

BMIT

Indian Institute of Technology Kharagpur

Date: _____ FN/AN Time: 3 hrs Full Marks: 50 No. of Students: 405
Autumn End-Sem. Exam, 2015 Subject: Economics Subject No: HS20001

Instruction: Answer one question at one place only. All questions are compulsory.

1. a) What do you mean by production function? Distinguish between (i) variable input and fixed input, and (ii) short run and long run production function. Discuss the three stages of production function and the production decisions in the context of a variable input. (1 + 2 + 3)
- b) The Matrix Manufacturing Company's short-run average cost function in 2012 is $AC = 10 + 5Q$ where AC is firm's average cost and Q is its output.
- i) Obtain an equation for the firm's short-run total cost function.
- ii) Does the firm have any fixed cost? Explain.
- iii) If the per unit price of the product is INR 9, is the firm making profits or losses? Explain. (1 + 1 + 1)
- c) Discuss the laws of returns to scale. Explain with examples the economies of scale. (2 + 2)
- d) The total cost TC of a firm is given by $TC = 1000 + 100Q - 80Q^2 + (1/3)Q^3$ where Q is the quantity produced. (1+2)
- Find: i) the marginal cost of production; and
- ii) the value of Q at which marginal cost is equal to average variable cost.
2. a) Hindustan Uniliver Ltd has proposed to launch a new product. It would require an initial investment of INR 1000 Crore in equipment, INR 200 Crore on land acquisition and INR 300 Crore towards reorganization of the activities. The project has an effective life of five years and would generate gross sales revenue of INR 2000 Crore in the first year, which will decline by 10% annually in subsequent years over the preceding year's sales revenues. The project's variable cost will be 20% of its sales revenues and additionally, the company has to bear a fixed cost of INR 100 Crore annually. The equipment would be completely obsolete after 5 years. The company will receive a salvage value of INR 100 Crore. The marginal tax rate faced by the company on its annual profits will be 20%. The company uses straight-line depreciation. Estimate the net cash flows over the life of the project. Does the project recover the capital invested and if yes, in how much time? (4)

b) Why is estimation of time value of money relevant? What factors determine the time value of money? How these factors can be accounted for in deriving the present value of an amount accruable annually over a period of time? (3)

c) The following information is available regarding six different projects of a company:

Project	Initial Capital (US\$)	PVof the Net Returns (US\$)
A	4000	6000
B	2000	2800
C	4000	5400
D	2000	2500
E	2000	2400
F	2000	2000

The company has a capital constraint and it can invest maximum of US\$ 8000. Derive net benefit-cost ratio (NBCR) for each project. On the basis of that, identify the combination of projects the company should undertake. (4)

d) What are the basic attributes of perfect competition? Discuss how a perfectly competitive firm attains equilibrium in both short-run and long-run. Under what conditions does a firm under perfect competition decide to shut-down?

A blade manufacturer is a price taker in the product market. The going price of a box of 10 blades is Rs 8. The firm's total cost function is as follows:

$$TC = 2 + 4Q + Q^2$$

Find the profit-maximizing output (in number of boxes) and the amount of profit. With the cost function remaining unchanged, below what price will the firm decide to shut down? (3+3)

3. a) What do you understand by 'Human Capability'? Explain it using mathematical notations. (4)

b) Show that (i) a large government budget deficit leads to a large current account deficit and (ii) an open economy can increase investment by borrowing from abroad. Discuss the mechanisms through which they operate. (2+2+2)

c) What is Pareto Optimality? How externality can lead to inefficient outcome? Use a suitable graph to discuss it. (1+4)

d) How can the present crisis in China affect Indian Economy adversely? (2)