

# Past Examination Questions for Certificate of Competency as a Wireman 1

## Structure of Theory Examination Paper:

PART A: 30 Objective Questions (1 Mark for Each Question)

PART B: 5 Short Answer Questions (5 Marks for Each Question)

PART C: 3 Essay Type Questions (15 Marks for Each Question)

**Duration: 3 Hours**

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- 1 Which of the following current rating will cause a person to suffer heart attack, burn, faint or die?
- A 1 mA
  - B 5 mA
  - C 10 A**
  - D 50 mA
- 2 Which of the following electrical appliance requires a 20A MCB?
- A Switch socket outlet
  - B Fluorescent light
  - C Water heater**
  - D Door bell
- 3 For a three phase supply installation, what is the instrument used to measure the insulation resistance?
- A Clamp-on meter
  - B Phasing meter
  - C 500V Megger**
  - D Multimeter
- 4 What is the voltage we get when measure between a RED phase and a YELLOW phase cable from a three phase electrical system?
- A 240 V
  - B 415 V**
  - C 600 V
  - D 1000 V
- 5 What is the acceptable value for low voltage system?
- A below 4500V between phases
  - B below 1000V between phases**
  - C below 200V between phases
  - D below 100V between phases
- 6 Below are the work scopes for maintenance of a three phase electrical system, **EXCEPT**.
- A Perform visual inspection on entire electrical system
  - B Cleaning of main switch rooms
  - C Cleaning of generator set up
  - D Checking for the screw size**
- 7 Three phase power supply is more efficient than single phase power supply. How much power can a three phase supply produce compared to a single phase supply?
- A 143% more power
  - B 153% more power

- C 173% more power**  
D 193% more power
- 8 A correction factor is to be applied when the installation conditions differ from those for which values of current carrying capacity are tabulated. Which of the followings can be the correction factors?
- A Ambient temperature, grouping and thermal insulation**  
B Ambient temperature, power factor and grouping  
C Grouping, thermal insulation and design current  
D Grouping, design current and efficiency
- 9 What is the possible cause of overcurrent?
- A New model of protective device being used  
B Cheaper RCD device being used  
**C Excessive load**  
D Open circuit
- 10 The voltage for single phase 240V **SHOULD NOT** exceed \_\_\_\_\_ of 240 equal to \_\_\_\_\_.
- A 4%, 9.6V**  
B 4%, 16.6V  
C 5%, 9.6V  
D 5%,16.6V
- 11 Calculate the voltage drop of a circuit supplied from 240V source through a 23m length 16.0mm<sup>2</sup> two core copper cable, clipped direct and carrying a design current of 33A.
- A 2.123V  
**B 2.125V**  
C 2.215V  
D 2.225V
- 12 Earth resistance depends on several factors as stated below, **EXCEPT**.
- A Moisture  
B Soil condition  
**C Power magnitude**  
D Current magnitude
- 13 There are two different methods of installing conduit. Which of the followings are these two different methods?
- A Concealed system  
B Surface and tray system  
C Concealed and tray system  
**D Surface and concealed system**

- 14 Which of the following is used to fix conduit in order to save an additional fixing screw?
- A Spacer bar Saddles
  - B Distance Saddles
  - C Ordinary Saddles
  - D Conduit Clips**
- 15 What is the function of switchgear?
- A Electrical protection, isolation and control or functional switching**
  - B Overcurrent Protection
  - C Earth Fault Protection
  - D Detect electrical fault
- 16 What is the main function of fuses in motor control circuit?
- A To provide isolating to the device
  - B To provide protection against over current**
  - C To performing functional and emergency switching
  - D To control the current flow in the device when it generated
- 17 Direct contact means \_\_\_\_\_.
- A Electric shock due to contact with a person being electrocuted
  - B Electric shock due to contact with the non-live part
  - C Electric shock due to contact with insulated cable
  - D Electric shock due to contact with bare cable**
- 18 What is the **BEST** method to reduce radio frequency interference?
- A Use protective device
  - B Main earth terminal
  - C Functional earth**
  - D TT-System
- 19 Which of the followings is the basic formula to calculate current?
- A  $I \times V$
  - B  $I / V$
  - C  $V / R$**
  - D  $V \times R$
- 20 Surface conduit means \_\_\_\_\_.
- A Conduits concealed in concrete or run under wood floors
  - B Conduit installed under the surface of walls, ceiling or trusses
  - C Conduit installed above the surface of walls, ceiling or trusses
  - D Conduits installed on the surface of walls, ceilings or trusses**

- 21 What is the acceptable value for insulation resistance test on a LV system as shown in the configuration below?

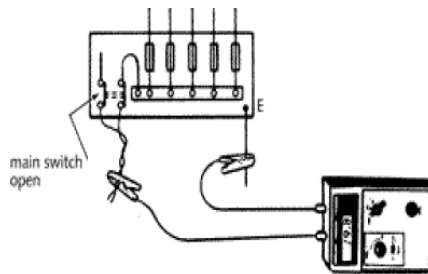


Figure 1

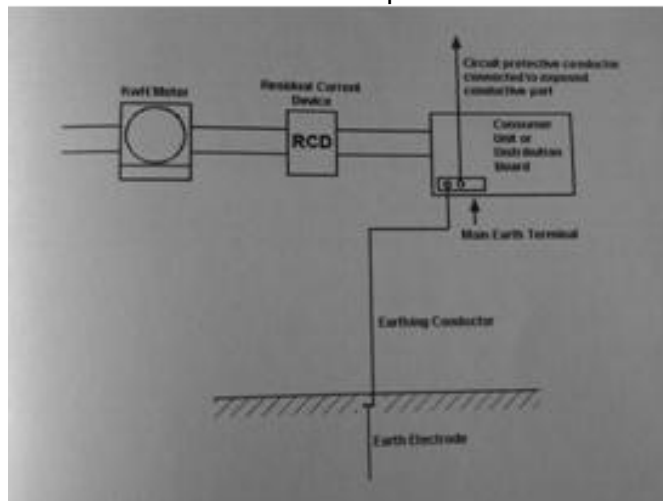
- A reading less than 100 ohm  
B reading more than 100 ohm  
C reading less than 1 K ohm  
D **reading more than 1 M ohm**
- 22 What will be the effect when motor experiences phase loss?
- A Motor run faster  
B **Motor burn out**  
C Motor become noisier  
D Motor become cooler
- 23 *“Smaller in size, normally two or three horsepower.”*  
The statement above **BEST** describes which of the followings?
- A **Single phase motor**  
B Three phase motor  
C Mechanical motor  
D Electrical motor
- 24 Below are some of the general rules applied for battery maintenance, **EXCEPT**
- A **Cover battery lids with oil**  
B Avoid overheating the battery  
C Match the charger to the battery requirements  
D Maintain the electrolyte at the appropriate level
- 25 Calculate the current flow for a single phase 240V water heater with power consumption of 4200 watt.
- A 16.5 A  
B **17.5 A**  
C 18.5 A  
D 19.5 A

- 26 What is the diameter of main earth conductor if the phase conductor is  $16\text{mm}^2$  PVC/PVC?
- A  $1.5\text{ mm}^2$
  - B  $6\text{ mm}^2$
  - C  $10\text{ mm}^2$
  - D  **$16\text{ mm}^2$**
- 27 Which of the following is **NOT** the advantage of using direct clipping wiring method?
- A Low cost
  - B **Easy to heat up**
  - C Easy to replace cable
  - D Easy and fast installation
- 28 What are the things to consider when sizing a cable?
- I Cable material
  - II Type of cable to be used
  - III Installation environment
  - IV Method of installation
- A I and II
  - B I, II and III
  - C I, III and IV
  - D **II, III and IV**
- 29 In a TT system, overcurrent can exist in three forms. What are these forms?
- I Earth Fault
  - II Overload current
  - III Overload Protection
  - IV Short circuit fault current
- A I and II
  - B **I, II and IV**
  - C II, III and IV
  - D All of the above
- 30 What are common types of fault in an electrical circuit?
- I High-value series-resistance fault
  - II Over-load circuit fault
  - III Open-circuit fault
  - IV Short-circuit fault
- A I, II & III
  - B I, II & IV
  - C **I, III & IV**
  - D II, III & IV

## STRUCTURE PART B & PART C

31

- a. List **THREE (3)** types of test for domestic wiring.
- Insulation resistance test
  - Polarity test
  - Earth loop impedance test
- b. Draw a diagram of earth fault loop impedance which shows the followings:
- Circuit protective conductor
  - Consumer's earthing terminal and earth conductor
  - Earth electrode Earth return path
  - Earthed neutral point
  - Transformer's winding
  - Phase conductor from the source to the point of fault

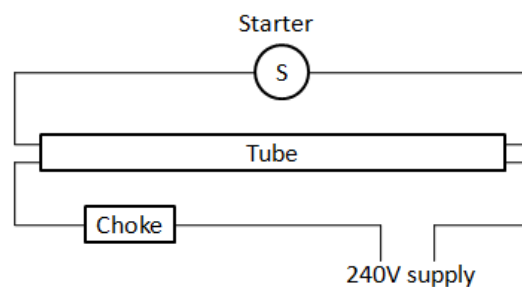


- c. What is the maximum resistance allowable for earth fault loop impedance?
- < 100 ohm
- d. If a 240 V circuit is protected by a 20A semi-enclosed fuse and has an earth-fault loop impedance of  $2.0\Omega$ , what is the earth-fault current in the event of a zero impedance earth fault?
- $I_f = 120A$
- e. What is the full name of ELCB and state its function?
- ELCB - Earth Leakage Circuit Breaker  
ELCB is a safety device used in electrical installations with high earth impedance to prevent shock.

32 List **FIVE (5)** information which are available on a nameplate of a typical motor?

- Manufacturer's name
- Model number

- c. Class of insulation
  - d. Rated output capacity
  - e. Alternating current frequency
- 33 List the steps of CPR rescue when a person is suffering from electrocution and is not breathing.
- a. Isolate supply immediately
  - b. Physically remove victim using non-conducting implements
  - c. Check for pulse and the response of the victim
  - d. Call for ambulance
  - e. Perform CPR while waiting for ambulance to arrive
- 34 Sketch the circuit diagram for fluorescent lighting installation.



- 35 List **FIVE (5)** types of tests to consumer installation before supply is connected.
- a. Insulation resistance test
  - b. Earth resistance test
  - c. Polarity test
  - d. Continuity test on ring circuit
  - e. Continuity test on protective conductor test
- 36 List **FIVE (5)** different types of motor.
- a. Single – Phase Motors
  - b. Split – Phase Motors
  - c. Capacitors – Start Motors
  - d. Capacitor – Run Motors
  - e. Universal Motors
- 37 List steps in wiring installation using surface GI piping system.
- a. Cut conduit using a hacksaw.
  - b. Remove burrs after cutting using a file or reamer.
  - c. When installing a switch drop for a surface conduit system, a length of conduit, previously threaded at one end, is temporarily secured so that the length of run and position of fixing saddles can be marked off.
  - d. Use a spirit level or plumb line to ensure the conduit runs are vertical, or measured

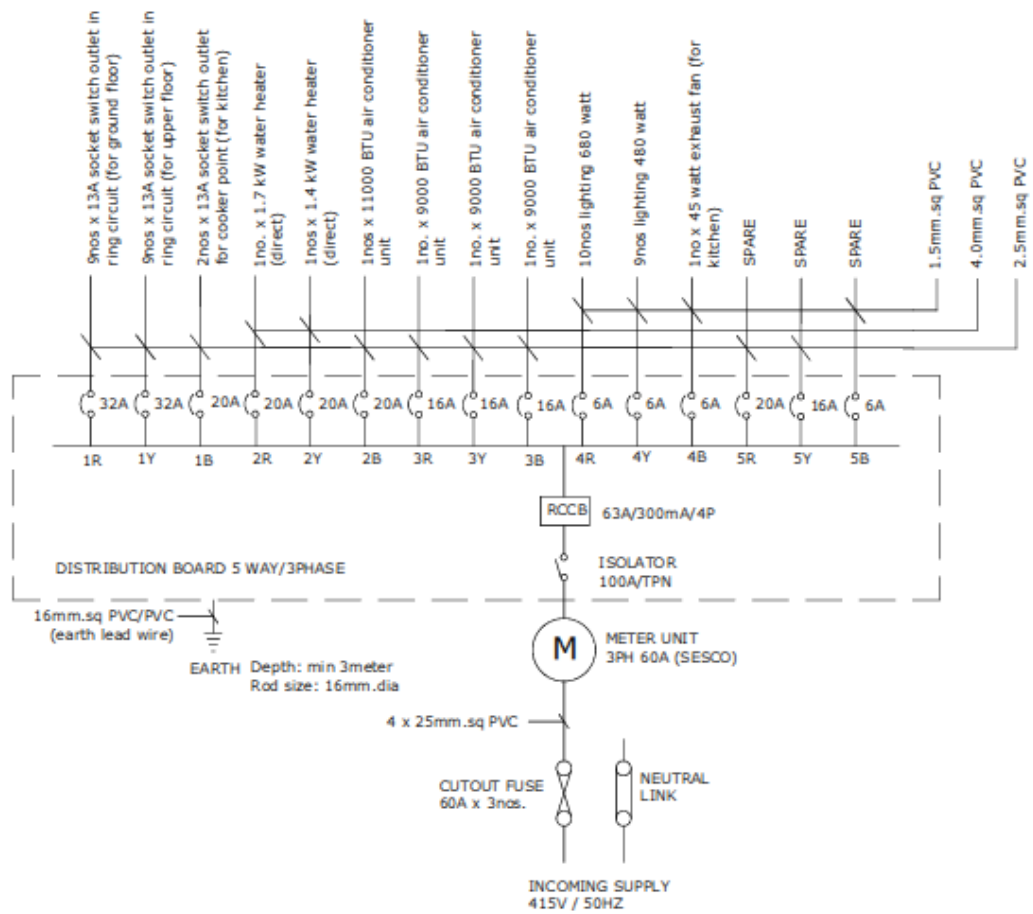


the position from the edge of finished block work.

- e. Drill wall plug fixings using power tools. These can be obtained with impact action for use on hard surfaces.
- f. Acting cutting and threading the conduit, a couple is screwed on ready to receive the box. The conduit saddle is dropped into position to enable the box to be located.
- g. The box is temporarily offered up and a spirit level is used to check the box for truth before marking off fixing hole positions.
- h. After drilling the wall and inserting the wall plugs, the box is fixed and the brass bush is inserted in position.
- i. The conduit saddles are refitted and tightened and the box is screwed onto the wall.
- j. The brass bush is tightened using a suitable spanner.
- k. The cables are pulled in and after trimming to length, the socket is wired and fixed in position.

38 You are required to install the electrical wiring for a double storey detached house which is receiving a three phase supply (415 volts/50Hz). Design the installation and draw a single line diagram with the circuits:

- a. 60A KWH meter 3 phase
- b. 60A cut-out fuse and neutral link
- c. 16mm<sup>2</sup> PVC/PVC cable
- d. 63A/0.3A 4P ELCB
- e. 60A TP-N Isolator
- f. 2 nos. air-condition point (Ground Floor)
- g. 1 no. cooker point (Ground Floor)
- h. 10 nos. lighting point (Ground Floor)
- i. 1 no water heater (Ground Floor)
- j. 10 nos. 13A switch socket outlet (Ground Floor)
- k. 3 nos. air-condition point (1<sup>st</sup> Floor)
- l. 10 nos. lighting point (1<sup>st</sup> Floor)
- m. 1 no water heater (1<sup>st</sup> Floor)
- n. 10 nos. 13A switch socket outlet (1<sup>st</sup> Floor)



# Soalan Peperiksaan bagi Sijil Pendawai Elektrik 1

## Struktur bagi kertas peperiksaan objektif:

Bahagian A: 30 Soalan Objektif (1 Markah bagi setiap jawapan yang betul)

Bahagian B: 5 Soalan Subjektif Pendek (5 Markah bagi setiap jawapan yang betul)

Bahagian C: 3 Soalan Subjektif Panjang (15 Markah bagi setiap jawapan yang betul)

**Masa: 3 Jam**

- 39 Sebelum memulakan teknik pemulihan pernafasan dan jantung (CPR), apakah tindakan awal yang perlu dilakukan?
- Membuka saluran pernafasan**
  - Lancarkan peredaran darah mangsa
  - Terus memberikan bantuan pernafasan
  - Letakkan mangsa dalam posisi pemulihan
- 40 Keterangan dibawah adalah BETUL bagi bacaan penunjuk turutan fasa **KEQUALI**
- Merah – Kuning – Biru (R)
  - Kuning – Biru – Merah (Y)
  - Biru – Merah – Kuning (B)
  - Merah – Biru – Kuning (B)**
- 41 Apakah tindakan yang perlu diambil apabila berlaku kemalangan yang melibatkan arus bervoltan tinggi?
- Menghubungi pihak pengendalian
  - Menghubungi pihak hospital berhampiran
  - Menghubungi pusat perkhidmatan kecemasan**
  - Menghubungi pihak pengurusan pemasangan
- 42 Pilih keterangan yang **BETUL** bagi pemula atau penghidup motor
- Memberikan perlindungan lebih arus atau beban lampau bagi sesebuah motor.**
  - Memberikan perlindungan dari fasa balikan atau menunggal didalam litar pemula.
  - Menjimatkan kos kendalian motor.
  - Memudahkan kerja-kerja senggaraan pada motor.
- 43 Fius atau pemutus litar miniatur (MCB) bagi litar pemula/penghidup motor, kebiasaannya berfungsi sebagai perlindungan terhadap
- litar pintas.**
  - voltan tinggi.
  - beban lampau.
  - fasa tunggal (*single phasing*).
- 44 Hitung regangan aruhan bagi induktor 50mH yang disambungkan kepada punca bekalan 230V, 50Hz?
- 11.31  $\Omega$
  - 12.00  $\Omega$
  - 12.33  $\Omega$
  - 15.71  $\Omega$**
- 45 Pilih persamaan di antara voltan talian ( $V_L$ ) dan voltan fasa ( $V_P$ ) dalam system tiga fasa sambungan bintang.

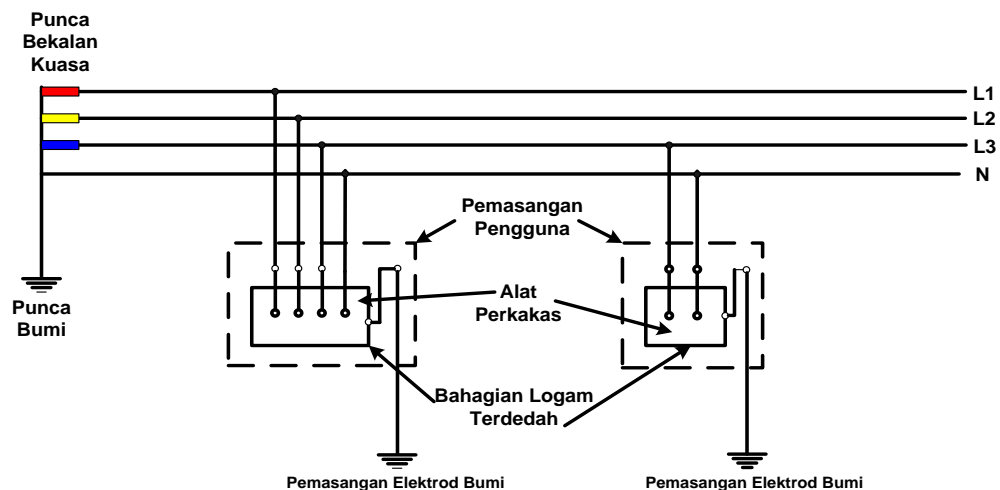
- A  $V_L = V_P$   
**B  $V_L = \sqrt{3} V_P$**   
 C  $V_P = \sqrt{3} V_L$   
 D  $V_P = \sqrt{3/2} V_L$
- 46 Sebuah pengubah penurun mempunyai 800 belitan prima dan 40 belitan sekunder, hitung nilai voltan prima jika keluaran pengubah 230 volt.
- A 1500 V  
 B 3300 V  
**C 4600 V**  
 D 6600 V
- 47 Berikut adalah kenyataan mengenai “Miniature Circuit Breaker” **KECUALI**
- A Litar kecil akhir yang rosak mudah di kesan  
 B Sifat terpelantik beban lebihan di tatah oleh pihak pengeluar  
 C Boleh digunakan untuk menggantikan fius padalitar kecil akhir  
**D Sifat terpelantik beban lebihan boleh di laras mengikut keperluan litar**
- 48 Apakah tujuan ujian kekutuban dijalankan bagi sesuatu pemasangan?
- A Memastikan setiap bahan pengalir tahan kepada suhu ambient persekitaran.  
 B Memastikan setiap pengalir yang digunakan mampu membawa arus yang melaluinya.  
 C Memastikan setiap pengalir pelindung mampu untuk membawa arus bocor ke bumi.  
**D Memastikan setiap pengalir fasa disambungkan pada fius dan kawalan kutub tunggal serta peranti pelindung sahaja**
- 49 Kenal pasti kebaikan motor segerak jika dibandingkan dengan motor aruhan.
- A Kecekapannya lebih tinggi  
 B Dapat menanggung beban yang lebih tinggi  
 C Kelajuan motor segerak boleh dilaras dengan lebih mudah  
**D Boleh dikendalikan pada factor kuasa uniti dan juga member kuasa reaktif**
- 50 Berapakah kelajuan motor segerak dengan bekalan 400V, 50 Hz yang mempunyai 2 pasang kutub?
- A 1500 rpm**  
 B 1600 rpm  
 C 1650 rpm  
 D 1700 rpm
- 51 Pilih saiz kabel dan peranti litar jejari yang digunakan untuk pemasangan yang mempunyai keluasan lantai tidak melebihi 50 m<sup>2</sup>.
- A Kabel bertebat pvk 2.5 mm<sup>2</sup> dengan peranti pelindung arus 15A.  
**B Kabel bertebat pvk 4 mm<sup>2</sup> dengan peranti pelindung arus 30A.**  
 C Kabel bertebat pvk 6 mm<sup>2</sup> dengan peranti pelindung arus 30A.  
 D Kabel bertebat pvk 4 mm<sup>2</sup> dengan peranti pelindung arus 20A.

52 Berdasarkan kenyataan di bawah, kenal pasti kehendak-kehendak am bagi pemasangan papan suis utama.

- I Bilik suis perlu menerima pengedaran udara yang baik.
- II Semua pintu dan lubang udara dipasang dengan anti-vermin.
- III Peti agihan diletakkan di dalam PSU untuk penggunaan beban di dalam bilik suis.
- IV Ruang kosong diperlukan di hadapan dan belakang bagi memudahkan kerja-kerja penyenggaraan.

- A I, II, III
- B I, III, IV
- C II, III, IV
- D I, II, III, IV**

52 Apakah jenis system pbumian yang ditunjukkan pada Rajah 1 di bawah?



Rajah 1

- A Sistem TT**
- B Sistem TN-S
- C Sistem TN-C
- D Sistem TN-C-S

53 Dalam sesuatu pemasangan elektrik hidup, apakah yang akan terjadi pada alatubah arus jika belitan sekunder (*secondary*) ditanggalkan dalam keadaan litar terbuka ?

- A Ia bergetar
- B Tetap seperti biasa
- C Voltan tinggi teraruh di belitan sekunder**
- D Voltan tinggi teraruh di belitan prima

54 Apakah tujuan ujian impedan gelung bumi (earth loop impedance test) yang dilakukan pada pemasangan elektrik?

- A Impedan pengalir fasa, neutral dan bumi
- B Impedan antara elektrod bumi pada suatu tapak
- C Impedan litar yang akan diambil oleh arus lebihan
- D Impedan litar yang akan diambil oleh arus kerosakan kebumi**

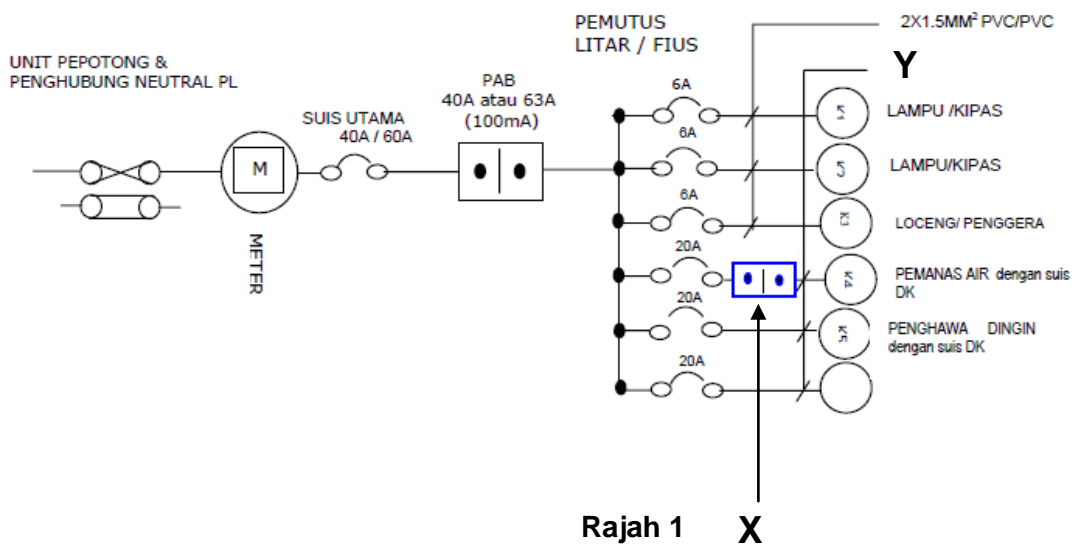
55 Kadar voltan untuk kabel pendawaian voltan rendah ialah 450/750 volt. Apakah yang dimaksudkan dengan nilai voltan tersebut?

- A Mana-mana fasa dan bumi tidak melebihi 750 volt
- B Mana-mana fasa dan bumi tidak melebihi 750 volt dan voltan diantara fasa tidak melebihi 450 volt
- C Mana-mana fasa dan bumi tidak melebihi 450 volt dan voltan diantara fasa tidak melebihi 750 volt**
- D Fasa merah dan bumi tidak melebihi 450 volt dan voltan diantara fasa merah dan fasa biru tidak melebihi 750 volt

56 Sebuah pengubah langkah turun (*step down transformer*) 11/0.433 kV jenis sambungan  $\Delta/Y$  mempunyai 750 belitan pada lilitan utama. Kirakan bilangan lilitan pada bahagian sekunder.

- A 10 lilitan
- B 15 lilitan
- C 17 lilitan**
- D 29 lilitan

57 Nyatakan kepekaan alat "X" dan saiz kabel "Y" pada Rajah 1.



- A 10 mA / 2.5 mm<sup>2</sup>
- B 10 mA / 4.0 mm<sup>2</sup>**
- C 30 mA / 2.5 mm<sup>2</sup>
- D 30 mA / 4.0 mm<sup>2</sup>

58 Pemutus Litar Bekas Teracu (MCCB) boleh member perlindungan arus lebihan dan arus bocor kebumi di dalam system pemasangan dengan adanya komponen tambahan. Pilih komponen-komponen tambahan yang diperlukan.

- I Balance Current Transformer
- II Earth Leakage Relay
- III Shunt Trip Coil
- IV Residual Current Circuit Breaker

- A I, II, III**
- B I, II, IV
- C II, III, IV
- D I, II, III, IV

59. Kenal pasti tujuan ujian rintangan elektrod bumi dilakukan pada sesuatu pemasangan elektrik.

- I Menguji kecekapan elektrod bumi
- II Menguji rintangan elektrod bumi
- III Mengetahui kesesuaian kedudukan elektrod yang ditanam
- IV Memastikan elektrod yang ditanam itu tidak berada dalam kawasan rintangan bertindih dengan elektrod lain.

- A I, II, III
- B I, III, IV
- C II, III, IV**
- D I, II, III, IV



## SOALAN SUBJEKTIF BAHAGIAN B & C

- 60 Berikan **EMPAT** tujuan pemula dipasang pada motor yang berkadaran melebihi 1.5 kuasa kuda.
- Mengurangkan arus mula yang tinggi;
  - Mengelakkan kerosakan motor dari kesan beban lampau berpanjangan;
  - Mengelakkan bahaya mekanikal motor hidup semula setelah kegagalan bekalan.
  - Mengurangkan kos operasi dan penyenggaraan
- 61 Kirakan peratus kegeliciran sebuah motor sangkar tupai tiga fasa 415V, 50Hz, 4 kutub beroperasi pada kelajuan 1460 rpm.
- 2.66%
- 62 Terangkan apakah tujuan pbumian keatas pemasangan dan peralatan elektrik.
- Tujuan pbumian keatas pemasangan dan peralatan elektrik adalah untuk keselamatan pengguna dari bahaya renjatan elektrik apabila terjadi arus bocor kebumi. Dan kerosakan peralatan elektrik serta kebakaran dari kesan panahan kilat
- 63 Senaraikan **ENAM** kreteria yang di perlukan untuk memilih sesuatu jenis kabel yang diperlukan bagi sesuatu pendawaian elektrik tiga fasa.
- Bahan pengalir
  - Jenis penebat
  - Jenis sarung atau perlindungan mekanik
  - Luas keratin rentas dan lembar
  - Kadaran voltan
  - Bilangan teras
- 64 Apakah defnisi bagi motor elektrik?
- Mesin yang menukarkan tenaga mekanikal kepada tenaga elektrik.
- 65 Berikan **DUA** jenis sambungan beban tiga fasa dan nyatakan hubung kait di antara voltan fasa dan arus fasa dalam litar-litar tersebut.

### SambunganBintang

$$V_{ph} = \frac{V_L}{\sqrt{3}}$$

$$I_{ph} = I_L$$

### Sambungan Delta

$$V_{ph} = V_L$$

$$I_{ph} = \frac{I_L}{\sqrt{3}}$$

- 66 Nyatakan **TIGA** kebaikan sistem tiga fasa berbanding penggunaan sistem satu fasa.
- Motor aruhan tiga fasa mempunyai kecekapan dan faktor kuasa yang lebih baik berbanding mesin satu fasa.
  - Motor aruhan tiga fasa boleh bermula dengan bersendirian.
  - Sistem tiga fasa dapat mengeluarkan tenaga elektrik yang lebih besar berbanding dengan sistem satu fasa
- 67 Berikan **LIMA (5)** cara yang boleh di praktikkan untuk menjimatkan penggunaan tenaga elektrik pada sesuatu pemasangan premis.
- Menggunakan lampu kalimantang kecekapan tinggi
  - Compact Fluorescent Lamp(CFL)
  - Electronic atau "Low Loss Ballast"
  - Dimming control
  - Memasang pantulan penyebar (Reflector)
- 68 Terangkan **LIMA (5)** kesan atau akibat apabila nilai rintangan elektrod bumi dan galangan gelung rosak ke bumi adalah tinggi?
- Pemutus Litar Bocor ke Bumi lambat atau tidak berkendali.
  - Pengalir pelindung/bumi akan menjadi panas dan merosakkan penebat kabel dan mungkin menyebabkan kebakaran jika dibiarkan berterusan.
  - Bahaya renjatan berterusan.
  - Peralatan dan perkakas elektrik akan rosak/terbakar.
  - Kehilangan nyawa dan mungkin berlaku kebakaran.