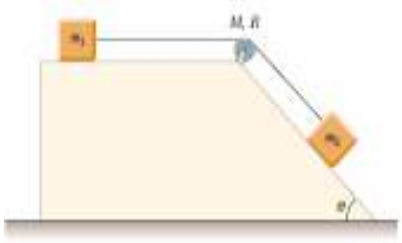
	MINISTRY OF RESEARCH AND HIGHER EDUCATION **PHYSICS MAJOR & PHYSICS EDUCATION- FMIPA** Campus A, Bd. Hasyim Asyari 5th Floor Jl. Rawamangun Muka No. 1 Jakarta 13220 Campus B UNJ Rawamangun Jl. Pemuda No. 10 Jakarta 13220 Tel. 021-29266285/29266284 www.unj.ac.id/fmipa/physics	**MIDDLE EXAMINATION 111** **BASIC PHYSICS I** **Date and time**: **Monday, October 24 2022** **Time**: **08.00- 09.4 0 WIB** **Platforms**: **Epsilon** **Study Program**: **Physics & Physics education** **Nature of the Exam**: **Closed book** **Lecturer**: **Prof. Dr. I Made Astra, M.Sc** **Dr. Umiatin, M.Si**

1. A car is pulled by a rope in a northeast direction with a force of 400 N forming an angle of 37^o to the east, a second rope pulls the car in a southeast direction by 800 N in a direction 37^o to the south, then a third rope pulls the car in a northwest direction with An angle of 37^o to the north is 600 N.
   a. Describe the forces acting on the car?
   b. How big is the resultant force acting on the car?
   c. Determine the direction of movement of the car?

2. If m1 = 2 kg and m2 = 6 kg, it is connected by a rope of negligible mass and through a wheel of radius 0.25 m and mass M = 10 kg. If the angle of the inclined plane is 30o and the coefficient of kinetic friction is 0.36 then:
   a. Draw a free diagram
   b. Acceleration of both blocks
   c. The tension in the strings of the two blocks



3. Two objects of mass 2 kg and kg respectively are moving towards each other with speeds of 2.5 m/s and 4 m/s. The two objects collide elastically at e = 0.4. Decide
   a. The speed of each object after the collision and determine their direction?
   b. What is the change in kinetic energy after the collision?

4. A ladder leans against a smooth wall, its top end is 4 m from the bottom of the floor and its bottom end is 3 m from the wall on a rough floor with Us = 0.25. Mass of ladder = 60 kg. A person of mass 50 kg climbs a ladder.
   a. Determine the magnitude of the normal force acting on the wall and floor?
   b. Determine at what distance from the ground the person rises and the exact ladder will move?