



MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR EXAMINATION FOR DIPLOMA IN ELECTRICAL AND
ELECTRONICS ENGINEERING

SUPPLEMENTARY EXAMINATION

EED 211: ELECTRICAL PRINCIPLES IV

DATE:

TIME: 2 HRS

INSTRUCTIONS

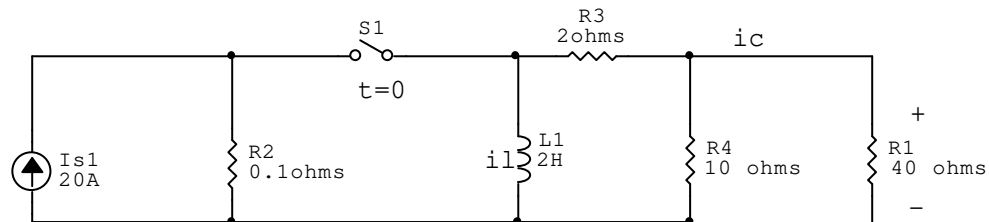
Instructions: answer question one and any other two questions

QUESTION ONE (COMPULSORY)

- (a) State four types of transients (4 marks)
- b) A series circuit consisting of a resistance of 100 ohms and inductance of 4H is connected in to a 10 V battery. calculate (i) instantaneous value of current at 2 millisecond
- (ii) time constant
- (iii) find the voltage across the inductance at time $t = \tau$ and $t = 5\tau$ (15 marks)
- (c) Define time constant (1 mark)
- (d) the resistance of 2000Ω is connected in series with a $2\mu\text{F}$ capacitor. Calculate the values of charging current and capacitor voltages at $t = 2, 4, 6$ ms from the instant the circuit is switched on to a 10 volts battery. (10 marks)

QUESTION TWO (20 MARKS)

For the circuit below, find the expression of $i_o(t)$ and $V_o(t)$. The switch was closed for a long time and at $t=0$, the switch was opened.



(20 marks)

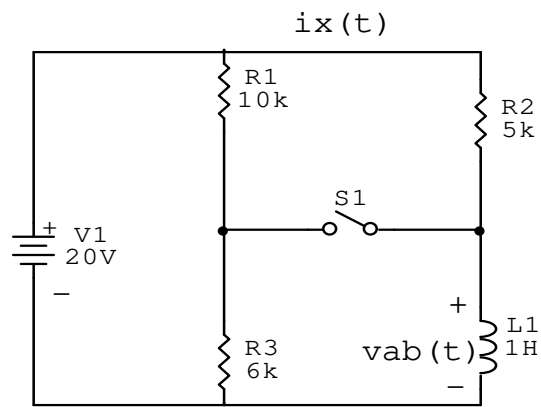
QUESTION THREE (20 MARKS)

- (a) Define transfer function (2 marks)
- (b) In a three phase system of voltages the three phase voltages are $100/0^\circ$, $100/-120^\circ$ and $100/-240^\circ$. Find the three line voltages. (10 marks)
- (c) Explain the term phase sequence and draw the wave shapes of 3 balanced voltages each having a magnitude E with phase sequence of ABC (8 marks)

QUESTION FOUR (20 MARKS)

for the circuit shown below, the switch 's' has been closed for a long time and then opens at $t=0$. Find

- (i) $V_{ab}(0^-)$
- (ii) $i_x(0^-)$
- (iii) $i_x(0^+)$
- (iv) $V_{ab}(0^+)$
- (v) $i_x(t=\infty)$
- (vi) $V_{ab}(t=\infty)$
- (vii) $i_x(t)$ for $t>0$



(20 marks)