**Question 1.** Explain the concept of a production function.

**Answer** It is the technological knowledge that determines the maximum levels of output that can be produced using different combinations of inputs. If the technology improves, the maximum levels of output obtainable for different input combinations increase. Then we have a new production
function. e.g., A firm produce a product (Y) by using two inputs $X_1$ and $X_2$.
Then production function can be expressed as
qy =: f ($X_1$.$X_2$)

**Question 2.** What is the total product of an input?

**Answer** Total product means the total quantity of goods produced by a firm during a given period of time with given inputs.

TP = AP x Number of variable factor (L)

**Question 3.** What is the average product of an input?



**Answer** Average product is defined as the output produced per unit of variable input. Calculated as AP=TP/L

**Question 4.** What is the marginal product of an input?

**Answer** Marginal product refers to the additional output produced, when one more unit of variable factor is employed. Calculated as

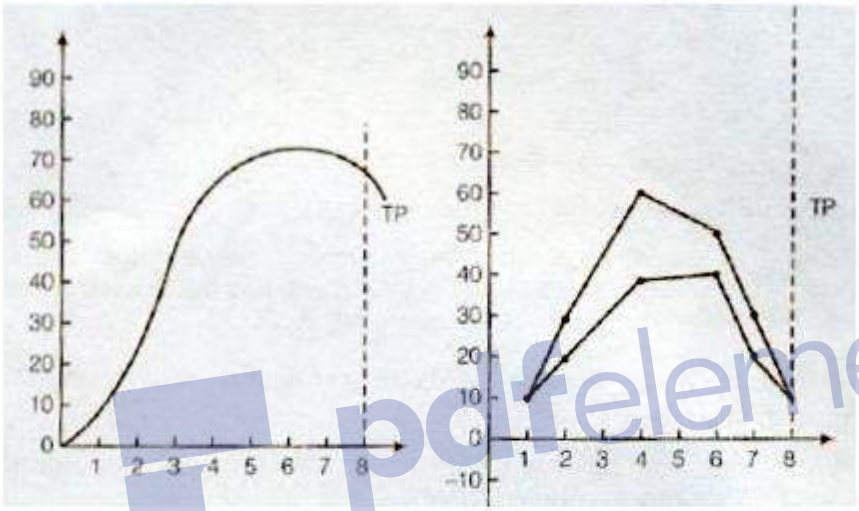
MP= Change in output / change in input $=\Delta q / \Delta X_1$

**Question 5.** Explain the relationship between the marginal products and the total product of an input.

**Answer**

| Units of fixed factor | Units of variable factor | MD | TP | AP |
|---|---|---|---|---|
| 1 | 0 | – | 0 | – |

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 6 | 6 | 6 |
| 1 | 2 | 14 | 20 | 10 |
| 1 | 3 | 28 | 48 | 16 |
| 1 | 4 | 24 | 72 | 18 |
| 1 | 5 | 8 | 80 | 16 |
| 1 | 6 | 4 | 84 | 14 |
| 1 | 7 | 0 | 84 | 12 |
| | 8 | -2 | 82 | 0 |






Relation between TP and MP

(i) When MP increases, TP increases at increasing rate.

(ii) When MP starts diminishIng. TP Increases only at diminishing rate.

(iii) When MP= D.TP is maximum.

(iv) When MP is negative, TP is declinillg.

**Question 6**. Explain the concepts of the short run and the long run.

**Answer** Short run refers to a period in which output can be changed by changing only variable factors. In the short run. fixed inputs like land. building, plant machinery etc. cannot be changed. It means, production can be raised by increasing only variable factors, but till the extent of fixed factors.

Long run refers to a period in which output can be changed by changing. all factor of production In the long run firm can change its factory size, techniques of production, purchase new plant machinery, patents etc

**Question 7**. What is the law of diminishing marginal product?

**Answer** Law of diminishing marginal product means that when more and more units of a variable factors are employed along with a fixed factor, the marginal product of the factor must fall. e.g.

| Units of fixed factor | Units of variable factor | MD |
|---|---|---|
| 1 | 0 | – |
| 1 | 1 | 6 |
| 1 | 2 | 14 |
| 1 | 3 | 28 |
| 1 | 4 | 24 |
| 1 | 5 | 8 |
| 1 | 6 | 4 |
| 1 | 7 | 0 |
| | 8 | -2 |



**Question 8.** What is law of variable proportions?

**Answer** The law which exhibits the relationship between the units of a variable factor (Keeping all other factors constant) and the amount of output in the short-run known as law of variable proportion.

**Question 9**. When does a production function satisfy constant returns to scale?

**Answer** Production function satisfy constant returns, when MP becomes zero and TP reaches its maximum point.

**Question 10.** When does a production function satisfy increasing returns to scale?

**Answer** A production function satisfy increasing returns, when every additional variable factor adds more and more to the total output. It means
TP Increase at an increasing order and MP also increases

**Question 11**. When does a production function satisfy decreasing returns to scale?

**Answer** A production function satisfy decreasing returns, when every additional variable factor adds lesser and lesser amount of output. It means
TP increases at a diminishing rate and MP falls with increase in variable factor

**Question 12.** Briefly explain the concept of the cost function.

**Answer** Cost Function The functional relationship between cost and quantity produced is termed as cost function.
$C = F(Q_x)$
C = Production Cost
$Q_x$ = Quantity produced of x goods
Cost function of a firm depends on two things.
(i) Production function,
(ii) Price of the factors of production. Higher the output of a firm. higher would be the production cost. That's why it depends on quantum of output.



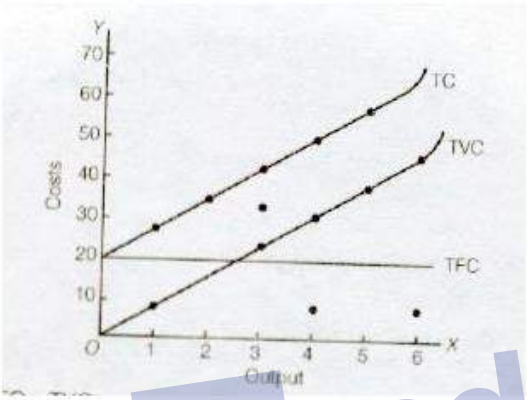
**Question 13.** What are the total fixed cost, total variable cost and total cost of a firm? How are they related?

**Answer** Total Fixed Cost The cost which does not change with the change In output. Even when output is zero. In other words, fixed costs are the sum total expenditure on the purchase or hiring of fixed factors of production.

Total Variable Cost The cost which change with the change in output.
In other words. variable costs are the expenditure incurred on the use of variable factors of production

Total cost is the sum total of total fixed cost and total variable cost at various level of output Relation among TFC, TVC and TC

| Output | TFC | TVC | TC= TFC+ TVC |
|---|---|---|---|
| 0 | 15 | 0 | 15 |
| 1 | 15 | 5 | 20 |
| 2 | 15 | 12 | 27 |
| 3 | 15 | 20 | 35 |
| 4 | 15 | 28 | 43 |
| 5 | 15 | 35 | 50 |
| 5 | 15 | 42 | 57 |






**Question 14**. What are the average fixed cost, average variable cost and average cost of a firm? How are they related?

**Answer**

(i) Average Fixed Cost (AFC) It refers to the per unit fixed cost of production Calculated as AFC= TFC/Q

Where TFC = Total fixed cost , Q= Quantity of output

(ii) Average Variable Cost (AVC) It refers to the per unit variable cost of production Calculated as AVC= TVC /Q

Where TVC = Total Variable Cost , Q= Quantity of output

(iii) Average Cost (AC) It refers to the per unit total cost of production. Calculated as AC=TC/Q

Where, TC = Total Cost , Q = Quantity of output

**Question 15.** Can there be some fixed cost in the long run? If not, why?

**Answer** No, there are no fixed costs in the long-run as all the factors are variable Fixed cost exists only in the short run

**Question 16.** What does the average fixed cost curve look like? Why does it look so?

**Answer** The average fixed cost curve looks like a rectangular hyperbola. It happens because same amount of fixed cost is divided by increasing output. As a result, AFC curve slope downwards and is a rectangular hyperbola.

**Question 17**. What do the short run marginal cost, average variable cost and short run average cost curves look like?

**Answer** The curves of short-run marginal cost, average variable cost and average cost are U shaped.

**Question 18.** Why does the SMC curve cut the AVC curve at the minimum point of the AVC curve?



**Answer** It is only when AVC is constant and at its minimum point. that SMC is equal to AVC. Therefore, SMC curve cuts AVC curve at its minimum points. And when AVC falls, SMC is less than AVC.

**Question 19.** At which point does the SMC curve cut the SAC curve? Give reason in support of your answer.

**Answer** SMC curve cuts the SAC curve at its minimum Point It happens because when SAC falls. SMC is less than SAC is less then SAC starts rising SMC IS more than SAC. It is only when SAC is constant and at its minimum point

**Question 20.** Whyis the short run marqmal cost curve U-shaped?

**Answer** Short-run marginal cost curve is U-shaped because of the law of variable proportions. In the short run as the employment of variable factor increases (fixed

factor being constant) in the initial stage MC decreases owing to increasing return bun finally tend to rise in accordance with the law of variable proportion. Hence the U-shape of MC.

**Question 21.** What do the long run marginal cost and the average cost curves look like?

**Answer** Long run marginal cost and the average costs curve is U shaped but fallter than shortrun U-shaped.

**Question 22.** The following table gives the total product schedule of labour. Find the corresponding average product and marginal product schedules of labour.

| L | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $TP_L$ (Units) | 0 | 15 | 35 | 50 | 40 | 48 |

**Answer**



| Labour (L) | TP (units) | AP = TP/L | Mp = $TP_n - TP_{n-1}$ |
|---|---|---|---|
| 0 | 0 | – | – |
| 1 | 15 | 15.00 | 15 |
| 2 | 35 | 17.50 | 20 |
| 3 | 50 | 16.67 | 15 |
| 4 | 40 | 10.00 | -10 |
| 5 | 48 | 9.60 | 8 |