



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN ELECTRICAL ENGINEERING

EEP 2201: CIRCUIT AND NETWORK ANALYSIS

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Sep 2018

Instructions to Candidates

You should have the following for this examination

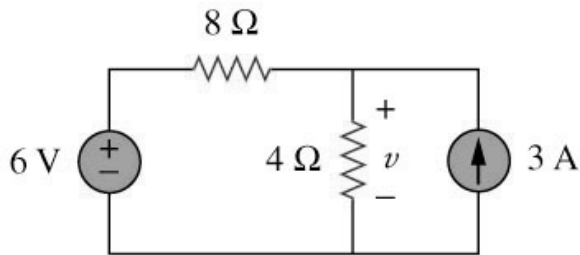
-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Attempt any THREE Questions

Do not write on the question paper.

Question ONE

(a) Use the superposition theorem to find V in the circuit shown below.



(5 marks)

(b) State

- i. the general equation of a complex wave
- ii. the RMS value of a complex wave
- iii. the form factor of a complex wave

(4 marks)

(c) With clear labels draw the phasor diagrams of a transformer's different on load conditions

(9 marks)

(d) State the four main passive filter network types:

(2 marks)

Question TWO

a)

- i. State the steps to solve the Thevenin's Theorem
- ii. List the applications of Thevenin's theorem.

(6 marks)

b)

- i. Using a suitable diagram derive and state the condition for maximum power transfer
- ii. State the equation of maximum power transferred to the load and efficiency of power transfer

(10 marks)

c) Calculate the power factor if $V(t) = V \sin(\omega t - 45^\circ)$ and $I(t) = I \sin(\omega t - 135^\circ)$

(4 marks)

Question THREE

a) With the help of diagrams state the four attenuator types

(8 marks)

b) Determine the equivalent circuit impedances of a 20kVA, 8000/240 V, 60 Hz transformer. The open-circuit and short-circuit tests led to the following data

$$V_{OC} = 8000 \text{ V}$$

$$V_{SC} = 489 \text{ V}$$

$$I_{OC} = 0.214 \text{ A}$$

$$I_{SC} = 2.5 \text{ A}$$

$$P_{OC} = 400 \text{ W}$$

$$P_{SC} = 240 \text{ W}$$

(8 marks)

c)

- i. What is meant by linear and nonlinear elements?
- ii. What is meant by active and passive elements?

(4 marks)

Question FOUR

a) State:

- i. Kirchoff's circuital laws.
- ii. Draw the V-I characteristics of ideal voltage source.
- iii. State super position theorem.

(6 marks)

- b) Consider a load that consumes 1kW of power at a power factor of 0.8 lagging and operates at 115 V (r m s). The load is connected to a voltage source by a wire with a resistance of 0.1.

- What is the power supplied by the source?

(6 marks)

- c) Compare series and parallel circuits.

(8 marks)

Question FIVE

- a) What are the effects on the resultant current wave of the following linear elements in single phase circuits when fed by a complex voltage

- Pure resistance
- Pure inductance
- Pure capacitance

(7marks)

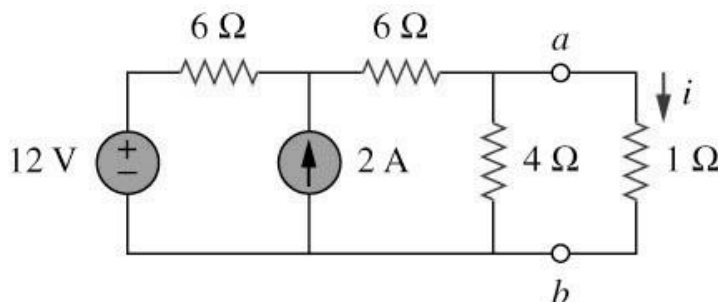
- b) State the four main passive filter network types:

(2marks)

- c) State the transformer efficiency equation clearly indicating its three loss types

(5 marks)

- d) Using Thevenin's theorem, find the equivalent circuit to the left of the terminals in the circuit shown below. Hence find i :



(6 marks)

