Microeconomics of the Cosmos

Microeconomics · Practice Test · 15 Questions

1. What is the primary microeconomic constraint regarding the potential commercial mining of Near-Earth Asteroids (NEAs) for precious metals?

A) The lack of legal international property rights
B) High marginal extraction and transport costs compared to terrestrial alternatives
C) The lack of demand for platinum group metals in space
D) The prohibition of private asteroid mining by the 1967 Outer Space Treaty

2. In the context of the International Space Station (ISS), what economic concept best explains the decision to share operational costs among multiple national space agencies?

A) Economies of scale
B) Shared fixed costs for a non-excludable club good
C) Asymmetric information
D) Price discrimination

3. NASA's Commercial Crew Program shifted the agency's role from a service provider to a customer. Which economic mechanism describes this change in market structure?

A) Monopolistic competition
B) Procurement outsourcing of government-provided services
C) Perfect price discrimination
D) Vertical integration

4. The 'Kessler Syndrome' represents an economic negative externality in Low Earth Orbit (LEO). What is the direct microeconomic consequence of this phenomenon?

A) The creation of a public subsidy for space debris removal
B) Increased insurance premiums and operational costs for satellite operators
C) A sudden increase in the supply of orbital slots
D) The elimination of barriers to entry for satellite startups

5. Which microeconomic theory explains why the 'Space Race' between the US and USSR led to an over-investment in non-commercial technologies?

A) Nash Equilibrium in a high-stakes competition game
B) The law of diminishing marginal utility
C) A perfectly competitive market model
D) The theory of contestable markets

6. What is the primary barrier to entry for private companies attempting to enter the orbital launch market, excluding regulatory hurdles?

A) The high elasticity of demand for satellite launches
B) The massive capital intensity and high fixed sunk costs
C) The presence of perfect information among consumers
D) The lack of potential technological spillovers

7. How does the 'Opportunity Cost' of funding the James Webb Space Telescope (JWST) manifest in the federal budget?

A) The reduction of funds available for other scientific or social expenditures
B) The inflation of telescope component prices
C) The decrease in labor supply for aerospace engineering
D) The expansion of the global telescope manufacturing market

8. In economic terms, what characterizes the 'orbital slot' (geostationary orbit position) as a resource?

A) An infinite supply good
B) A scarce, rivalrous commodity governed by the ITU
C) A non-excludable public good
D) A good with zero marginal cost of usage

9. Which economic factor most contributed to the retirement of the NASA Space Shuttle fleet in 2011?

A) The high marginal cost per flight compared to expendable launch vehicles
B) The lack of demand for shuttle-based transport
C) The emergence of private competitors in 1980
D) The exhaustion of global aerospace labor supply

10. When private companies like SpaceX offer reusable rockets, they are primarily attempting to change which microeconomic variable?

A) The elasticity of supply for rocket fuel
B) The average total cost per unit of payload delivered to orbit
C) The marginal utility of space travel for tourists
D) The total revenue of the public space sector

11. What defines the market for 'Launch Services' given that only a few entities can reliably provide heavy-lift capability?

A) Perfect competition
B) Oligopoly
C) Monopsony
D) Perfect monopoly

12. In the economics of Mars colonization, why would 'in-situ resource utilization' (ISRU) be necessary to achieve economic feasibility?

A) To increase the marginal utility of Martian soil
B) To minimize the high cost of transporting Earth-based inputs
C) To stimulate competition among asteroid miners
D) To prevent market failure in the terraforming industry

13. The concept of 'Space Tourism' currently experiences high prices due to supply constraints. What type of market entry would be required to lower these prices to the level of long-haul air travel?

A) Decreasing the fixed costs per launch through innovation and scale
B) Increasing government subsidies for all tourists
C) Implementing price ceilings on ticket prices
D) Reducing the barrier to entry by removing safety regulations

14. Why is the 'Space Debris' problem considered a 'Tragedy of the Commons'?

A) Because orbital space is a finite resource being degraded by individual actors
B) Because the government owns all orbital space
C) Because the market for space debris removal is too competitive
D) Because no one uses orbital space

15. What microeconomic benefit do companies gain from 'spin-off' technologies derived from space research and development?

A) Internalizing the positive externalities of R&D investment
B) Avoiding all corporate taxation
C) Maximizing the deadweight loss of the aerospace industry
D) Eliminating competition in secondary markets