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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022**

COURSE NAME : ELECTRICAL SYSTEM MEASUREMENT
AND TESTING
COURSE CODE : BBJ 10305
PROGRAMME CODE : BBJ
EXAMINATION DATE : JANUARY / FEBRUARY 2022
DURATION : 2 HOURS
INSTRUCTION : 1. ANSWERS ALL QUESTIONS.
2. THIS FINAL EXAMINATION IS A
**ONLINE ASSESSMENT AND
CONDUCTED VIA CLOSE BOOK.**

THIS EXAMINATION PAPER CONSIST OF SEVEN (7) PAGES

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SECTION A

- Q1** The measurement unit for current is _____.
- A. Volt
 - B. Watt
 - C. Ampere
 - D. Coulomb
- Q2** What is the voltage and frequency of a single phase electrical system in Malaysia refer to ST 2015 book?
- A. 240 V / 50 Hz
 - B. 240 V / 60 Hz
 - C. 230 V / 50 Hz
 - D. 230 V / 60 Hz
- Q3** An ammeter is to be connected _____ to measure current.
- A. next to the supply
 - B. opposite the supply
 - C. in series in the circuit
 - D. in parallel with the circuit
- Q4** 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
- Q5** Earth electrode resistance is _____.
- A. $1M\Omega$
 - 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
- Q6** What is the formula of total resistance for parallel circuit connection?
- A. $R_T = R_1 + R_2 + R_3$
 - C. $R_T = (R_1 + R_2)^2 \times R_3$
 - D. $1/R_T = R_1 + 1/R_2 + 1/R_3$
 - B. $1/R_T = 1/R_1 + 1/R_2 + 1/R_3$

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- Q7** Which of the following is correct for single phase electrical system?
- A. Live & Earth
 - B. Live & Neutral
 - C. Neutral & Earth
 - D. Live, Neutral & Earth
- Q8** 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%
- Q9** 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
- Q10** For a single phase system, how many poles are there in an ELCB?
- A. 1
 - B. 2
 - C. 3
 - D. 4
- Q11** Which of the following instrument is use to do continuity test?
- A. Ammeter
 - B. Voltmeter
 - C. Multi meter
 - D. Clamp on meter
- Q12** Electric power is measure in unit of _____.
- A. watt
 - B. ohm
 - C. power
 - D. ampere

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- Q13** Calculate the total resistance of two resistors connected in parallel with value of $R_1 = 65 \Omega$ and $R_2 = 80 \Omega$.
- A. 35Ω
 - B. 145Ω
 - C. 0.028Ω
 - D. 35.86Ω
- Q14** The value 300 mili ampere can be rewritten as _____.
- A. 3 Ma
 - B. 0.03 A
 - C. 30×10^{-3} A
 - D. 300×10^{-3} A
- Q15** Given the voltage is 120 volt, the total resistance is 2700Ω , find the total current in the circuit.
- A. 44 A
 - B. 0.044 A
 - C. 0.0044 A
 - D. 44×10^{-6} A
- Q16** What is the acceptable value for earth resistance?
- A. 10 ohm
 - B. 15 ohm
 - C. below 1 ohm ($<1 \Omega$)
 - D. less than 100 ohm ($<100 \Omega$)
- Q17** 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
- Q18** The followings are insulation method as protection in electrical system, except.
- A. Gas type insulation
 - B. Oil type insulation
 - C. Glass type insulation
 - D. Ceramic type insulation

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Q19 What method can be used to protect the underground cable from mechanical damage?

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

Q20 When a live cable gets into contact with metalwork, it is referred as _____.

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

Q21 Which of the following mathematical function is used to find power factor?

- A. sin
- B. cos
- C. tan
- D. log

Q22 Refer **Figure Q22**, what is the wiring method describe.

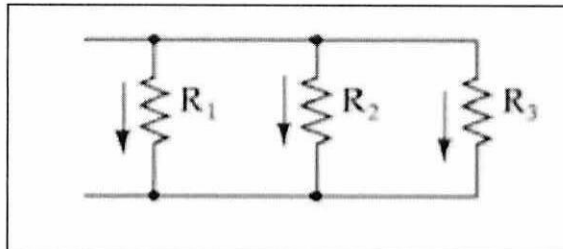


Figure Q22

- A. series circuit
- B. power circuit
- C. parallel circuit
- D. series-parallel circuit

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Q23 Refe **Figure Q23**, label A is _____.

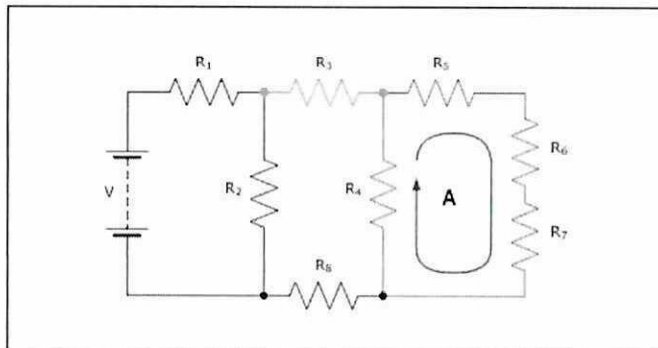


Figure Q23

- A. node
 B. mesh
 C. branch
 D. junction
- Q24 Which of the main switchboard installations requirement listed below is false?
- A. Meter panel shall be sealable from the outside
 B. Size of the panel shall be 500 x 600 x 270 mm (H X W X D)
 C. Panel shall be made of mild steel of minimum 1.5mm thickness
 D. Separate energy meter panel is required to be installed outside the MSB
- Q25 Which of the following test is to be carried out after temporary supply is connected during testing of an electrical installation?
- A. Polarity
 B. Insulation resistance
 C. Earth electrode resistance
 D. Continuity of ring final circuit conductors

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SECTION B

- Q26** (a) Give the difference between dead testing and live testing while performing leakage current test. (5 marks)
- (b) State the five (5) objectives of measuring earth resistance for electrical grounding systems. (5 marks)
- (c) Explain how to carry out the insulation testing for three phase electrical installation with the help of suitable diagram. (15 marks)
- Q27** (a) What are the advantages of using voltmeter is directly connect across the resistor only compared to voltmeter is connected directly connect across the ammeter and resistor in ammeter-voltmeter method? (5 marks)
- (b) The ammeter-voltmeter method is used to measure the of an aircraft instrument resistance. With the voltmeter connected across the resistance, the readings on the ammeter and voltmeter are 0.4 A and 3.2 V respectively. The resistance of the voltmeter is 500 W.
- (i) Draw the circuit connection.
- (ii) Calculate the true value of resistance.
- (iii) Calculate percentage error in the value of resistance, if the voltmeter current is ignored. (10 marks)
- (c) The Wheatstone bridge is a circuit used to compare an unknown resistance with a known resistance. In **Figure Q2(c)** shows constructed unbalanced Wheatstone Bridge. Calculate the output voltage across points C and D and the value of resistor R_4 required to balance the bridge circuit. (10 marks)

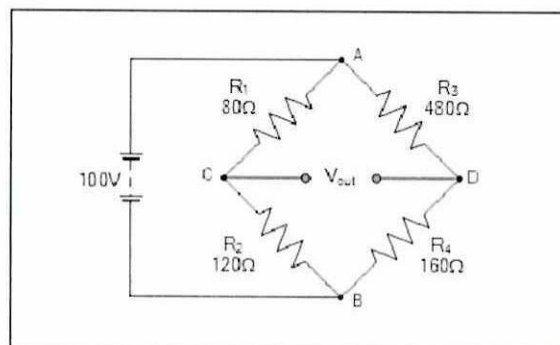


Figure Q2(c)

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- END OF QUESTIONS -