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IB DIPLOMA PROGRAMME

Physics & Economics Higher Level

Test your knowledge and analytical skills with these carefully curated Higher Level practice questions. Each problem is designed to mirror the rigor and structure of official IB examinations.

Physics HL

1 MECHANICS

A wooden block of mass 2.5 kg rests on a rough horizontal surface. A horizontal force of 15 N is applied to the block. If the coefficient of dynamic friction is 0.40, calculate the acceleration of the block. (Take $g = 9.8\ m/s^2$).

2 WAVE PHENOMENA

Monochromatic light is incident on a diffraction grating with 500 lines per millimeter. The second-order maximum is observed at an angle of 32°. Calculate the wavelength of the light in nanometers.

3 ATOMIC & NUCLEAR

Outline the main principles of the Rutherford model of the atom and explain how the Geiger-Marsden scattering experiment provided evidence for its structure.

4 ELECTROMAGNETISM

Two point charges, +4.0 μC and -6.0 μC, are separated by a distance of 0.50 m in a vacuum. Calculate the magnitude of the electrostatic force between them and state whether it is attractive or repulsive.

5 ENERGY PRODUCTION

Explain the process of nuclear fusion and why high temperatures and pressures are required for it to occur in main sequence stars.

Economics HL

1 MICROECONOMICS

Discuss how the implementation of a Pigouvian tax can correct the market failure associated with negative externalities of production.

2 MACROECONOMICS

Using the Keynesian multiplier concept, evaluate the impact of a $50 million increase in government spending on an economy where the marginal propensity to consume is 0.8.

3 GLOBAL ECONOMICS

Discuss the conditions under which the theory of comparative advantage suggests that two countries will benefit from international trade.

4 MICROECONOMICS

A firm experiences a price elasticity of demand of 1.5 for its primary product. Evaluate the potential effect on total revenue if the firm decides to decrease the price of this product by 10 percent.

5 MACROECONOMICS

To what extent is expansionary monetary policy effective in stimulating economic growth during a deep recession?