SAXONY EGYPT UNIVERSITY
FOR APPLIED SCIENCE AND TECHNOLOGY

Mid-Term Exam
Spring 2025

Course Name: **GAP 121 Physics I**

Date : …25./03./2025 **Time allowed: 60 Minutes**

Name:	**Faculty:**	**ID:**

The Exam Contains 5 Questions in 2 Pages. Programmable & Graphical Calculators are NOT allowed.

Question 1: (4 Marks)

Compute the radial acceleration of a point on the surface of the Earth at the equator, due to the rotation of the Earth about its axis. The radius of the earth is 6.37×10^6 m.

Question 2: (4 Marks)

The vector position of a particle varies in time according to the expression $r = t^3 \hat{\imath} + 20 \hat{\jmath}$ (a) Find expressions for the velocity and acceleration as functions of time. (b) Determine the particle's position at t = 2.00 s.

Question 3: (4 Marks)
A tire 0.400 m in radius rotates at a constant rate of 100 rev/min. Find the speed and acceleration of a small stone lodged in the tread of the tire (on its outer edge).

Question 4: (4 Marks)
A force F_1 of magnitude 5.00 N acts at the origin in a direction 60.0° above the positive *x*-axis. A second force F_2 of magnitude 4.00 N acts at the origin in the direction of the positive *y*-axis. Find the magnitude and direction of the resultant force $F_1 + F_2$.

Question 5: (4 Marks)
A car whose speed is increasing at a rate of 0.700 m/s^2 travels along a circular road of radius 20 m. When the instantaneous speed of the automobile is 4.00 m/s, find (a) the tangential acceleration, (b) the centripetal acceleration, and (c) the magnitude of the total acceleration.