Past Examination Questions for Certificate of Competency as a Wireman 2

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 followings best determines the type of low voltage system used in a particular installation?

A The resistance of any point on an installation to earth
B The maximum loading required by the installation
C The allowances for diversity of final circuits
D The type of control devices used

2 Based on present practice, what is the maximum number of 13A socket outlets connected in one ring?

A 2 nos
B 5 nos
C 10 nos
D No limit

3 The unit of measurement for current is _____.

A Volt
B Watt
C Ampere
D Coulomb

4 Which of the followings is associated with Ohm's Law?

A $I = V / R$
B $P = I^2 \times V$
C $R_T = R_1 + R_2 + R_3 + \ldots\ldots$
D $P = I \times V$

5 Single phase electrical system consists of three wires, L, N and E. What does L, N and E means?

A L- Live, N- None, E- Earth
B L- Life, N- Neutral, E- Earth
C L- Live, N- Neutral, E- Earth
D L- Live, N- Neutral, E- Electric

6 How does a Wireman facilitate the disconnection of each final sub-circuit for testing?

A The Neutral conductor shall be connected at the DB in the same order as that in which the Live conductors are connected to the fuses or circuit breakers.
B The Neutral conductor shall be connected at the DB in the reverse order as that in which the Live conductors are connected to the fuses or circuit breakers.
C The Neutral conductor shall be connected at the DB together with the Live conductors.
D The Neutral conductor shall be connected to the fuses or circuit breakers in the same order as that in which the Live conductors are connected at the DB.

7 **"Electric shock cause by contact with electricity due to the failure of insulation in equipment or conductor"**

How electric shock as described above happens?

A Overcurrent
B Short circuit
C Direct contact
D Indirect contact

8 Wireman Second Grade is a competent person for _____ electrical wiring.

A surface
B conduit
C three phase
D single phase

9 The measurement unit for soil resistivity is _____.

A Ohm
B Earth
C Ampere
D Coulomb

10 What is the voltage and frequency of a single phase electrical system in Sarawak?

A 210V / 50Hz
B 240V / 50Hz
C 240V / 60Hz
D 110V / 60Hz

11 An ammeter is to be connected _____ to measure current.

A in series in the circuit
B in parallel with the circuit
C next to the supply
D opposite the supply

12

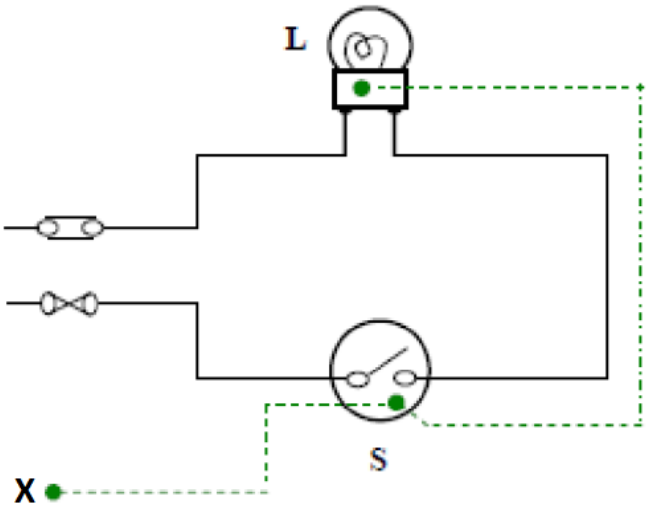


Figure 1

Figure 1 above shows a one way lighting schematic diagram. What is X in the consumer unit?

A Neutral terminal
B Earth terminal
C Single pole breaker
D Double pole isolator

13 The followings have high conductivity **EXCEPT**.

A Concrete
B Copper
C Silver
D Steel

14 Which of the followings describes the conductor of a power cable best?

A Bigger conductor carries more load
B Smaller conductor carries more load
C High load causes low temperature in the conductor
D Low load causes high temperature in the conductor

15 Calculate the voltage allowable for a single phase electrical system if the permissible voltage drop is 4%?

A 223.4V
B 230.4V
C 223.4V
D 201.6V

16 What does the electrical symbol in Figure 2 means?

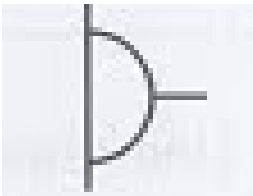


Figure 2

A Fan point
B 1 way light switch
C Phillip head screw driver
D 13A switch socket outlet

17 What is the size of cable use for the installation of 13A switch socket outlet connected in ring circuit?

A $1.5mm^2$
B $2.5mm^2$

C $4mm^2$
D $16mm^2$

18 The followings are types of earth electrode **EXCEPT**.

A Earth rods
B Earth tapes
C Underground structural metalwork embedded in foundations
D Welded metal reinforcement of pre-stressed concrete embedded in the earth

19 Which of the followings is the normal type of Earthing system for SESCO installations?

A IT
B TT
C TN-S
D TN-C-S

20 What should the CPC be if the incoming cable is $6.0mm^2$?

A $2.5mm^2$
B $4.0mm^2$
C $6.0mm^2$
D $16mm^2$

21 What is the maximum height for switches to be installed in a room so that all persons can easily use them?

A 450mm
B 1200mm
C 1600mm
D 2000mm

22 A Single phase motor for an automatic gate must be installed in such a way as to be connected directly to a 20A miniature circuit breaker (MCB) with a motor starter and a 15A switch socket outlet. What type of motor starter shall be used in such circuit?

A Direct On Line
B Start Delta starter
C Auto Transformer starter
D Primary resistance type starter

23 What is the current demand to be assumed for a 15A socket outlet?

A 5A
B 13A
C 15A
D 20A

24 Earth electrode resistance is _____.

A 1MΩ

B conductive mass of earth
C resistance of an earth electrode to earth
D impedance of phase to earth loop path starting and ending at the point of fault

25 What is the voltage for three phase low voltage system in Sarawak?

A 240V
B 433V
C 415V
D 1000V

26 The consumer unit contains devices for the protection of final circuits against which of the followings?

I Overload
II Short Circuit
III Earth fault

A I and II
B I and III
C II and III
D I, II and III

27 The consumer unit may contain the followings **EXCEPT**.

A Fuse
B SESCO Meter
C Residual current device
D Miniature circuit breaker

28 **"An emergency switch is to be provided for every part of an installation which may have to be disconnected rapidly from the supply to prevent or remove danger."**

Which of the following does not describe an emergency switch?

A Readily accessible from the place where the danger may occur
B Marked, preferably with a black handle or push button
C Capable of cutting off the full load current
D Double pole for single phase system

29 The number of cables to be installed in trunking shall be such that a space factor of _____ is not exceeded.

A 35%
B 40%
C 45%
D 50%

30 Which of the following is the correct sequence of control for installation as required by SESCO in Sarawak?

I Cut out / fuse
II KwH Meter
III Distribution Board
IV Residual current device

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

31 Space factor for low voltage cables installed in trunking is _____.

A 35%
B 40%
C 45%
D 50%

32 A power supply of 10V is connected to an mp3 player which draws a current of 0.25A. What is the resistance value of the mp3 player?

A 30 ohms
B 40 ohms
C 45 ohms
D 50 ohms

33 Which of the following **BEST** describe a diode?

A A component that allow electric current to flow in one direction
B A component that conducts electric charge
C A component that regulate voltage
D A component that control current

34 What is the correct voltage and frequency for a single phase supply?

A 200V/50Hz
B 240V/50Hz
C 110V/60Hz
D 240V/60Hz

35 When performing drilling works, a person is required to observe the following safety work practices **EXCEPT**

A Wear gloves
B Use goggles
C Wear slippers
D Wear long sleeves shirts

36 Which of the combinations below can cause a fire?

A Fuel, water, oxygen
B Fuel, paper, oxygen

C **Fuel, heat, oxygen**
D Fuel, heat, gas

37 What is the minimum cable size allowable for use of 13A switch socket outlet circuit installation?

A $1.5mm^2$
B **$2.5mm^2$**
C $4mm^2$
D $16mm^2$

38 What is the formula of total resistance for parallel circuit connection?

A **$1/R_T = 1/R_1 + 1/R_2 + 1/R_3$**
C $1/R_T = R_1 + 1/R_2 + 1/R_3$
D $R_T = (R_1 + R_2)^2 \times R_3$
B $R_T = R_1 + R_2 + R_3$

39 Which of the following is correct for single phase electrical system?

A **Live, Neutral & Earth**
B Neutral & Earth
C Live & Neutral
D Live & Earth

40 According to IEE Wiring Regulation, what is the maximum percentage of voltage drop allowed in a cable?

A 2%
B **4%**
C 6%
D 10%

41 What is the maximum number of stranded wires in a cable?

A **7**
B 8
C 9
D 10

42 An underground cable installed at an area where the risk of excavation is high, increased protection should be provided by the followings, **EXCEPT**.

A The user of heavier duty conduit
B Buried the underground cable in concrete
C **Lay underground cable under the bush**
D Use a combination of mechanical protection (double protection)

43 What fuse rating should be used for a radial circuit?

A 5A

B 10A
C 15A
D 20A

44 According to IEE wiring regulations, the following electrical system require to be earthed **EXCEPT**.

A Frame of metal roofing
B All wooden doors and cupboard
C Secondary winding point in a transformer
D All metallic covers which consists of wiring system

45 Which of the following is the Earthing system adopted by Syarikat SESCO Berhad within their installation?

A TT System
B TN-S System
C TN-C-S System
D TN-C and IT System

46 What is the acceptable value for earth fault loop impedance?

A Shall not exceed 1 Ohm
B Shall not exceed 10 Ohms
C Shall not exceed 50 Ohms
D Shall not exceed 100 Ohms

47 What is the standard colour to be used for trunking metal on electrical applications?

A Red
B Blue
C white
D Orange

48 For a single phase system, how many poles are there in an ELCB?

A 1
B 2
C 3
D 4

49 What is the colour for the dry powder type fire extinguisher?

A Red
B Blue
C Green
D Yellow

50 Where do low pressure sodium lamp normally been used?

A Office

B Car parks
C Washroom
D Table lamp

51 _____is used to create a glow discharge to warm up the electrodes in a fluorescent lamp and cause the bimetal strip to bend and touch the electrodes.

A Current from battery
B Current from transformer
C Voltage flow from ballast
D Voltage flow through starter

52 Which of the following instrument is use to do continuity test?

A Ammeter
B Voltmeter
C Multi meter
D Clamp on meter

53 List below are the advantages of using LED lamp **EXCEPT**.

A Maintenance free
B Low energy consumption
C Cool down fast after switch on
D Consist of infrared lighting (with UV radiation)

54 What is the advantage of fuse over MCB?

A Cheaper
B Faster current cut-off time
C Provide more current flow
D Can measure earth fault loop impedance

55 In electrical theory, electromagnetism is _____.

A a type of stone
B the capacity of an electric field to do work, typically measured in volts
C an influence produced by an electric charge on other charges in its vicinity
D a fundamental interaction between the magnetic field and the presence and motion of an electric charge

56 According to Fire Regulation, what is the class of electric fire (fire relating to electrically energized equipment)?

A Class A
B Class C
C Class E
D Class F

57 In order to calculate the correct current carrying capacity of a cable, which correction factor need to be consider?

A **Ambient temperature**
B Ambient current
C Ambient voltage
D Ambient power

58 Which of the following shows the correct order of a consumer supply installation?

A Meter – Isolator – MCB – RCD
B MCB – RCD – Isolator – Meter
C Isolator – RCD – Meter – MCB
D **Meter – Isolator – RCD – MCB**

59 "This rule shows the direction of induced current flow when a conductor moves in a magnetic field for generator". What rule does the above statement refer to?

A Thumb rule
B Left hand rule
C **Right hand rule**
D Fleming's right hand rule

60 Electric current is measure in unit of _____.

A watt
B ohm
C power
D **ampere**

61 Calculate the total resistance of two resistors connected in parallel with value of R1 = 65Ω and R2 = 80Ω.

A 35.86 watt
B **35.86 Ω**
C 35.86 A
D 35.86 F

62 The value 300 mili ampere can be rewritten as _____.

A 3 m A
B 0.03 A
C 30×10^{-3} A
D **300×10^{-3} A**

63 Given the voltage is 120 volt, the total resistance is 2700 Ω, find the total current in the circuit.

A **0.044 A**
B 44 A
C 0.0044 A
D 44×10^{-6} A

64 What is the colour that is representing the Neutral conductor?

A red
B green
C black
D purple

65 Given voltage is 240v, Resistance is 2kΩ. What is the power value?

A 480 W
B 120 W
C 28.8 W
D 12.8 W

66 Which formula below is calculating the time of a frequency?

A $\mathbf{t = \frac{1}{freq}}$
B t = freq x voltage
C $t = I^2$ x freq
D $t = \sqrt{I^2}$ x S ÷ K

67 What is the frequency of electricity supply used in Malaysia?

A 40 Hertz
B 50 Hertz
C 60 Hertz
D 100 Hertz

68 Which of the conductor material below is used for large current handling?

A gold
B aluminium
C silver
D copper

69 Which of the following insulation material can withstand high temperature up to 250° Celsius?

A PVC
B cross link polythene
C mineral insulated
D low smoke fume

70 What is the acceptable value for earth resistance?

A below one(1) ohm (<1 Ω)
B 10 ohm
C 15 ohm
D less than 100 ohm (<100 Ω)

71 Given the earth fault loop impedance (Z_s) is 0.4Ω, find the fault current if the supply is 225 volt.

A 415.5 A
B 489.3 A
C 562.5 A
D 662.5 A

72 What is the depth of burying an earth electrode copper rod, according to regulation?

A must be 2 feet
B minimum 3 meter
C must be at least 1 meter
D must be at least 1.5 meter

73 Which of the following formula is used to calculate the cross sectional area of a circuit protective conductor?

A S = t x k x I
B **S =** $\frac{\sqrt{I^2 t}}{k}$
C S = $\frac{\sqrt{kt}}{I}$
D S = $\frac{\sqrt{I^2 k}}{t}$

74 If 3 unit 1.5V batteries, with two batteries labelled with B2 and B3 are connected in parallel while the other battery, B1 is connected in series with B2 and B3 as shown below. Calculate the total voltage.

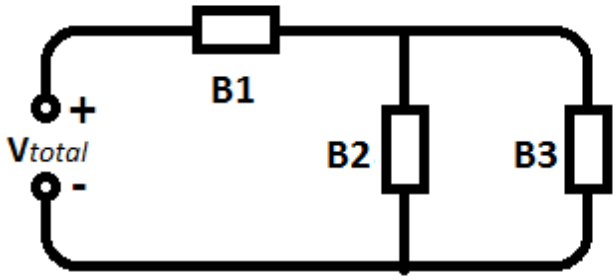


Figure 1

A 1.5 volt
B 2.5 volt
C 3.0 volt
D 4.5 volt

75 An electric kettle rated at 2300 W, calculate the current design if the voltage measured is 225 volts.

A **10.22 A**
B 12.55 A
C 14.45 A
D 16.75 A

76 What is the cable size for switch socket outlet?

A 1.5 mm^2
B **2.5 mm^2**
C 4.0 mm^2
D 6.0 mm^2

77 What is the maximum floor size for a ring circuit installation according to regulation?

A 25 m^2
B 50 m^2
C **100 m^2**
D 125 m^2

78 What is the maximum socket outlet in a radial circuit?

A 1 point
B **2 point**
C 5 point
D 10 point

79 In lighting circuit installation, what is the maximum number of lamps controlled by one unit 6A miniature circuit breaker if the lamp has 100W per circuit?

A 1 lamp per point
B 5 lamps
C 10 lamps
D **14 lamps**

80 What is the protection rating for lighting circuit?

A 3 A Fuse
B **5 A Fuse**
C 15 A Fuse
D 20 A Fuse

81 A 32A MCB is used as protective device for which circuit?

A **switch socket outlet connected in ring circuit with maximum 10 point.**
B water heater circuit
C lighting circuit
D air-conditioner circuit

82 Why does a conductor of a circuit get hot?

A the voltage is too high

B the electron flow faster
C because of overload or fault
D the power factor is below 1

83 According to SESCO requirement, what is the acceptable RCD Time Tripping during testing on single phase and three phase system?

A 400 mili-seconds
B 100 mili-seconds
C 50 mili-seconds
D below 40 mili-seconds

84 A residential site measured the earth fault loop impedance (Z_s) is 0.45Ω, and the voltage is 236 volts. Calculate the fault current.

A 524 V
B 524 A
C 524 Ω
D 524 W

85 What is the standard height of a light switch to be installed?

A 1 meter from ground.
B 1.2 meter from ground.
C 1.5 meter from ground.
D 2 meter from ground.

86 When a person receives an electrical shock when touching an electric kettle is called_____.

A indirect contact
B direct contact
C short circuit contact
D overcurrent contact

87 What is the diameter of main earth conductor if the phase conductor is 16mm^2 PVC/PVC?

A 1.5 mm.dia
B 6 mm.dia
C 10 mm.dia
D 16 mm.dia

88 What is the arrangement order of a consumer installation?

A Meter unit - RCD – MCB
B Incoming – Meter unit - Isolator – RCD – MCB
C Incoming – Meter unit - RCD – Isolator – MCB
D Meter unit – Isolator – RCD – MCB - Incoming

Which of the following material is likely to cause a corrosive attack?

A Rubber.
B PVC.
C Cement and plaster.
D Paper.

89 Which of the method below can be used to determine the direction of rotation of a motor?

A Fleming left hand rule
B Fleming right hand rule
C Fleming grip rule
D Fleming rule

90 What does BS 3036 refers to?

A Cartridge fuse
B Semi-enclosed fuse
C MCB
D RCD

91 What is the color used to represent the Neutral conductor?

A red
B green
C black
D purple

92 The followings are insulation method as protection in electrical system, **EXCEPT**

A Glass type insulation
B Oil type insulation
C Ceramic type insulation
D Gas type insulation

93 Squirrel cage motor is categorized as _____ motor.

A capacitor start
B synchronous
C induction
D DC

94 What will be the consequences if the neutral cable is broken?

A Equipment become more efficient
B Equipment may damage due to power surge
C RCD trips
D Equipment under voltage

95 Below is the application of Low Pressure Sodium Lamp, **EXCEPT**

A Highway
B Fish Pond

C Car Park
D Domestic Housing Estate

96 Which of the following is **NOT** renewable energy?

A Coal
B Solar
C Hydro
D Wind

97 What method can be used to protect the underground cable from mechanical damage?

A Install MCB
B Install inside a conduit
C Lay the cable directly into the ground
D Use bigger cable size

98 When a live cable gets into contact with metalwork, it is referred as _____.

A direct contact
B indirect contact
C short circuit contact
D over current contact

99 The following listed the advantages of MCB, **EXCEPT**

A Resetable
B Expensive
C Longer tripping time
D No stock inventory to keep

100 The measurement unit for soil resistivity is _____.
A Ohm
B Earth
C Ampere
D Coulomb

101 The consumer unit contains devices for the protection of final circuits against which of the followings?

I Overload
II Short Circuit
III Earth fault

A I and II
B I and III
C II and III
D I, II and III

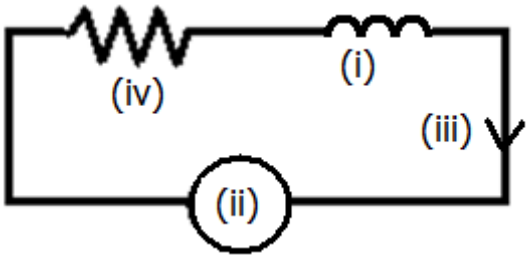
102 This value 55,300 can be change to prefix unit.
Nilai ini 55,300 boleh ditukar menjadi unit kejuruteraan prefix.

A **55.3×10^3**
B 55.3×10^5
C 55.3×10^{-3}
D 55.3×10^{-6}

103 What is the unit name for power?
Apakah nama unit bagi kuasa?

A joule
B **watt**
C volt
D ampere

104 Refer to figure below, the voltage value is recognized from label.
Rujuk ke gambarajah dibawah, nilai voltan boleh dikenali dari tanda.



A i
B **ii**
C iii
D iv

105 This symbol ~is what type of supply?
Simbol ini ~ merupakan jenis bekalan?

A alternating current back
arus ulang balik
B direct current
arus terus
C **alternating current**
arus ulang alik
D current back flow
arus balik

106 Given the formula V x I, what is the **CORRECT** value calculated?
*Diberikan rumus berikut V x I , apakah nilai yang **BETUL** dikirakan?*

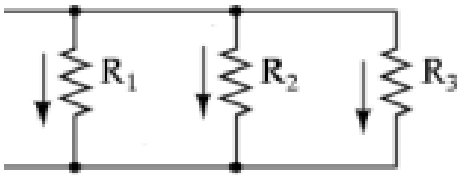
A Ohm
B Watt
C Ampere
D **Power**

107 The voltage is 24vDC, resistance is 75 Ω, calculate the current?

Nilai voltan adalah 24 v DC, nilai perintang adalah 75 Ω, kirakan nilai arus?

A 0.32 k A
B 0.32 A
C 0.32 µ A
D 0.32 m A

108 Refer figure below, what is the wiring method describe.
Rujuk rajah di bawah, apakah kaedah pendawaian menggambarkan.



A parallel circuit
litar selari
B series circuit
litar sesiri
C power circuit
litar kuasa
D lighting circuit
litar pencahayaan

109 The correct formula to calculate power in series circuit are.
Rumus yang betul untuk mengira nilai kuasa bagi litar sesiri adalah.

A P = Vt x It x Rt
B P = Vt x It ÷ Rt
C P = Vt x It
D P = (Vt x It) + Rt

110 In a single phase electrical system, what do the letters (L), (N) and (E) means:-
Dalam sistem elektrik fasa tunggal, apa yang huruf (L), (N) dan (E) bermaksud: -

A (L) Live, (N) none, and (E) Electric
B (L) Live, (N) Neutral, and (E) Earth
C (L) Live, (N) Neutral, and (E) Electric
D (L) Life, (N) Neutral, and (E) Electric

111 What is the correct voltage and frequency rating in a single phase system?
Apakah nilai voltan dan frekuansi yang betul dalam sistem satu fasa?

A 200V/50Hz
B 240V/50Hz
C 240V/60Hz
D 110V/60Hz

112 According to the regulations in the Ordinance of Sarawak, the number of regulations relating to Wireman.
Mengikut peraturan dalam buku Ordinance Sarawak, apakah nombor peraturan berkaitan dengan pendawai.

A Rule 20
B Rule 50
C Rule 85
D Rule 49

113 The followings are the causes of accidents due to electric shock, **EXCEPT**.
*Berikut adalah punca kemalangan akibat kejutan elektrik, **KECUALI**.*

A using hand tools do not work quality
menggunakan alat tangan kerja yang tidak berkualiti.
B there is an injury to the cable insulation.
terdapat kecederaan pada penebat kabel.
C did not switch off the main switch during work on electrical equipment.
tidak menutup suis utama semasa melakukan kerja pada peralatan elektrikal.
D use of personal protective equipment (PPE)
mengunakan alat pelindungan peribadi (PPE)

114 A person is receiving electric shocks, what actions should you should do first?
Apabila seseorang hanya menerima kejutan elektrik, apakah tindakan pertama yang perlu anda lakukan?

A tried to call an ambulance.
cuba untuk memanggil ambulans.
B try to touch or pull the victim with your hands.
cuba untuk menyentuh atau tarik mangsa dengan tangan anda.
C quickly switch off the main supply.
bertindak cepat memutupkan suis utama.
D quickly take a fire extinguisher
dengan cepat mengambil alat pemadam api

115 Who is in-charge regarding the safety of workers in the workplace?
Siapakah orang yang bertanggungjawab menjaga keselamatan pekerja ditempat kerja?

A Wireman
pendawai
B safety officer
pegawai keselamatan
C whom are competent
orang yang berkompetent
D parents
pihak ibubapa

116 What is the name extinguishing agent suitable for the type of fire caused by a short circuit in the electrical appliance?
Apakah nama ejen pemadam api yang sesuai untuk jenis kebakaran yang disebabkan oleh litar pintas pada perkakas elektrikal?

A water
air
B halon
halon
C carbon dioxide
karbon dioksida

D foam
buih

117 Refer to the picture below, the suitable use of this safety protective is.
Berdasarkan gambar di bawah, fungsi kegunaan alat perlindungan keselamatan ini adalah.

A to install the wiring
melakukan pemasangan pendawaian.
B holding the hot metal object
memegang objek logam panas.
C perform the drilling hole
melakukan penggerudian lubang.
D the welding works
melakukan kerja kimpalan.

118 What is a conductor?
Apakah itu konduktor?

A a material that allows current to flow.
bahan yang membenarkan arus mengalir.
B a material that block the flow of current.
bahan yang menyekat pengaliran arus.
C a material that energy to flow.
bahan yang membolehkan tenaga mengalir.
D a materials that increase the power.
bahan yang meningkatkan kuasa.

119 The conductor material listed below are used in the wiring installation, **EXCEPT**.
Bahan konduktor tersenarai di bawah adalah digunakan dalam pendawaian pemasangan, ***KECUALI****.*

I Copper
Tembaga
II Aluminum
III Alloy
Aloi
IV Silver
Perak

A III
B I & IV
C I, II & IV
D II, III & IV

120 What is the unit to identify the size of the conductor?
Apakah unit untuk mengenal pasti saiz konduktor?

A mili meter (mm)

B mili meter square (mm^2)
***mili meter persegi* (mm^2)**

C Inches
inci

D meter

121 Which type of cable insulation that can withstand operating temperatures of 250 ° degrees Celsius?
Jenis yang mana satu kabel penebat yang boleh menahan suhu operasi lebih daripada 250° darjah celsius?

A thermosetting compound (XLPE)
kompaun thermosetting

B rubber
getah

C polyvinyl chloride
polyvinyl klorida

D mineral insulated
mineral terlindung

122 Cable voltage drop for single-phase system is referring to how many percentage?
Nilai kabel kejatuhan voltan untuk sistem fasa tunggal adalah merujuk berapa peratusan?

A 2%, 9.6 volt

B 3%, 9.6 volt

C 4%, 9.6 volt

D 6%, 9.6 volt

123 Which statement is true about the cable conductor?
Kenyataan yang manakah benar mengenai kabel konduktor.

A higher current, the cable will be hotter.
lebih tinggi arus, kabel akan panas.

B a lower current, over heat cables.
lebih rendah arus, kabel lebih panas.

C cable size is larger, less heat.
Saiz kabel lebih besar, kurang panas.

D The size of the larger cable, do not change.
Saiz kabel lebih besar, tidak perubahan.

124 What is the earthing system practiced in Malaysia?
Apakah sistem pembumian yang diamalkan di Malaysia?

A TN-S sytem

B TT system

C TN-C-S system

D IT system

125 What is depths of the electrode copper rod for the earthing installation?
Apakah kedalaman yang perlu ditanam untuk pemasangan elektrode tembaga bagi sisyem pembumian?

A less than 2 feet
kurang dari 2 kaki
B less than 2 meter
kurang dari 2 meter
C more than 3 meter
lebih dari 3 meter
D more than 5 meter
lebih dari 5 meter

126 What is size is the minimum CPC cable used in galvanized iron conduit installation?
Apakah saiz kabel minima CPC yang digunakan pada pemasangan konduit logam?

A 4.0 mm^2
B 6.0 mm^2
C 10.0 mm^2
D 16.0 mm^2

127 Listed below are the types of circuits for a home wiring installation.
Disenaraikan di bawah adalah jenis litar untuk pemasangan pendawaian sebuah rumah.

I circuit ring
litar gelang
II circuit cooking
litar memasak
III lighting circuit
litar pencahayaan
IV radial circuit
litar radial

A I & II
B II, III & IV
C I, II & III
D I, II, III & IV

128 Which figure below represents the florescent lamp light symbol?
Yang manakah gambar dibawah mewakili simbol lampu pendaflor?

A 
B 
C 

D 

129 What is the value rating of the circuit breaker for the ring circuit ?
Apakah nilai rating pemutus litar kecil untuk litar gelang?

A 6 A
B 16 A
C 20 A
D 32 A

130 The purpose of insulation resistance test is to measure the cable _____

Tujuan ujian penebatan adalah untuk mengukur _____

A the resistance value of the cable
nilai rintangan kabel
B leakage current
arus kebocoran
C leakage voltage
voltan kebocoran
D to ensure insulation is good
agar kabel penebat baik

131 In a distribution board, which electrical component is used to detect over-current?
Dalam papan arus agihan, komponen elektrik yang manakah digunakan untuk mengesan masalah arus beban berlebihan?

A main isolator
B Earth leakage circuit breaker (ELCB)
C Miniature circuit breaker (MCB)
D Residual current device (RCD)

132 The following symbol represents a _____.

A consumer unit
B switch socket outlet
C lighting point
D ceiling fan

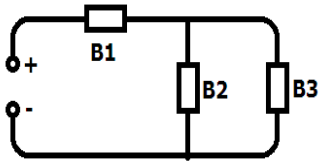
133 What is the on-site testing acceptable value for earth rod resistance?

A below one (1) ohm (<1 Ω)
B 10 ohm
C 15 ohm
D 20 ohm

134 How can we reverse the rotor direction of a three phase induction motor?

A swap any of the two phases
B decrease the winding resistance
C swap any of the three phases
D increase current

135 Three units of 1.5V battery (B1, B2 and B3) are connected as shown in diagram below. Calculate the total voltage.



A 1.5 volt
B 2.5 volt
C 3.0 volt
D 4.5 volt

136 An electric kettle rated at 2300 W, calculate the design current if the supply voltage is 235 volts.

A 9.28 A
B 9.58 A
C 9.78 A
D 9.98 A

137 What is the maximum number of power points allowable for radial circuit of 1 MCB?

A 1 point
B 2 points
C 5 points
D 10 points

138 What is the cable size used for power socket outlet?

A 1.5 mm2 PVC
B 2.5 mm2 PVC
C 4.0 mm2 PVC
D 6.0 mm2 PVC

139 What type of material is the **BEST** conductor?

A gold
B silver
C copper
D aluminum

STRUCTURE PART B & PART C

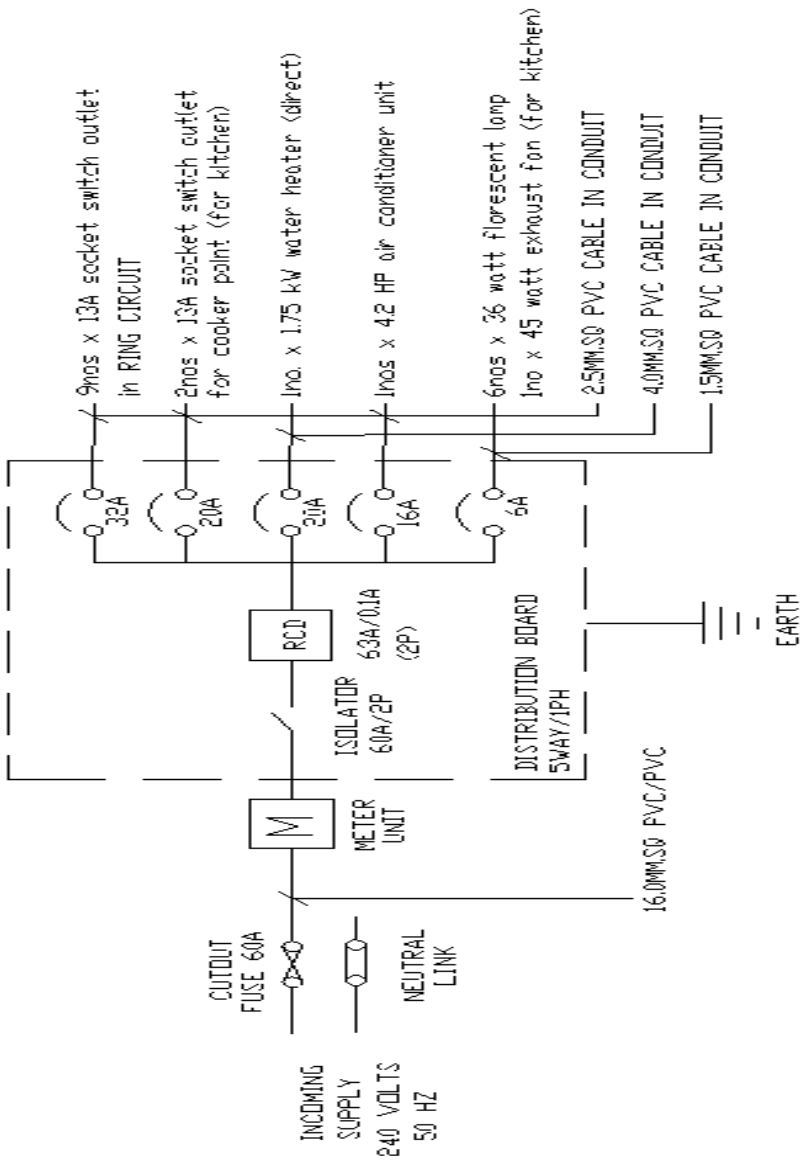
140 State **FIVE** (5) sources that can be used for generation of electricity.

Coal**,** natural gas**,** petroleum**,** geothermal, hydro

141 Refer to technical specification below, produce the full schematic diagram for a single storey house.

Supply : 240 volts AC/50Hz
Meter unit : 1 phase 60A KWH Meter
Cutout fuse rating: 60A
Isolator : 60 A / 2P
Cable size incoming: 16mm² PVC/PVC
Protection Rating: 63A / 100mA / 2P

Ground floor
- 6nos x 36 watt florescent lamp
- 9nos x 13A socket switch outlet in ring circuit
- 2nos x 13A socket switch outlet for cooker point (for kitchen)
- 1no. x 1.75 kW water heater (direct)
- 1no x 45 watt exhaust fan (for kitchen)
- 1nos x 4.2 HP air conditioner unit



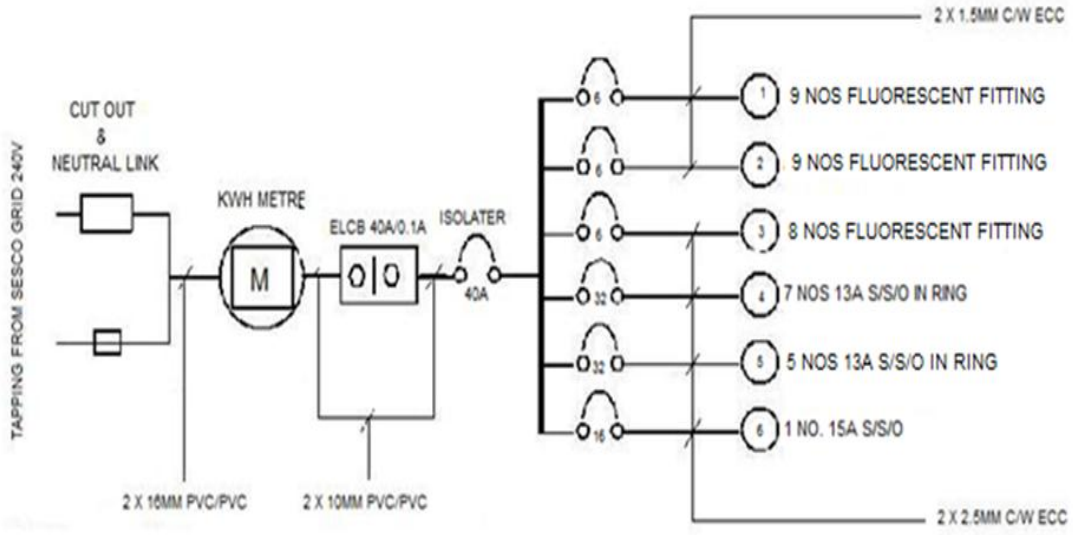
142 List two (2) advantages of Earthing an installation.

a. Provide a path for fault current to earth
Allow operation of protective system devices

143 The following electrical apparatus are installed in a house receiving a 240V supply.

i. 26 points fluorescent light
ii. 12 points 13A switch socket outlet
iii. 1 point 15A switch socket outlet

Based on local wiring standards, plan the distribution of apparatus into sub circuits. Draw the main circuit diagram from the cut out fuse until the final sub circuit.



144 List the steps to save a victim of electrical shock.

a. Call for help
b. Switch off the main switch, if found
c. If unable to find the main switch, isolate the victim using an isolating material such as a stick
d. If victim is unconscious, apply First Aid Treatment
e. Send victim to hospital for further treatment

145 Fill in the blanks using the words given below:

Miniature circuit breaker	*Live*	*Fuse*	*Earth/ earth terminal block*	*Main on/off switch*

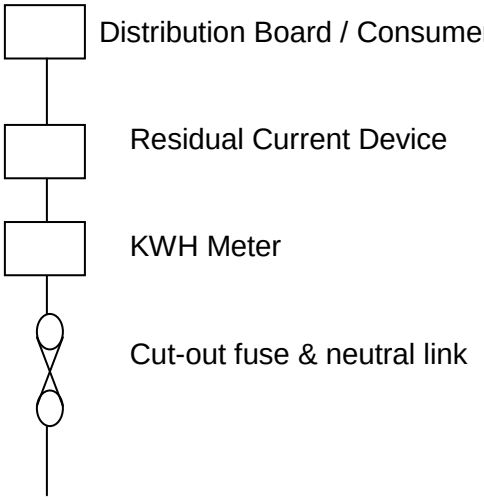
The consumer unit distributes power to the various circuits within the home. The (i) **Live** incoming cable is taken to the (ii) **Main On/Off Switch.**This supplies current to a metal bar within the box, and on this bar a protective device a (iii) **Fuse/ Miniature Circuit Breaker** or (iv) **Miniature Circuit Breaker/Fuse**. The cable's earth is connected to (v) **Earth/ Earth Terminal Block.**

146 Draw the commonly use electrical symbols for the followings:

Soalan	Simbol	Keterangan
a.		Ceilling fan point
b.		Single phase motor

c.		Exhaust fan
d.		36W flourecent tube
e.		One way switch

147 Draw a diagram which shows the sequence of control (of the incoming circuit) for a domestic installation as required by Syarikat SESCO Berhad.



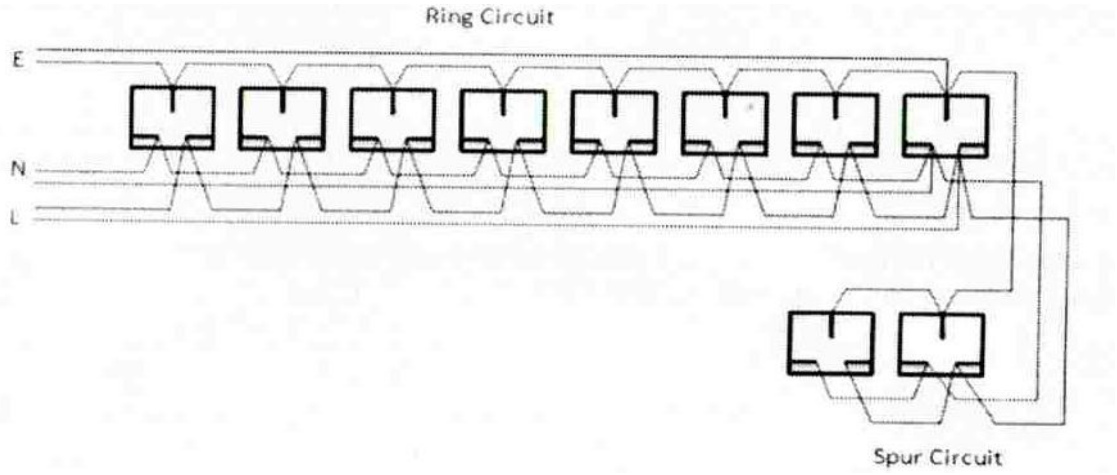
148 List five steps to save a victim of electrical shock.

a. Call for help
b. Switch off the main switch, if found
c. If unable to find the main switch, isolate the victim using an isolating material such as a stick
d. If victim is unconscious, apply First Aid Treatment
e. Send victim to hospital for further treatment

149 What is circuit breaker (CB) use for?

Circuit breaker use for protecting the wiring/cable of its circuit from excessive current due to an overload or short circuit.

150 Draw a diagram connecting 8 numbers of 13A S/S/O in ring circuit and 2 numbers of 13A S/S/O spur point.



151 List three (3) the advantages of a Miniature Circuit Breaker (MCB).

a. Shorter tripping time
b. Can be reuse
c. Easy to reset

152 List five (5) sources of electricity.

i. Hydro
ii. Solar energy
iii. Coal
iv. Nuclear reactor
v. Geothermal

153 List out **FIVE** (5) advantages of compact fluorescent lamp (CFL).

a. The life of the CFL lamp is 10000 to 12000 hours
b. Easy to fix
c. No starter required
d. Low power consumption
e. Able to fit a normal lamp holder – screw type or pin type

154 What is the main function of Transformer?

Transformer main function is to change the voltage from higher value to lower value or the other vice versa.

155 What is a circuit protective conductor (CPC) and what is its purpose?

Circuit protective conductor (CPC) is a system of conductors joining together all exposed conductive parts and connecting them to the main earthing terminal (MET).

The purpose of the circuit protective conductor is to provide a path for earth fault current so that the protective device will operate to remove dangerous potential differences.

156 Below are the lamps and ceiling fan that will be installed in a residential house. Incoming voltage is 240v.

- 6nos x 36 watt florescent lamp
- 3nos x 18 watt florescent lamp
- 1nos x 85 watt ceiling fan

a. Calculate the current demand for this residential house.

2.66A

b. Find the diversity load value.

1.7556 A

157 Fill in the table below according to the consumer installation requirement.

Circuit name	No. of point	MCB Rating	Cable size (mm^2)
a. Switch socket outlet	10	**32 A**	**2.5**
b. Air-conditioner point	1	**16 A**	**2.5**
c. Water heater point	1	**20 A**	**2.5 / 4.0**
d. Cooker point	2	**20 A**	**4.0**
e. Lighting point	10	**6A**	**1.5**

158 List three (3) types of tests to consumer installation before supply is connected.

a. **I**nsulation resistance test
b. Earth resistance test
c. Polarity test

159 List two (2) types of tests to consumer installation after supply is connected.

a. Polarity test
b. Earth fault loop impedance test

160 Calculate the current demand for the following electrical appliances plugged into a switch socket outlet. The supply voltage is 240 V / 50 Hz.

a. LED TV, 650 W = 2.7A
b. Washing machine, 1850 W = 7.7A
c. Table fan, 60 W = 0.25A
d. Desktop computer, 625 W = 2.6A
e. Refrigerator, 680 W = 2.83A
f. Hifi system, 1500 W = 6.25A

Total current demand is 22.33 A

161 Name two (2) component of an electric motor.

stator : stationary/fix winding
rotor : moving part

162 List any three (3) factors that affect the motor speed.

i. amount of current flowing through it,
ii. the number of coils on the armature,
iii. the strength of the field magnet,

163 If a 1 k Ω and a 2 k Ω resistor are parallel-connected across a 12 V supply, how much current is received by the 2 k Ω resistor?

I= V/R
Parallel voltage is the same
I_{2k} = 6mA

164 List **THREE** (3) reasons for earthing.

i. fire
ii. electric shock
iii. Unstable voltage conditions.

165 Name two (2) elements that allow a miniature circuit breaker to achieve automatic operation (disconnection).

a. magnetic element
b. thermal element

166 What are the advantages of MCBs over fuses?

i. non-destructive determination of tripping characteristic
ii. shorter tripping times
iii. immediate indication of faulty circuit

167 List out **THREE** (3) different current ratings of miniature circuit breaker (MCB) that are used in a domestic household?

i. 6A for lighting
ii. 16A for air-conditioning unit
iii. 20A for radial circuit, cooker circuit and water heater circuit

168 Name two (2) types of material used as conductor in a cable for AC supply.

Copper, aluminium

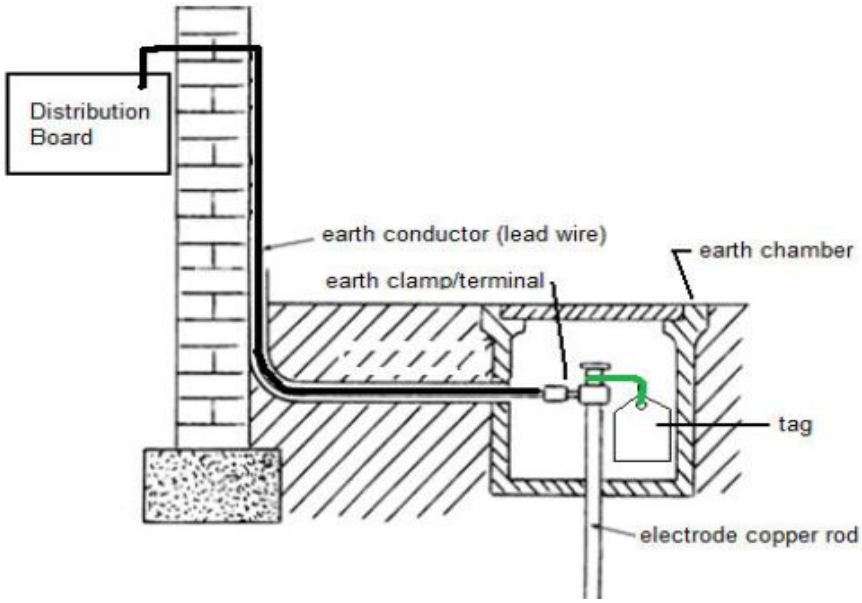
169 List down three (3) types of test for NO LIVE TEST (DEAD test).

a. continuity of protective conductor (earth)
b. polarity test
c. insulation test

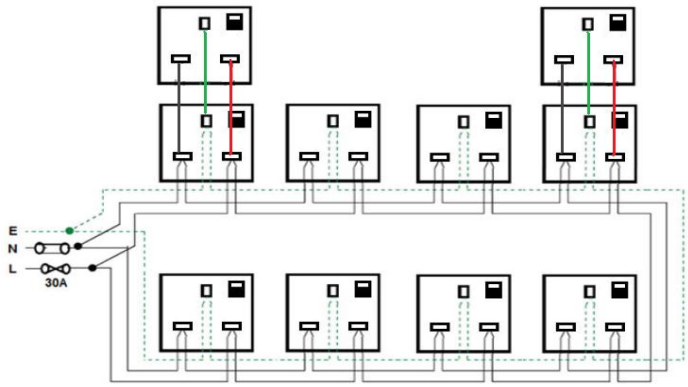
170 Name the two (2) types of LIVE test.

a. earth fault loop impedance (Zs)
b. polarity test

171 Draw the complete TT earthing system diagram for residential house.



172 Draw a complete wiring connection consist of 8 point SSO in Ring and 2 point SSO in Spur. This circuit shall be protected by a fuse breaker.



173 Electrical energy is obtained by conversion from other sources, of energy. Name any five (5) of these sources of energy.

a. Coal
b. Natural Gas,
c. Petroleum
d. Hydropower
e. Nuclear energy

174 List **FIVE** (5) electrical hazards that might cause fire.

a. Fault in electrical appliances
b. Misuse and overload a socket point
c. Poor maintenance of electrical appliances
d. In-correct wiring
e. Poor workman ship,

175 List out five (5) tests according to order before an electricity is supply to a new Installation.

a. Continuity of protective conductor test
b. Main and supplementary banding continuity test
c. Continuity if ring circuit conductor test
d. Installation resistance test
e. Site applied insulation test

176 List out five (5) advantages of Compact Fluorescent Lamp (CFL).

a. The life of the CFL lamp is 10,000 to 12,000 hours
b. Easy to fix
c. No starter required
d. Low power consumption
e. Able to fit a normal lamp holder – screw type or pin type.

177 Two resistors, R1=10Ω and R2=20Ω, are connect in series to a source of 60V. Calculate the total resistance, and, the current flow in the circuit.

$R1 = 10\Omega,\ R2 = 20\Omega$

$\text{Total resistance}:$

$R_T = R = 30\Omega$

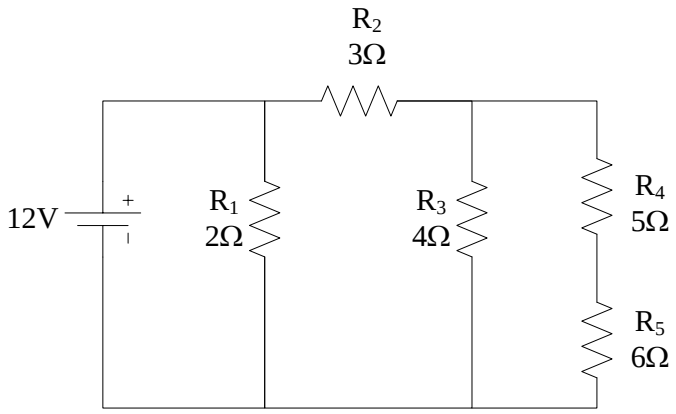
$\text{Total current in the circuit}:$

$I = 2\text{A}$

178 List out FIVE (5) main components contains in consumer unit or distribution box according to regulation?

a. Isolator
b. Protective device
c. Circuit breaker
d. Earthing terminal
e. Neutral terminal

179



Calculate the total resistance, R_T, and total current, I_T, for the above circuit.

$R_{45} = 11\Omega$

$R_{345} = 2.93\Omega$

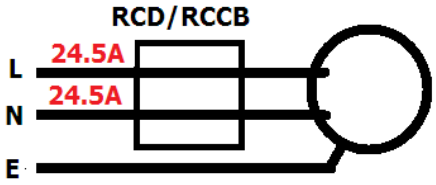
$R_{2345} = 5.93\Omega$

$R_T = 1.49\Omega \approx 1.5\Omega$

$I_T = 8\text{A}$

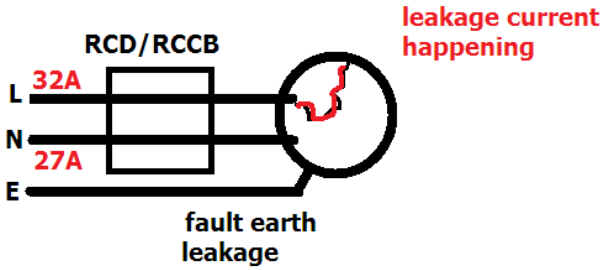
180 How does RCD able to detect fault in the circuit? Give an example describing a fault in the circuit with diagram?

Healthy condition



RCD operate normal when LIVE and NEUTRAL conductor is detecting same value. Refer example figure above, the LIVE reads 24.5 A, the neutral (current return path) shall be 24.5A.

Faulty condition



When there is leakage on earth body of equipment, the current on live side shall be higher value as given drawing above 32A.

Once the RCD detect unbalance current between LIVE and NEUTRAL conductor, it will TRIP and cut off supply.

Soalan Peperiksaan bagi Sijil Pendawai Elektrik 2

Struktur bagi kertas peperiksaan objektif:

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

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

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

Masa:3 Jam

181 Hukum Ohm menyatakan bahawa arus (I) yang mengalir melalui beban berkadar terus dengan voltan (V) yang merentasi beban dan berkadar songsang dengan _____.

A kerja
B kuasa
C tenaga
D rintangan

182 Berikan **ENAM** jenis sistem pendawaian yang digunakan di negara kita.

a. Sistem pendawaian permukaan
b. Sistem pendawaian tersembunyi
c. Sistem pendawaian kondiut
d. Sistem pendawaian sesalur
e. Sistem pendawaian salur
f. Sistem kabel penebatan mineral pelapik kuprum

183 Saiz minima kabel yang digunakan untuk membuat pendawaian litar lampu ialah _____.

A 1.5mm²
B 2.5mm²
C 4.0mm²
D 10.0mm²

184 Antara berikut ialah sebab-sebab pengujian dijalankan mengikut turutan yang betul **KECUALI**

A untuk memastikan pemasangan betul-betul selamat digunakan
B untuk mengelakkan bahaya pada orang yang menguji
C untuk mengelakkan alat penguji rosak
D untuk mengikut arahan

185 Apakah langkah pertama yang patut anda lakukan sekiranya rakan anda terkena renjatan elektrik?

A Matikan bekalan.
B Meminta bantuan.
C Memanggil ambulan.
D Memberi pertolongan pemulihan pernafasan.

186 Pemadam api jenis serbuk kering tidak sesuai digunakan untuk kebakaran yang melibatkan…….

A kayu.
B kertas.
C logam.
D elektrik.

187 Alat yang sesuai digunakan untuk memotong wayar dan meratakan hujung kabel pada suatu tamatan ialah

A pisau.
B gimlet.
C gergaji.
D pemotong sisi.

188 Arus dalam istilah elektrik bermaksud

A perbezaan keupayaan di antara dua titik dalam litar elektrik.
B daya atau tekanan yang menyebabkan cas elektrik mengalir.
C pergerakan cas elektrik yang disebabkan oleh pergerakan elektron bebas.
D pergerakanarus sebanyak 1 ampiar yang mengalir di antara dua titik yang mempunyai keupayaan 1volt.

189 Di antara berikut yang manakah aksesori pendawaian elektrik?

A Lampu
B Meter KWH
C Kipas Siling
D Suis satu hala

190 Pengalir boleh ditakrifkan sebagai _____.

A bahan yang membenarkan pengaliran elektron bebas mengalir melaluinya
B bahan yang tidak membenarkan arus mengalir jika bertentangan arah
C bahan yang tidak membenarkan arus elektrik melaluinya
D bahan yang digunakan untuk melindungi kabel

191 Apakah tujuan utama ujian dan pemeriksaan dilakukan ke atas pepasangan elektrik baru?

A Menentukan semua radas dan aksesori mengikut piawaian.
B Menentukan semua radas dan aksesori dipasang dengan betul.
C Menentukan bekalan dapat disambung untuk mendapatkan bayaran oleh pihak pembekal.
D Menentukan semua radas, aksesori dan pendawaian berfungsi dengan betul dan selamat sebelum bekalan disambungkan.

192 Simbol pelan pendawaian mentafsirkan tentang?

I kedudukan pemasangan peralatan.
II jumlah litar dan poin pemasangan.
III jenis peranti dan aksesori pendawaian.
IV sambungan dan tamatan punca aksesori.

A I, II dan III
B I, II dan IV
C II dan III
D III dan IV

193 Litar pintas boleh berlaku apabila _____.

A pengalir neutral tidak dipasang kepada bekalan.
B pengalir hidup bersentuhan dengan sesalur PVC.
C pengalir bumi bersentuhan dengan pembuluh PVC.
D pengalir hidup bersentuh dengan pengalir neutral tanpa beban.

194 Jumlah susutan voltan (vd) maksima yang dibenarkan bagi pemasangan bekalan fasa tunggal (240V) ialah

A tidak melebihi 9.5 volt.
B tidak melebihi 9.6 volt.
C tidak melebihi 16.6 volt.
D tidak melebihi 116.6 volt.

195 Berikan lima (5) jenis turutan ujian yang perlu dilakukan ke atas sesuatu pepasangan sebelum bekalan elektrik dimasukkan.

a. Ujian keterusanpengalir pelindung
b. Ujian keterusan pengalir litar akhir gelang
c. Ujian penebatan
d. Ujian kekutuban
e. Ujian rintangan elektrod bumi

196 Alat untuk mengukur beza upaya atau daya gerak elektrik (d.g.e) ialah

A volt meter.
B amp meter.
C watt meter.
D ohm meter.

197 Berikut adalah kemalangan yang disebabkan oleh elektrik, **KECUALI**

A renjatan elektrik
B pendawaian
C kebakaran
D melecur

198 Pilih jawapan yang **BETUL** bagi faktor kepelbagian lampu pada pepasangan rumah kediaman.

A 66% daripada jumlah permintaan arus
B 90% daripada jumlah permintaan arus
C 75% daripada jumlah permintaan arus
D 100% daripada jumlah permintaan arus

199 Satu litar yang bermula dan berakhir ditempat sama ialah…..

A litar akhir jejari
B litar akhir gelang
C litar alat pemasak
D litar lampu kalimantang

200 Manakah faktor-faktor berikut yang perlu dalam menentukan jenis sistem pendawaian?

I Kos pemasangan.
II Jenis bangunan dan keselamatan.
III Suhu persekitaran (suhu ambien).
IV Rekabentuk dan keluasan bangunan.

A I, II dan III
B I, II dan IV
C II, III dan IV
D I, III dan IV

201

Rajah 1

Rajah 6 di atas, menunjukkan salah satu aksesori yang digunakan di dalam pendawaian pembuluh GI. Namakan aksesori tersebut.

A Sesendal betina *(Female Bush)*
B Sesendal jantan *(Male Bush)*
C Nat pengunci *(Lock Nut)*
D Pengganding *(Coupler)*

202 Berdasarkan kenyataan di bawah, kerosakan tersebut ditakrif sebagai?

> Kerosakan ini lazimnya terjadi apabila punca fasa dan neutral bersentuh di antara satu dengan lain. Apabila ia berlaku, akan menyebabkan peranti pelindung terpelantik dan memutuskan bekalan elektrik. Jika peranti pelindung tidak berfungsi ia boleh menyebabkan kabel menjadi panas dan boleh menyebabkan kerosakan penebat dan boleh berlaku kebakaran.

A kerosakan bumi.
B kerosakan litar pintas.
C kerosakan arus bocor.
D kerosakan litar terbuka.

203 Berapakah nilai rintangan ujian penebatan yang dibenarkan untuk sesebuah pepasangan satu fasa?

A Tidak kurang dari 1 ohm.
B Tidak kurang dari 1 megaohm.
C Tidak kurang dari 1.5 megaohm.
D Tidak kurang dari 1.6 megaohm.

204 Kesesuaian jarak klip adalah penting semasa pemasangan kabel pendawaian permukaan supaya

A pendawaian kelihatan kemas.
B kabel disokong dengan sempurna.
C mudah membuat sudut dan bengkokan kabel.
D mudah membuat penambahan dan pengubahsuaian.

205 Kabel yang disambung dari peranti pelindungan MCB ke tamatan suis satu hala dinamakan?

A pengalir suis.
B pengalir hidup.
C pengalir neutral.
D pengalir pelindung.

206 Berikut adalah peraturan mengenai pemasangan lampu neon **KECUALI**.

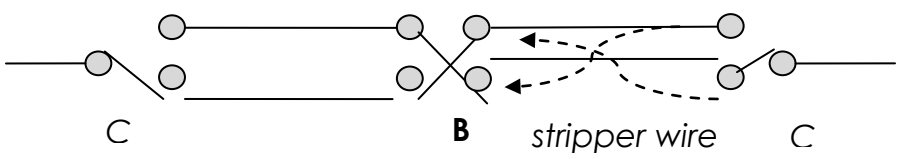
A kabel voltan tinggi berperisai digunakan.
B suis pengasing mesti dari jenis satu kutub.
C belitan skunder pengubah mesti dibumikan.
D perlu papan tanda BAHAYA VOLTAN TINGGI.

207 Sistem keselamatan kebakaran terbahagi kepada dua (2) kategori iaitu _____ dan _____.

I perlindungan
II pemuliharaan
III pencegahan
IV pembaikan

A I dan IV sahaja
B II dan III sahaja
C I dan III sahaja
D IIII dan IV sahaja

208 Berpandukan Rajah 1 pemasangan suis pertengahan di bawah, apakah yang berlaku sekiranya *stripper wire* pada terminal A ditukar ke terminal B dan terminal B ditukar ke terminal A?



Rajah 1

A Lampu tidak boleh menyala.
B Lampu akan sentiasa menyala.

C Tidak menjejaskan kefungsian litar.
D Sambungan menjadi siri dan lampu malap.

209 Berapakah bilangan maksimum soket alir keluar 13 ampiar yang disambung secara litar gelang yang dibenarkan dalam suatu keluasan bilik 100 meter persegi?

A Satu.
B Dua.
C Tiga.
D Tiada Had.

210 Bilangan kabel yang dipasang dalam sesuatu konduit hendaklah mengikut faktor ruang iaitu tidak melebihi

A 40%
B 44%
C 45%
D 48%

211 Senarai di bawah adalah jenis-jenis lampu nyahcas **KECUALI**.

A Lampu pijar
B Lampu neon
C Lampu kalimantang
D Lampu wap sodium

212 Satu kuasa kuda bersamaan berapa kilowatt?

A 746 kilowatt.
B 74.6 kilowatt.
C 7.46 kilowatt.
D 0.746 kilowatt.

213 Penghidup yang sesuai bagi motor berkuasa 1.5 kuasa kuda.

A Star Delta Starter.
B Direct On Line Starter.
C Rotor Resistance Starter.
D Auto Transformer Starter.

214 Berapakah kuasa minima motor elektrik yang memerlukan kawalan penghidup?

A 0.25 kilowatt.
B 0.37 kilowatt.
C 0.75 kilowatt.
D 0.85 kilowatt.

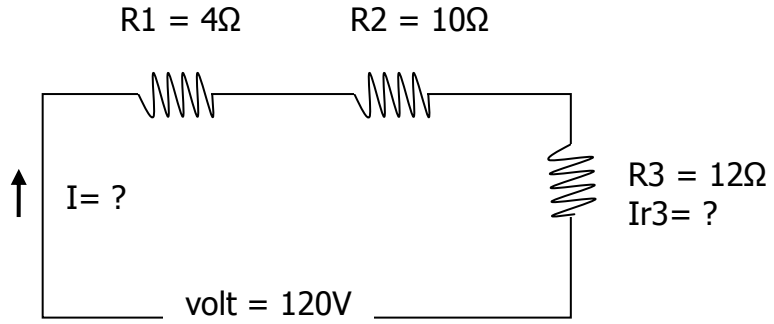
215 Setiap pendawaian industri hendaklah mempunyai perlindungan yang terdiri daripada

I pengasing.
II perlindungan lebihan arus.

III perlindungan arus bocor ke bumi.
IV perlindungan kerosakan mekanikal.

A I, II dan III.
B I, II dan IV.
C II, III dan IV.
D I, II, III dan IV.

216 Merujuk Rajah 1 di bawah, kirakan jumlah rintangan litar.



Rajah 1

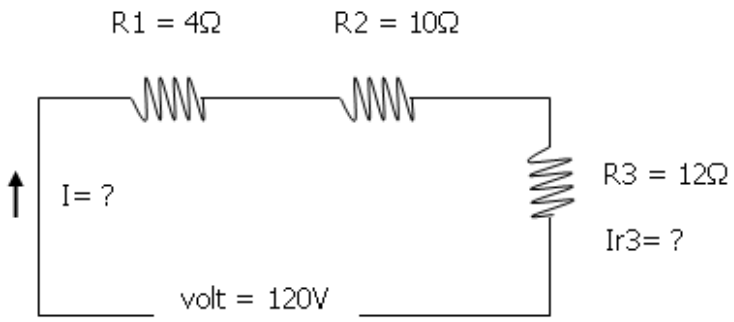
A 25Ω.
B 26Ω.
C 26.5Ω.
D 27.5Ω.

217 Di antara berikut, yang manakah merupakan peraturan umum mengenai Litar Soket Alir Keluar bagi Litar Jejari?

I Jumlah bilangan soket yang boleh dipasang adalah tidak terhad.
II Litar ini mestilah dilindungi oleh alat perlindungan samada fius atau MCB.
III Bilangan soket alir keluar bergantung pada keluasan lantai bilik, saiz pengalir dan kadaran perlindungan.
IV Kabel yang digunakan digunakan ialah kabel jenis tembaga bersalut PVC dan saiz kabel mestilah tidak kurang dari 2.5mm².

A I,II & III sahaja
B I, III & IV sahaja
C II, III & IV sahaja
D I, II & IV sahaja

218 Merujuk Rajah di bawah, berapakah jumlah arus dalam R3?



Rajah 1

A 2.62 ampiar.
B 3.62 ampiar.
C 4.62 ampiar.
D 5.62 ampiar.

219 Apakah fungsi bagi arah jari telunjuk dalam hukum tangan kiri Fleming?

A Arus.
B Daya elektrik.
C Medan magnet.
D Daa gerak elektrik balik.

220 Berdasarkan penyataan di bawah, yang manakah merupakan peraturan bagi soket alir keluar?

A Punca bumi soket alir keluar mestilah disambung ke pengalir keterusan bumi litar kecil akhir.
B Soket alir keluar boleh disambung di dalam bilik mandi tanpa mengira kedudukannya.
C Soket alir keluar hanya digunakan pada voltan bekalan lebih daripada 250 Volt sahaja.
D Bilangan soket alir keluar untuk litar jejari yang boleh disambung adalah 3 poin sahaja.

221 Apakah yang dimaksudkan dengan kadar voltan 600/1000 volt untuk kabel pendawaian voltan rendah?

A Mana-mana fasa dan bumi tidak melebihi 1000 volt.
B Mana-mana fasa dan bumi tidak melebihi 1000 volt dan voltan di antara fasa tidak melebihi 600 volt.
C Fasa merah dan bumi tidak melebihi 600 volt dan voltan diantara fasa merah dan fasa biru tidak melebihi 1000 volt.
D Mana-mana fasa dan bumi tidak melebihi 600 volt dan voltan diantara fasa tidak melebihi 1000 volt.

222 Bagi perkakas pemasak untuk pemasangan rumah persendirian, faktor kepelbagaiannya ialah

A 10A pertama + 30A selebihnya + 5A jika disertakan soket alir keluar.
B 10A pertama + 30%A selebihnya + 5A jika disertakan soket alir keluar.
C 10A pertama + 30A selebihnya + 13A jika disertakan soket alir keluar.
D 10A pertama + 30% A selebihnya + 13A jika disertakan soket alir keluar.

223 Alat untuk mengukur beza upaya atau daya gerak elektrik (d.g.e) ialah

A volt meter.
B amp meter.
C watt meter.
D ohmmeter.

224 Suatu notis standard yang mempamerkan perkataan …… hendaklah diletakkan di luar tiap-tiap tempat yang mengandungi radas elektrik di mana gangguan tidak dibenarkan pada radas itu.

A "AWAS"
B "BAHAYA"
C "DILARANG MASUK"
D "ORANG SEDANG BEKERJA"

225 Pemilihan kuprum sebagai pengalir kabel adalah kerana mempunyai ciri-ciri berikut.

I ringan.
II kerintangan rendah.
III mudah dibentuk menjadi pengalir.
IV mudah disadur bagi tujuan pemetrian.

A I, II dan IV
B I, III dan IV
C II, III dan IV
D I, II , III dan IV

226 Seseorang yang memegang Perakuan Kekompetenan sebagai Pendawai tidak boleh membuat apa-apa kerja, tindakan atau perkara-perkara di bawah Peraturan-Peraturan Elektrik 1994 jika dia berumur melebihi?

A 55 tahun.
B 60 tahun.
C 65 tahun.
D 70 tahun.

227 Sel (bateri) yang biasa digunakan terbahagi kepada **DUA (2)** jenis iaitu Sel Primer dan Sel Sekunder. Apakah yang dimaksudkan dengan Sel Primer?

A Sel Kering yang boleh menyimpan voltan.
B Sel Kimia yang boleh dicaskan semula setelah kehabisan cas.
C Sel yang boleh dipakai untuk berulang kali dan menyimpan arus elektrik.
D Sel Kimia yang tidak boleh dicaskan semula apabila telah kehabisan cas.

228 Penjanaan tenaga elektrik boleh dilakukan dengan menggunakan kaedah berikut **KECUALI**

A hidro
B terma
C nuklear
D **resapan**

229

Kedudukan jarum penunjuk pada multimeter (Ohm)	**Jenis kerosakan pada perintang**
0 (sifar)	

Jadual 1

Berdasarkan Jadual 1, nyatakan jenis kerosakan perintang.

A **Terpintas**
B Terbuka
C Terputus
D Terpatah

230 Apakah sifat arus kapasitor dalam sistem arus ulangalik?

A Mengekor voltan
B **Mendahului voltan**
C Sefasa dengan voltan
D Sama ada mendahului atau mengekor voltan

231 Pilih peralatan pengukuran yang digunakan untuk menyukat *ground loop current.*

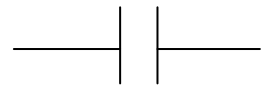
A Jangka lux
B Jangka hidrovolt
C Jangka bumi (earth tester meter)
D **Alat uji galangan gelung bumi (earth loop tester)**

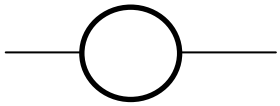
232 Berapakah kadar arus minimum bagi seseorang itu terkena renjatan elektrik yang boleh membawa maut?

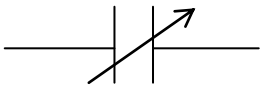
A 5 ampiar dan 240 volt a.u.
B 50 ampiar dan 415 volt au.
C **50 miliampiar dan 60 volt au.**
D 60 miliampiar dan 70 volt au.

233 Rajah di bawah menunjukkan simbol-simbol yang digunakan dalam litar elektrik, di antara yang berikut, yang manakah menunjukkan simbol bagi pemuat?

A

B 

C 

D 

234 Suatu beban berkadar 4.0 kW, 230V menggunakan kabel 4.0mm² bertebatkan p.v.c. yang mempunyai susut volt 11mV / amp / meter. Jarak beban daripada papan agihan ialah 50 meter. Berapakah kadar susutan voltan kabel?

A 2.55 V
B 5.55 V
C 9.17 V
D 9.57 V

235 Kenal pasti litar yang sesuai mengguna saiz kabel 2.5 mm^2 dengan kadaran fius 20 Amp.

A Litar lampu
B Litar loceng
C Litar jejari soket alir keluar
D Litar gelang soket alir keluar

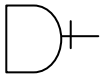
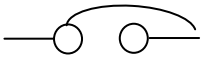
236 Pilih kenyataan yang **BETUL**mengenai ujian kekutuban bagi pepasangan mengikut peraturan elektrik.

I Memastikan semua pengalir hidup disambungkan kepada alat kawalan
II Memastikan pengalir neutral disambungkan pada punca sepunya (common) suis lampu
III Memastikan pengalir hidup disambungkan pada bahagian tamatan tengah pemegang lampu Edison
IV Memastikan pengalir hidup, neutral dan bumi disambungkan pada tamatan yang betul di soket keluaran

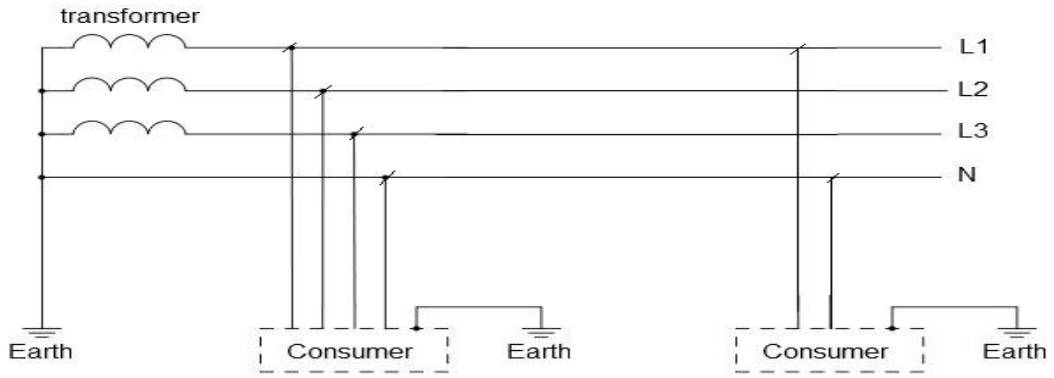
A I, II , III
B I, III , IV
C II, III , IV
D I, II, III , IV

SOALAN SUBJEKTIF BAHAGIAN B & C

237 Lukiskan simbol yang betul berdasarkan pada keterangan yang diberi.

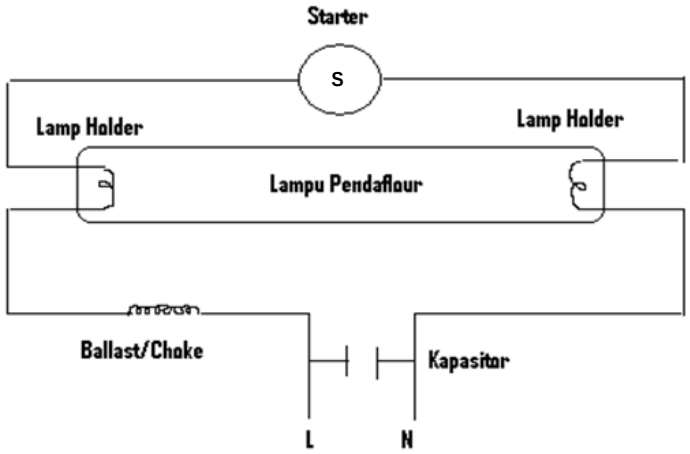
Bil	Simbol	Keterangan
1		Soket Alir Keluar 13A
2		Pemutus Litar Bocor Bumi (ELCB)
3		Pemutus Litar Miniatur (MCB)
4		Poin Kipas Siling
5		Suis Dua Hala

238 Sistem pembumian TT merupakan sistem yang banyak digunakan di Malaysia. Huraikan dengan bantuan gambarajah bagi sistem tersebut.

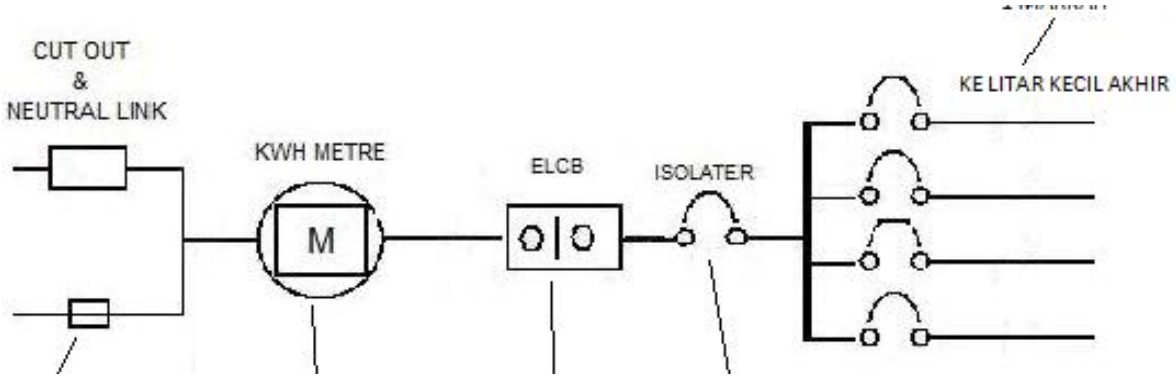


Pembumian diantara pihak pembekal dan pengguna diasingkan. Pembumian bagi pepasangan pengguna disambung terus ke bumI melalui elektrod bumI. Kebiasaanya sistem ini digunakan pada talian rentang atas.

239 Lukiskan gambarajah sebuah lampu kalimantang (1 X 36 Watt) serta namakan komponen-komponennya.



240 Lukiskan gambarajah skematik bagi kawalan turutan pengguna dan labelkan bahagian-bahagiannya.



241 Dalam sistem bekalan, pihak pembekal menggunakan sistem gelang dan sistem jejari bagi tujuan penghantaran. Senaraikan satu (1) kebaikan dan satu (1) kelemahan kedua-dua sistem tersebut.

<u>Sistem gelang</u>

Kebaikan:
- Apabila salah satu daripada pengubah rosak, pengubah lain masih lagi berfungsi. Pengubah yang rosak boleh dibaiki tanpa menganggu pengubah yang lain.
- Sistem ini juga dapat menampung beban pengguna yang banyak walaupun saiz kabelnya kecil.

Keburukan:
- Kawasan pengubah yang rosak tidak akan mendapat bekalan elektrik

<u>Sistem jejari</u>

Kebaikan:
- Sistem yang termurah

Keburukan:

- Apabila salah satu daripada pengubah rosak, pengubah-pengubah lain tidak dapat berfungsi
- Saiz kabel yang digunakan lebih besar dibanding dengan penggunaan sistem gelang

242 *Pemutus litar arus baki (RCCB) terpelantik apabila suis lampu dihidupkan'.* Sebagai seorang pendawai, nyatakan sebab pemutus litar tersebut terpelantik dan tindakan anda untuk membaiki kerosakan ini.

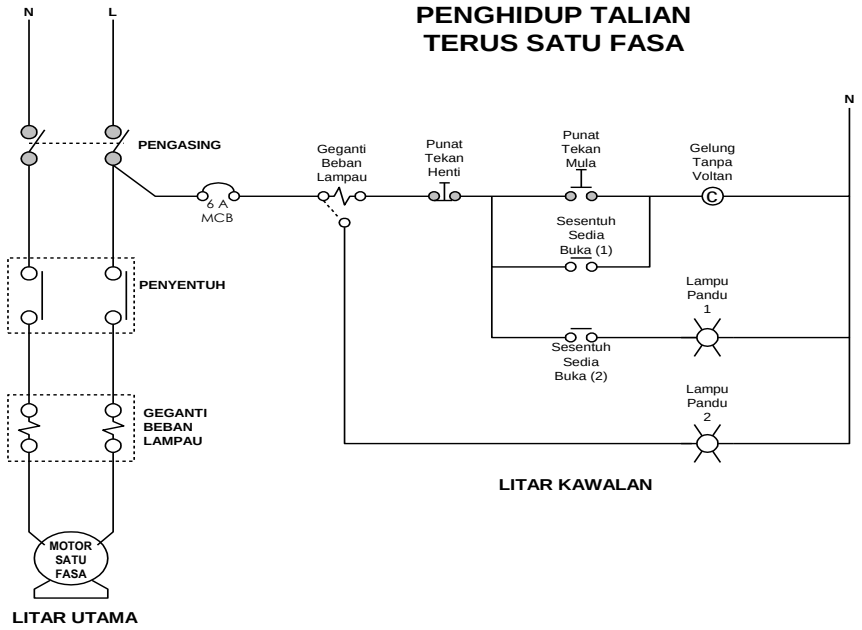
RCCB terpelantik apabila suis lampu dihidupkan adalah disebabkan:

a. pengalir hidup tersentuh dengan pengalir bumi atau,
b. pengalir neutral tersentuh dengan pengalir bumi

Tindakan:

a. Asingkan bekalan.
b. Kenalpasti kedudukan lampu-lampu yang dikawal oleh suis tersebut dan buat pemeriksaan di setiap lampu tersebut.
c. Sekiranya terdapat sentuhan, asingkan sentuhan tersebut dan buat apa-apa cara supaya sentuhan itu tidak berulang.
d. Laksanakan pengujian sebelum bekalan disambung semula.

243 Lukiskan dan labelkan litar utama dan litar kawalan bagi Penghidup talian terus (*direct on-line starter*) Motor 1 Fasa.



244 Terangkan secara ringkas operasi kendalian bagi Penghidup talian terus (*direct on-line starter*).

a. Apabila Punat Tekan Hidup ditekan, arus akan melalui Gelung Tanpa Voltan C1.
b. Gelung Tanpa Voltan C1 akan menghasilkan elektromegnet seterusnya menarik Sesentuh Sedia Buka 1 dan Sesentuh Sedia Buka 2.
c. Sesentuh Sedia Buka 1 bertindak sebagai Sesentuh Pemegang dalam litar kawalan
d. Pada ketika ini motor akan menerima arus melalui Litar Utama dan menggerakkan

motor dalam keadaan mara dan lampu pandu 1 akan menyala.

e. Apabila Punat Tekan Henti ditekan, Gelong Tanpa Voltan akan hilang keelektromagnetannya dan semua sesentuh akan kembali pada kedudukan asal. Motor akan terhenti.
f. Sekiranya berlaku lebihan beban, Geganti Beban Lampau akan terpelantik dan memutuskan litar, Lampu Pandu 2 menyala dan motor akan berhenti

245 Sebuah motor yang melebihi 0.5 hp atau 0.37KW mestilah mengadakan kawalan keselamatan. Nyatakan tiga (3) ciri-ciri perlindungan bagi kawalan tersebut.

a. Menghidup dan memberhenti motor- (start / stop button)
b. Memutuskanbekalanbilaberlakubebanlampau-(Overload relay)
c. Mengelak motor daripada hidup kembali secara automatic setelah menerima bekalan jika berlakunya kegagalan bekalan-(No volt coil)

246 Nyatakan lima (5) langkah utama jika anda berdepan dengan mangsa renjatan elektrik.

1. Putuskan punca bekalan dengan mematikan suis utama dan sekirany apunca bekalan terlalu jauh untuk dimatikan, gunakan penebat seperti kayu untuk memisahkan mangsa dari punca bekalan.
2. Letakan mangsa renjatan di tempat yang mempunyai peredaran udara yang baik dan selamat.
3. Longgarkan pakaian seperti talileher, butang baju serta tanggalkan benda-benda yang boleh menyekat proses pemulihan seperti gigi palsu (jikaada).
4. Berikan bantuan kecemasan awal seperti CPR kepada mangsa.
5. seterusnya minta bantuan dan buat panggilan kecemasan untuk mangsa dibawa ke hospital untuk rawatan lanjut.

247 Nyatakan saiz MCB dan saiz kabel yang sesuai digunakan bagi litar akhir kecil di bawah.

a. Litar Pencahayaan;
   MCB ialah 6A dan saiz kabel ialah 1.5mm.
b. Litar kuasa (13A Soket Alr Keluar dalam litar gelang.
   MCB – 32A dan saiz 2.5mm.

248 Pengalir adalah bahagian kabel yang fungsinya untuk mengalirkan arus elektrik. Nyatakan **TIGA (3)** perbezaan di antara pengalir kuprum dan aluminium.

<u>Pengalir aluminium</u>

a. Saiz kabel bermula 10mm keatas
b. Digunakan untuk talian atas
c. mudah patah jika dibentuk

<u>Pengalir kuprum</u>

a. saiz kabel bermula 1mm ke atas
b. Digunakan selain dari talian atas
c. mudah dibentuk

249 Apakah tujuan dilakukan ujian penebatan?

Tujuan ujian penebatan dilakukan adalah untuk memastikan tidak ada sentuhan langsung

diantara pengalir hidup dengan neutral mahupun dengan pengalir bumi dan sebaliknya. Ia juga disebut sebagai litar pintas tanpa beban diantara pengalir hidup dan pengalir neutral.

250 Berikan **DUA** kebaikan dan **DUA** kelemahan fius boleh dawai semula.

Kebaikan

a. Dawai elemen fiusnya paling murah jika dibandingkan dengan alat perlindungan lain
b. Senang ditukar ganti.

Kelemahan

a. Menghasilkan arka dan mengeluarkan bunyi yang kuat
b. Mungkin diganti dengan saiz elemen fius yang salah
c. Kapasiti pemutusan fius rendah

251 Namakan lima (5) jenis elektrod bumi yang digunakan dalam sistem pembumian.

a. Rod Kuprum (copper rod).
b. Paip Galvani (G.I paip).
c. Plat Galvani.
d. Jalur pita.
e. Struktur Keluli atau logam yang sedia ada ditanam didalam tanah.

252 Nyatakan lima (5) kaedah untuk mengurangkan bacaan rintangan elektrod bumi sekiranya bacaannya mencatat nilai yang tinggi.

a. Menambah panjang elektrod
b. Menambah elektrod secara selari
c. Menaburkan serbuk besi disekeliling elektrod bumi
d. Menabur arang batu disekeliling elektrod bumi
e. Menanam elektrod pada kawasan yang lebih lembab