aspect ID | Max Mark | Aspect of Criterion - Description | Requirement or Nominal Size | Result or Actual Value | Mark Awarded |
|-----------|----------|---|-----------------------------|------------------------|--------------|
| 1 | 5 | Equipment or accessory terminals correctly terminated | | | |
| | | The marking team must identify the items that are to be inspected by lottery. | | | |
| | | Terminations must have no copper visible at the termination when viewed at 90 degrees. | | | |
| | | Terminations must have no plastic inside the termination and be a good electrical and mechanical joint . | | | |
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| | | 0 mistakes = 5 | | | |
| | | 1 mistakes = 3 | | | |
| | | 2 mistakes = 1 | | | |
| | | 3 mistakes = 0 | | | |
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5 Maximum Mark for Sub Criterion

Mark Awarded _____

Malang, June 2016

Signatures confirming the accuracy of this result

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| EXPERT 1 |
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| EXPERT 2 |
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| EXPERT 3 |
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