Multiple Choice Questions

1. Refer to the above data for a utility-maximizing consumer. Assume that new product Z doesn't exist. How many units of X and Y will this consumer buy, given his or her $12 budget?

A. 5 of X and 7 of Y.
B. 7 of X and 5 of Y.
C. 6 of X and 6 of Y.
D. 5 of X and 6 of Y.

2. The corporate decision on type and level of R&D activity is difficult because:

A. the interest-rate cost of funds is difficult to estimate.
B. much of corporate R&D is based on the pursuit of science, not on the profit motive.
C. expected returns lie in the future and are highly uncertain.
D. total returns and marginal returns greatly diverge.
3. Refer to the above data. At $100 million of R&D expenditures, the:
A. marginal cost of R&D exceeds the marginal benefit.
B. marginal benefit of R&D exceeds the marginal cost.
C. expected rate of return from R&D is negative.
D. firm has exceeded its affordable level of R&D.

4. As it relates to R&D, a firm's expected-rate-of-return-curve, \( r \):
A. slopes downward because the firm arrays, highest to lowest, the rates of returns on R&D activities.
B. slopes upward because of the law of diminishing returns.
C. is a horizontal line.
D. depends on whether it borrows from the bank or used retained earnings in financing R&D.

![Diagram of i, r vs. R & D expenditures (millions of dollars)](image)

5. In the above diagram, at $10 million of R&D expenditure the:
A. expected rate of return exceeds the interest rate cost of funds.
B. firm is spending an optimal amount on R&D.
C. interest rate cost of funds exceeds the expected rate of return.
D. marginal benefit of R&D is less than the marginal cost of R&D.

6. The conjecture that R&D expenditures as a percentage of firms' sales first rise, reach a peak, and then fall as industry concentration rises is known as the:
A. inverted-U theory.
B. bell-shaped curve.
C. average product of R&D theory.
D. theory of increasing and diminishing returns.
7. Technological advance is a three-step process involving:
A. invention, duplication, and diffusion.
B. duplication, innovation, and diversity.
C. invention, innovation, and diffusion.
D. necessity, invention, and solution.

8. The process by which new firms and new products replace existing dominant firms and products is called:
A. monopolistic competition.
B. process innovation.
C. the inverted-U process.
D. creative destruction.

9. (Last Word) In 1981, IBM introduced its version of the personal computer to compete with existing personal computers offered by Apple and others. IBM’s action best exemplifies:
A. invention.
B. scientific determinism.
C. diffusion.
D. technological lag.

10. The major source of new scientific knowledge in the United States is:
A. university and government research.
B. R&D work in large corporations.
C. entrepreneurs working alone.
D. purely competitive and monopolistically competitive firms.

11. Entrepreneurs:
A. work exclusively in government and university R&D laboratories.
B. often form small companies called startups.
C. are less likely to exist in service industries than in manufacturing industries.
D. are engaged mainly in basic scientific research.

12. New scientific knowledge mainly comes from university and government laboratories, not private firms, because:
A. large corporations do not have funds available to channel toward basic research.
B. government pays scientists higher salaries than do private firms.
C. entrepreneurs find it difficult to secure venture capital to finance innovation.
D. basic scientific principles, as such, cannot be patented and do not always have commercial applicability.

13. About ____ percent of business R&D spending is for basic research.
A. 1.
B. 6.
C. 13.
D. 20.
14. Industry A has a 60 percent concentration ratio, while industry B has a 40 percent concentration ratio. According to the inverted-U theory, all else equal, we can conclude that:
A. Industry A will be more technologically progressive than B.
B. Industry C with a 10 percent concentration ratio will be more progressive than either industry A or B.
C. Industry D with a 80 percent concentration ratio will be more technologically progressive than either industry A or B.
D. that none of the above are necessarily true.

15. Technological advance improves productive efficiency by:
A. lowering average total cost.
B. enhancing monopoly power.
C. increasing marginal utility.
D. decreasing a nation’s exports.

16. Which among the following is the strongest determinant of an industry's technological progressiveness?
A. the scientific character of its industry and the number of technological opportunities available.
B. the size of the industry concentration ratio; the lower the ratio, the greater the firm's technological progressiveness.
C. the Herfindahl index in the firm's industry; the higher the index value, the greater the firm's technological progressiveness.
D. the amount of retained earnings in the industry.

17. The spread of innovation through imitation refers to:
A. invention.
B. diffusion.
C. duplication.
D. diversification.

18. Assume that a firm's interest-rate-cost of funds curve for R&D is perfectly elastic. Which of the following would increase a firm's optimal R&D expenditures and, in equilibrium, reduce the expected rate of return on the last dollar of R&D?
A. a rightward shift of the expected-rate-of-return curve
B. an upward shift of the interest-rate-cost of funds curve
C. a leftward shift of the expected-rate-of-return curve
D. a downward shift of the interest-rate-cost of funds curve

19. The first discovery (as distinct from first commercial application) of a product or process is called:
A. innovation.
B. invention.
C. creative destruction.
D. diffusion.
20. Refer to the above diagram that relates to Firm X. Suppose X implements an innovative new production method that shifts its total product curve from TP₂ to TP₁. Other things equal:
A. the average product of X's labor would fall.
B. the average total cost of X's output would decline.
C. X would supply less output at each product price than before.
D. the demand curve for X's product would shift to the right.

21. In deciding on an optimal amount and type of research and development, firms should adhere to the rule: Expand R&D until:
A. expected rate of return is zero.
B. expected rate of return equals the interest rate.
C. expected rate of return exceeds the interest rate by the greatest amount.
D. the interest rate is constant.

22. Kodak introduced to the marketplace a digital camera which uses no film, but which takes photos that can be shown on personal computers. This is an example of:
A. economies of scale.
B. product innovation.
C. process innovation.
D. venture capital.

23. Entrepreneurs:
A. include everyone engaged in R&D work.
B. are located in small enterprises only.
C. try to anticipate the future.
D. work exclusively in government and university R&D laboratories.
24. Refer to the above data. In equilibrium, the introduction of new product Z has increased this consumer's total utility by:
   A. 42 utils.
   B. 54 utils.
   C. 60 utils.
   D. 66 utils.

25. In the above diagram, at $40 million of R&D expenditure, the expected rate of return:
   A. equals the interest rate cost of funds.
   B. is greater than the interest rate cost of funds.
   C. is less than the interest rate cost of funds.
   D. is negative.

26. Refer to the above diagram that relates to Firm X. Which of the following would illustrate process innovation by X?
   A. a downshift in the total product curve from TP₁ to TP₂
   B. an upshift in the total product curve from TP₂ to TP₁
   C. a move from a to b on TP₁
   D. a move from c to d on TP₂

27. The theory of creative destruction was advanced many years ago by:
   A. Bill Gates.
   B. John Maynard Keynes.
   C. Joseph Schumpeter.
   D. Adam Smith.

28. Fast-second strategies are more likely to be used by:
   A. dominant firms than by startup firms.
   B. startup firms rather than existing firms.
   C. pure competitors rather than oligopolists.
   D. entrepreneurs than by corporations.

29. A profit-maximizing firm should not undertake a R&D project for which the:
   A. Expected rate of return exceeds its interest-rate cost of funds.
   B. interest-rate cost of funds exceeds the expected rate of return.
   C. expected returns are in the distant future.
   D. the expected returns, though potentially very large, are uncertain.

30. In general, the:
   A. number of firms in the industry is far more important than the industry's scientific character and extent of technological opportunities.
   B. greater is an industry's concentration ratio, the higher its R&D expenditures in relation to sales.
   C. industry's scientific character and extent of technological opportunities often is more important than the industry's concentration ratio.
   D. higher the industry's interest cost of borrowing funds for R&D, the greater is the industry's progressiveness.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5. A</td>
<td>15. A</td>
<td>25. A</td>
</tr>
<tr>
<td>10. A</td>
<td>20. B</td>
<td>30. C</td>
</tr>
</tbody>
</table>