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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2018/2019**

COURSE NAME : ELECTRICAL TECHNOLOGY  
PRINCIPAL

COURSE CODE : BBV 10503

PROGRAMME : BBV

EXAMINATION DATE : DECEMBER 2018 /JANUARY 2019

DURATION : 3 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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- Q1** A series of RLC circuit consisting of a resistance of  $20 \Omega$ , an inductance of  $0.2 H$ , and a capacitance of  $150 \mu F$  is connected across  $400 V$ ,  $50 Hz$  source.
- (a) Draw the RLC circuit and label it completely. (3 marks)
- (b) Then, calculate
- (i) the impedance
  - (ii) the current
  - (iii) the voltage drops  $V_R$ ,  $V_L$  and  $V_C$
  - (iv) the power factor
  - (v) the average power
- (10 marks)
- (c) Thus, illustrate the current  $V_R$ ,  $V_L$  and  $V_C$  in a phasor diagram (7 marks)
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- Q2** A parallel circuit has two branches. Branch I consist of a capacitor of  $80 F$  capacity. Branch II consists of a resistance of  $25 \Omega$  in series with an inductance of  $0.15 H$ . A voltage of  $230 V$ ,  $50 Hz$  is applied across the circuit. Calculate
- (a) the circuit current (6 marks)
- (b) the power factor of the circuit (7 marks)
- (c) the average true power (7 marks)

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**Q3** An inductance coil having a resistance of  $20 \Omega$  and an inductance of  $200 H$  is connected in parallel with a variable capacitor. This parallel combination is connected in series with a resistance of  $8000 \Omega$ . A voltage of  $230 V$ , at a frequency of  $10^6 Hz$  is applied across the circuit. Calculate

- (a) the value of capacitance at resonance (5 marks)
- (b) the Q-factor of the circuit (5 marks)
- (c) the dynamic impedance of the circuit (5 marks)
- (d) the total circuit currents (5 marks)

**Q4** A  $100 kVA$  single-phase transformer has a maximum efficiency of  $98\%$  at a power of  $0.80$  lagging. The daily load cycle of the transformer is as follows:

$20 kW$  load at  $0.5$  (lag) power factor for 12 hours  
 $80 kW$  load at  $0.8$  (lag) power factor for 6 hours  
 $100 kW$  load at  $0.9$  (lag) power factor for 6 hours

Calculate the all-day efficiency of the transformer (20 marks)

**Q5** A balanced 3-phase load consists of three coils, each of resistance  $4 \Omega$  and inductance  $0.002 H$ . Determine the total power when the coils are

- (a) star connected to a  $400 V$ , 3-phase,  $50 Hz$  supply (10 marks)
- (b) delta connected to a  $400 V$ , 3-phase,  $50 Hz$  supply (10 marks)

- END OF QUESTIONS -

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