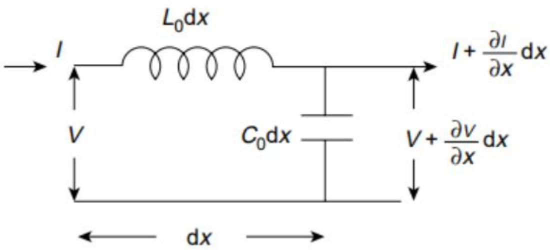
	MINISTRY OF EDUCATION, CULTURE, RESEARCH AND TECHNOLOGY STATE UNIVERSITY OF JAKARTA FACULTY OF MATHEMATICS AND NATURAL SCIENCES **PHYSICS & PHYSICS EDUCATION PROGRAM** Campus A UNJ Rawamangun, Gd. Hasjim Asj'arie Lt. 5 Jl. Rawamangun Muka No. 1 Jakarta 13220 Tel. 021-29266285/29266284	**FINAL EXAMINATION 118**	
		WAVE	
		Date and time	**Wednesday, June 14 2023**
		Jam	**08.00-09.40.00**
		Study Program	**Physics and Pend. Open Note**
		Nature of the Test	**Physics 1 A4 sheet**
		Lecturer	**Dr. Esmar Budi, MT** **Dr. Iwan Sugihartono, M.Sc** **Dr. Widyaningrum, M.Si** **Riser Fahdiran, M.Si**

Instructions: *Work sequentially, using a pen!*

1. Look at the following picture



The LC circuit above represents a wave on a transmission line when the wire length element meets the boundary conditions. a) Explain how wave propagation on a transmission line is represented by a circuit L-C.

b) Determine the voltage and current wave equations on the transmission line.

c) Determine the speed of propagation of the voltage and current waves

d) Referring to answer c, explain what influences the speed of wave propagation at the transmission route.

2. a) It is known that the electric field components of electromagnetic waves propagating in a vacuum are expressed by:

$_0$ 2 sin ( )

Determine the components of the magnetic field and draw a sketch of the direction of propagation of the electromagnetic wave.

b) If the electromagnetic wave above propagates in a medium with impedance towards a medium with impedance, determine the reflection and transmission coefficient of the electromagnetic wave at the boundary of the two media if and if. Draw a sketch of the propagation of the wave.

3. It is known that the intensity of the diffraction pattern is expressed by the equation: (0 (sin)^2 (SSO)^2

With gaps.) ; ( ) ; = gap width; = distance between gaps; N = number

a) If N = 2 prove that the diffraction intensity becomes 4 0 (sin)^2 ^{2}

b) Draw a sketch of the intensity graph of the diffraction pattern *I* vs for N = 1 and N = 2 and give it explanation.

Collaboration is prohibited!