MINISTRY RESEARCH AND EDUCATION TALL
UNIVERSITY COUNTRY JAKARTA
FACULTY MIPA
PROGRAM STUDIES PHYSICS - EDUCATION PHYSICS
EXAM END SEMESTER (UAS)
COMPUTING PHYSICS (3 credits)

Date	:	15 June 2023
Time	:	100 minute
Device Which allowed	:	Open book, Calculator scientific
Lecturer	:	Dr. B. Heru Iswanto, M.Sc Handjoko Permana, M.Sc goddess Muliyati, M.Sc

Instruction Processing:

- Do it question in a way manually on sheet answer.
- Write Name, NIM, subject, And lecturer guardian
- Do it question with ballpoint.
- Results calculation Enough until 4 decimal
- Results cheat / Work The same will given mark **ZERO**

1. (35 points) **Numerical Integrals** . The work done by gas undergoing expansionisothermal can be calculated with the equation:

$$W = \int P \, dV$$

where *P* and *V* are the pressure and volume of the gas. If the results of measuring the pressure and volume of the gasas in the following table, calculate the work done by the gas (in kJ) using the combination rule trapezoid, rule Simpson's 1⁄3, and Simpson's 3⁄8 rule.

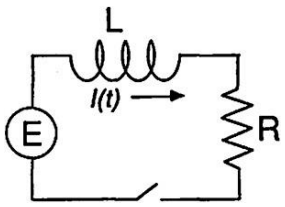
$P\ (\ kPa\ )$	336	294.4	266.4	260.8	260.5	249.6	193.6	165.6
$V\ (\ m^3\ )$	0.5	2	3	4	6	8	10	11

2. (30 points) **Numerical Differential** : The following is data on the distance traveled by the rocket (y) totime (t):

$t\ (s)$	0	25	50	75	100	125
$y\ (\ km\ )$	0	32	58	78	92	100

Use differentiation numeric For estimate speed And acceleration rocket every moment.

3. (35 points) **Ordinary Differential Equations** : A circuit as inthe image has inductance L = 50 H, resistance R = 20 Ohm, and voltage source E = 10 sin (t) Volts. At t = 0 there is no electric current Which flow, $I\ (\ 0\ ) = 0$. When the switch closed then current will flowequal to $I\ (\ t\ )$ according to the equation:



$$L\frac{dI}{dt} + R\ I = E$$

a. Make it count current electricity on $t = 0.3\ s$ use method Runge-Kutta 2nd order with h = 0.1
b. Make it count error from results calculation the.