

 <p> MINISTRY EDUCATION, CULTURE, RESEARCH AND TECHNOLOGY UNIVERSITAS NEGERI JAKARTA FACULTY MATHEMATICS AND KNOWLEDGE KNOWLEDGE NATURAL MAJOR PHYSICS & EDUCATION PHYSICS Campus A UNJ Rawamangun, Gd. Hasjim Asj'arie Lt. 5 Jl. Rawamangun Muka No. 1 Jakarta 13220 Tel. 021-29266285/29266284 </p>	EXAM MIDDLE SEMESTER 118	
	Physics Mathematics II	
	Date and time	Monday, 27 March 2023
	O'clock	10.00 - 11.40
	Study Program	Education. Physics & Physics
	Nature of the Exam	Closed Books / 1 Sheet A4 Write Hand
Lecturer	Prof. Dr. I Made Astra Prof. Dr. Mangasi AM Dr. Firm B. Prayitno Handjoko Permana M.Sc	

Notes: **Closed book.**

Can bring *note* paper *writing hand* 1 sheet size A4.

No can open HP/Gadget/Laptop

1. a. Find element dA coordinate Polar with use Jacobians
- b. Use coordinate polar for count integral following:

$$\int_0^{\infty} \int_0^{\infty} e^{-\sqrt{x^2 + y^2}} dx dy$$

2. Determine is Medan vector $\vec{F} = z \hat{i} + x \hat{k}$ is conservative? If yes, find the Medan scalar potential

3. Determine $\int_C \vec{F} \cdot d\vec{r}$ with C is $x^2 + y^2 - 2 = 0$ from point (1, 1) to point (1, -1) and $\vec{F} = (2x - 3y) \hat{i} - (3x - 2y) \hat{j}$

4. Draw it sketch following function

$$f(x) = \begin{cases} x, & 0 < x < 4 \\ 8 - x, & 4 < x < 8 \end{cases}$$

And develop become row:

- a. Row Fourier Cosine (draw the sketch)
- b. Fourier Series Sinus (draw the sketch)