



MINISTRY OF EDUCATION, RESEARCH CULTURE  
AND TECHNOLOGY  
UNIVERSITAS NEGERI JAKARTA  
Major. Physics & Major. Physic  
Education  
Faculty of Mathematics and Natural  
Sciences

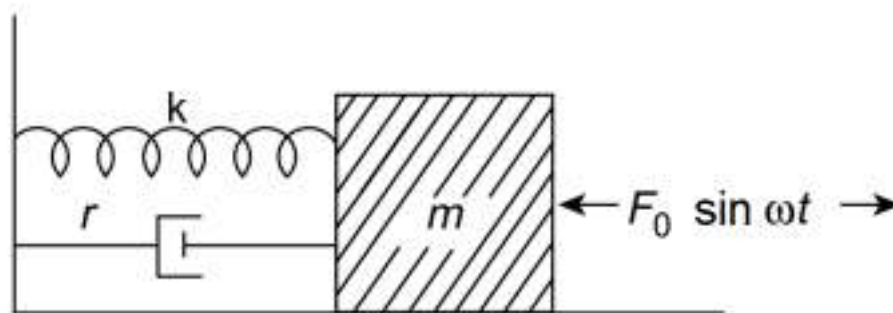
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MIDDLE EXAMINATION 117

CLASSIC MECHANICS

Date and time	Friday / 28 October 20 222
Hours/ Duration	08.00 - 09.40 WIB / 100 minutes
Place	GHA
Characteristic	Can bring 1 sheet notes A4 size
Study Program	Physics & Physics Education
Lecturer	Dr. Hadi Nasbey, M.Sc. Dr. Teguh Budi Prayitno, M.Si. Riser Fahdiran, M.Si. Dewi Mulyati, M.Si, M.Sc. Upik Rahma Fitri, M.Pd.

1. Take note picture following .



- Determine the equations of motion and specific solutions of the following forced oscillation conditions.
  - From this solution, when does the system experience resonance?
2. A ball of mass  $m$  is thrown with an initial speed  $v_0$  in a horizontal plane. If the drag force acting is in the form  $F(v) = -k(v)$  ( $k$ : constant) and the motion only occurs in the  $x$ -axis, determine:
- The speed equation.
  - Equality of position (assume initial position is zero).
3. A particle moves in 2 dimensions with the equation below:

$$v(r) = \frac{1}{2}k(x^2 + 4y^2)$$

Known  $t = 0, x = a, y = 0, \dot{x} = 0, \dot{y} = v_0$ . Find the equation of motion under these conditions.