



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND SEMESTER EXAMINATION FOR CERTIFICATE IN ELECTRICAL AND
ELECTRONICS ENGINEERING

EED 108: ELECTRICAL ENGINEERING PRINCIPLES II

DATE: 1/8/2016

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

ATTEMPT QUESTION 1 AND ANY OTHER TWO

1. (a) A resistor of 8Ω is connected in series with a capacitor of $6\mu\text{f}$ and an inductor of 2H . They are connected across 250V , 50Hz supply. Determine:-
 - i) impedance of the circuit
 - ii) supply current
 - iii) phase angle (15 marks)
- (b) State three conditions of an RLC circuit at resonance frequency (6 marks)
- (c) A coil having a resistance of 12Ω and an inductance of 0.1 H is connected across a 110 V , 60 Hz supply. Calculate the;
 - I. reactance of the coil
 - II. impedance of the coil
 - III. supply current (9 marks)

2. Two coils are connected in series and their effective inductance is found to be 20 H. After the connection of one of the coils is reversed, the effective inductance is 8 H. if the coefficient of coupling is 0.7, calculate the;
- self inductance of each coil
 - mutual inductance (20 marks)
3. A coil of 400 turns is rotated at 2400 rpm in a magnetic field having a uniform density of 0.2 T, the axis of rotation being at right angles to the direction of the flux. The mean area per turn is 100 cm^2 . Calculate the
- frequency
 - maximum value of e.m.f generated
 - generated e.m.f when the coil is rotated through 30° from the position of zero e.m.f (20 marks)
4. A series circuit consists of a $1 \mu\text{F}$ capacitor, a coil of inductance 0.64H and a resistance of 60Ω . The circuit is connected to a 60 V a.c supply. For this circuit, calculate the;
- Resonance frequency
 - Supply current
 - Potential difference across each of the three components
 - Active power absorbed by the circuit (20 marks)
5. (a) Define the following terms with reference to alternating systems.
- frequency
 - peak value
 - Instantaneous value (3 marks)
- (b) An alternating voltage has an equation $v = 100 \sin 250t$. Determine for this voltage;
- frequency
 - r.m.s voltage
 - average voltage
 - The Instantaneous voltage when $t = 0.6 \text{ sec}$ (17 marks)