

CONFIDENTIAL



UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(TAKE HOME)
SEMESTER II
SESSION 2019/2020**

COURSE NAME : ELECTRIC CIRCUIT ANALYSIS II
COURSE CODE : BEF 12503
PROGRAMME CODE : BEV
EXAMINATION DATE : JULY 2020
DURATION : 3 HOURS
INSTRUCTION : ANSWER **FIVE (5)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

CONFIDENTIAL
TERBUKA

- Q1**
- (a) Describe capacitor with its structure, dielectric, and different units. (2 marks)
 - (b) Compute the Standard Units of capacitance. (3 marks)
 - (c) Summarize any **TWO (2)** characteristics of capacitors found in datasheets. (2 marks)
 - (d) Calculate the charge stored on a 3-pF capacitor with 20 V across it and find the energy stored in the capacitor. (3 marks)
- Q2**
- (a) Compose differential equation of the first order RC circuit at the initial conditions. (2 marks)
 - (b) Explain the time constant of RC and RL circuits. (2 marks)
 - (c) Identify the different types of singularity function (or) switching function. (2 marks)
 - (d) Corroborate the response of transient and steady state RC circuit. (2 marks)
 - (e) In a first order source free RC circuit, the equivalent Resistance is 4Ω and the capacitor value is 0.1F. Find the time constant, τ . (2 marks)
- Q3**
- (a) Identify **TWO (2)** key points in determining the initial conditions in second order circuit. (2 marks)
 - (b) Characterize the **THREE (3)** types of solutions/cases obtained in the second order circuit from its characteristic equation roots with respect to damping frequencies. (3 marks)
 - (c) Summarize the complete solutions for the overdamped, underdamped, and critically damped cases of step response of a series RLC circuit. (3 marks)
 - (d) Analyse a second order RLC circuit in Figure Q3(d), where the switch has been closed for a long time. It is open at $t = 0$. Find the current flowing through the circuit at $t=0^-$. (2 marks)
- Q4**
- (a) Identify **THREE (3)** steps to analyze the AC circuits. (3 marks)
 - (b) Compose the statements of mesh analysis and Thevenin's Theorem. (4 marks)
 - (c) Given a sinusoid is $v(t) = 12 \sin(50t + 10^\circ)$. Analyze the sinusoid to determine the amplitude, phase, period, and frequency. (3 marks)

- Q5** (a) Corroborate when the maximum average power transfer to the load. (1 marks)
- (b) Differentiate the power factor and power factor angle. (2 marks)
- (c) Illustrate the volt ampere reactive, VAR (Q) with respect to different types of loads. (3 marks)
- (d) Analyze the average power absorbed by an impedance $z = 30 - j70 \Omega$ when a voltage $V = 120\angle 0^\circ$ is applied across it. (4 marks)
-
- Q6** (a) Explain the mutual inductance. (2 marks)
- (b) Summarize about the dot convention in **TWO (2)** points. (2 marks)
- (c) Corroborate the dot convention of the coupled coils in series connections. (2 marks)
- (d) Correlate the coupling coefficient of magnetic coupled circuits with respect to its coils. (2 marks)
- (e) In a magnetically coupled circuit, the inductors L1, 5H and L2, 4H are connected in parallel arrangements having the mutual inductance 2.5H during the conduction period. Determine the coupling coefficient. (2 marks)

-END OF QUESTIONS -

FINAL EXAMINATION

SEMESTER / SESSION : SEM II / 2019/2020
COURSE NAME : ELECTRIC CIRCUIT ANALYSIS II

PROGRAMME CODE : BEV
COURSE CODE : BEF 12503

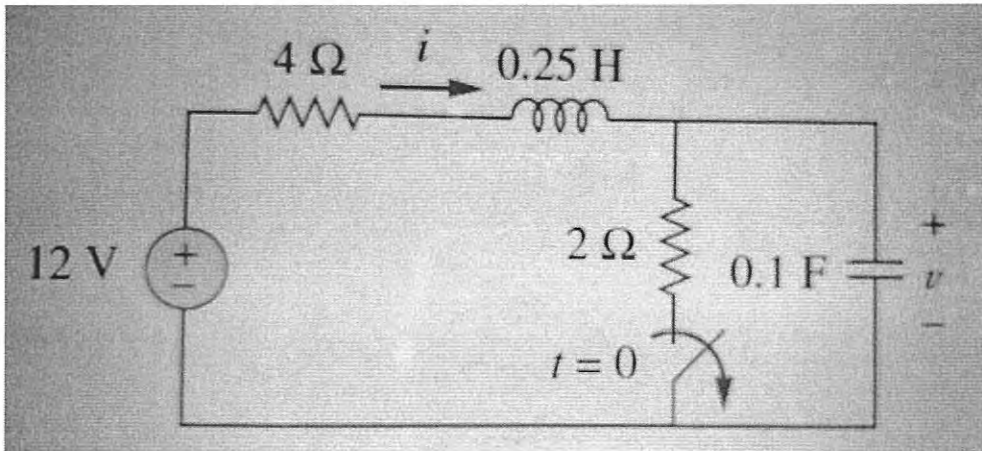


Figure Q3 (d)

TERBUKA