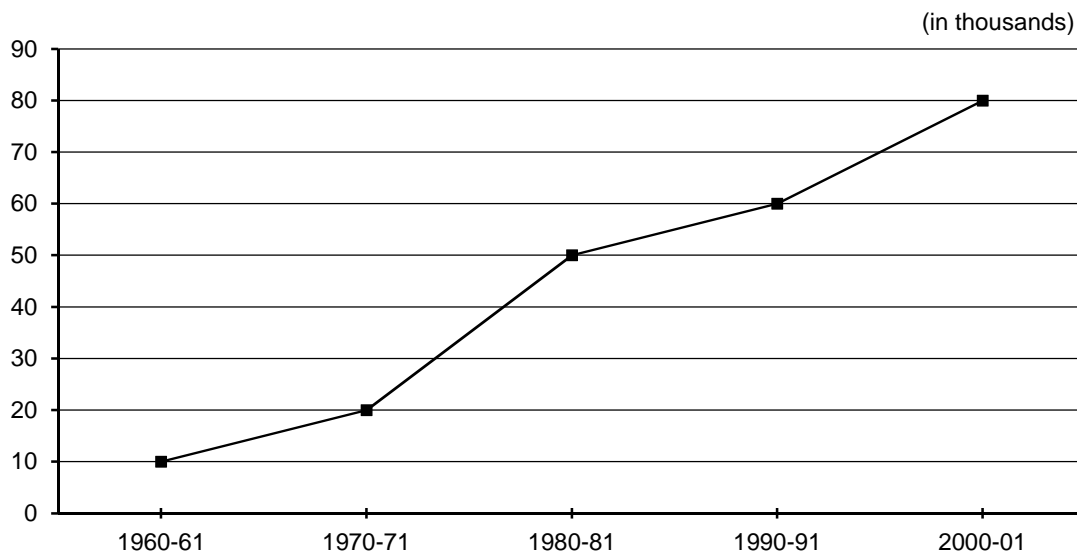


## CHAPTER – 4

### LINE GRAPHS

#### Worked out Examples:

The following line-graph represents the number of branches of public sector banks in India:



**4.01:** Find the percentage increase in the number of branches from 1960-61 to 1990-91.

**Sol:** Number of branches in 1960-61 is 10,000 and that in 1990-91 is 60,000.  
 $\therefore$  Percentage increase  

$$= \frac{60,000 - 10,000}{10,000} \times 100 = 500\%$$

**4.02:** If the total number of public sector banks in 1960-61 and 2000-01 were 14 and 28 respectively, then find the ratio of average branches per bank in these two years.

**Sol:** Average branches per bank in 1960-61  

$$= \frac{10,000}{14} \text{ and in } 2000-01 = \frac{80,000}{28}$$

$$\therefore \text{Ratio} = \frac{10,000}{14} : \frac{80,000}{28}$$

$$= \frac{10,000}{14} \times \frac{28}{80,000} = \frac{1}{8} \times 2 = 1 : 4$$

**4.03:** There is a proposal to merge SBI and its associate banks in 2000-01 due to which the total number of branches will decrease by 5,000. After this SBI has 40% of total branches. Find the percentage change in the total branches of SBI and its associate banks before and after merging.

**Sol:** Total branches of SBI after merging  
 $= 40\% \text{ of } (80,000 - 5,000) = 30,000$   
 $\therefore$  Total branches of SBI and its associate branches before merging

$$= 5,000 + 30,000 = 35,000$$

$\therefore$  Percentage change in SBI and its associate banks after merging

$$= \frac{5,000}{35,000} \times 100 = 14 \frac{2}{7} \% \text{ decrease}$$

**4.04:** If 40% of the total branches are in rural areas in 1970-71 and 40% of the total branches are in urban areas in 2000-01, then find the increase in the number of rural branches in these two years.

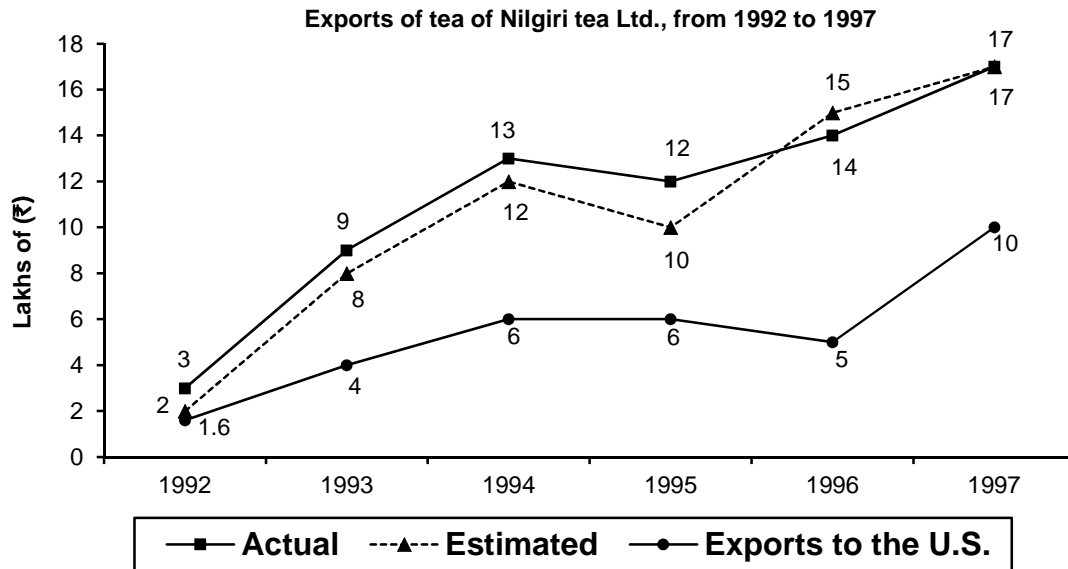
**Sol:** Total number of rural branches in 1970-71  
 $= 40\% \text{ of } 20,000 = 8,000$   
 Total number of rural branches in 2000-01  
 $= 60\% \text{ of } 80,000 = 48,000$   
 $\therefore$  Increase in the number of rural branches is  
 $48,000 - 8,000 = 40,000$

**4.05:** If there were 10,000 branches less in 1980-81, then between which two decades, is the growth rate in number of branches the lowest?

**Sol:** In 1980-81, total number of branches is 40,000  
 $\therefore$  Percentage increase from 1960-61 to 1970-71  
 $= 10\text{k} \rightarrow 20\text{k} \therefore 100\%$   
 Percentage increase from 1970-71 to 1980-81  
 $= 20\text{k} \rightarrow 40\text{k} \therefore 100\%$   
 Percentage increase from 1980-81 to 1990-91  
 $= 40\text{k} \rightarrow 60\text{k} \therefore 50\%$   
 Percentage increase from 1990-91 to 2000-01  
 $= 60\text{k} \rightarrow 80\text{k} \therefore 33\%$   
 From 1990-91 to 2000-01, the percentage increase (i.e. growth rate) is the lowest.

### Exercise – 4(a)

**Directions for questions 1 to 5:** These questions are based on the following line graph.



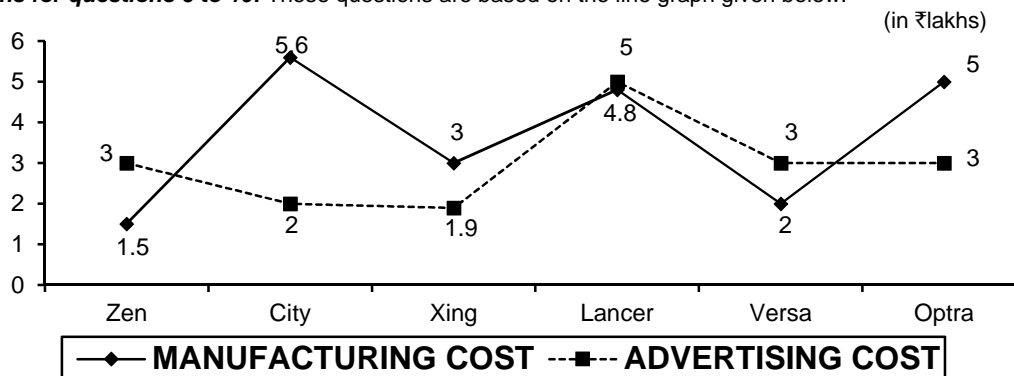
**Directions for questions 1 to 5:** Type in your answer in the input box provided below the question.

- In which year is the ratio of actual exports of tea to the estimated exports of tea, the highest?
- Total exports to the US is approximately what percent of total actual exports for the given period?
- In the year 1996, the estimated exports to the US were ₹5.5 lakhs when \$1 was estimated as ₹40. However the actual exports to the US were only ₹5 lakhs due to the appreciation of the value of rupee.

What was the actual value of \$1 (other factors remained constant)?

- In the year 1994, if \$1 was equal to ₹40, find the quantity of tea exported (in kg) to the US where the cost of tea per kilo is \$8.
- In which year is the ratio of exports of tea to the US when compared to the actual exports of Nilgiri tea Ltd, the highest?

**Directions for questions 6 to 10:** These questions are based on the line graph given below.

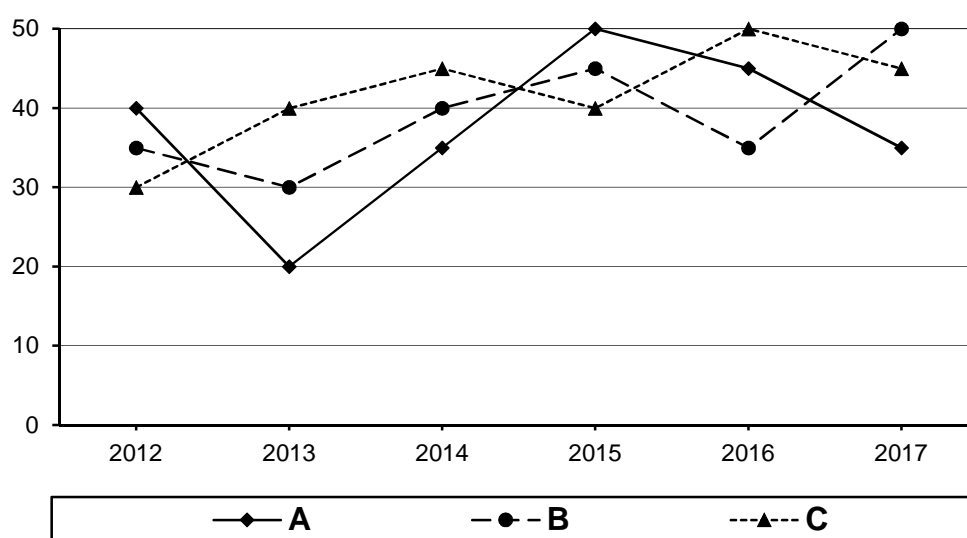


Total Cost = Manufacturing Cost + Advertising Cost

- For which of the following cars is the manufacturing cost as a percentage of advertising cost the least?  
(A) Xing  
(B) City  
(C) Lancer  
(D) Zen
- In a certain year, 30,000 “City” cars, are produced, and are sold at ₹9.3 lacs/car. If 2% of the total profit is given as a bonus to the 2,040 engineers, the amount received by each engineer as bonus is (in ₹)  
(A) 5,000                      (B) 50,000  
(C) 5 lacs                      (D) None of these

8. Which of the following statements is true?
- The difference in the manufacturing and the advertising costs of Optra is the same as that of Versa.
  - The ratio of the manufacturing to the advertising cost of Zen is the same as that of Xing.
  - The total cost of Zen and Xing put together is less than the total cost of Lancer.
  - None of these
9. The company that manufactures Zen produces 500 Zen cars per day while the company that manufactures City produces 600 City cars per day. They sell them at ₹6 lacs/car and ₹8.4 lacs/car respectively. The profit made by the former is approximately what percent of that of the latter?
- 100%
  - 156%
  - 250%
  - None of these
10. The ratio of the manufacturing cost to the total cost is the least for
- Optra
  - Zen
  - City
  - Lancer

**Directions for questions 11 to 15:** These questions are based on the following graph which shows the profit percentage earned on three products A, B and C over the years 2012 through 2017.



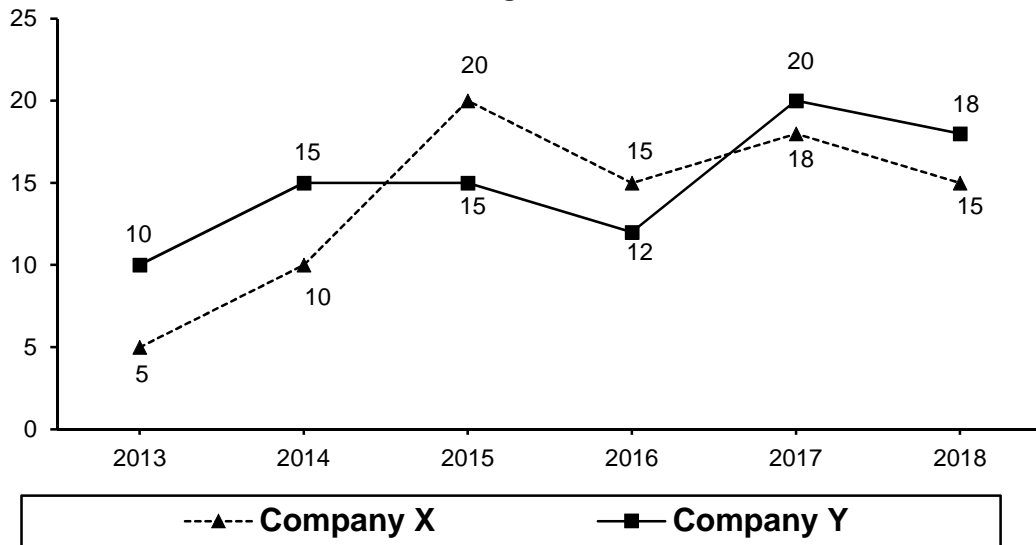
Profit = Selling Price – Cost price

$$\text{Profit percentage} = \frac{\text{Profit}}{\text{Cost price}} \times 100$$

11. If the selling price of product B in 2013 was ₹3.9 lakhs, then what was the profit earned on product B in rupees in that year?
- 60 thousand
  - 55 thousand
  - 80 thousand
  - 90 thousand
12. Cost price of product A in 2013 is equal to the cost price of product C in 2017. What will be the ratio of the selling price of product A in 2013 to the selling price of product C in 2017?
- 24 : 29
  - 29 : 25
  - 25 : 29
  - 29 : 24
13. Selling price of product B in 2014 and 2015 were equal. What was the ratio of its cost prices in 2014 to that of 2015?
- 29 : 28
  - 25 : 27
  - 36 : 35
  - 33 : 25
14. Selling price of product B in 2016 is equal to its cost price in 2017. What is the ratio of its selling price in 2016 to that in 2017?
- 1.5
  - 0.66
  - 0.8
  - 1.2
15. In which year is the percent rise/fall in the percent profit earned by selling product A the least?
- 2013
  - 2014
  - 2015
  - 2016

**Directions for questions 16 to 20:** Study the following graph carefully and answer the questions.

**Percentage of profit made by two companies X and Y from 2013 through 2018**



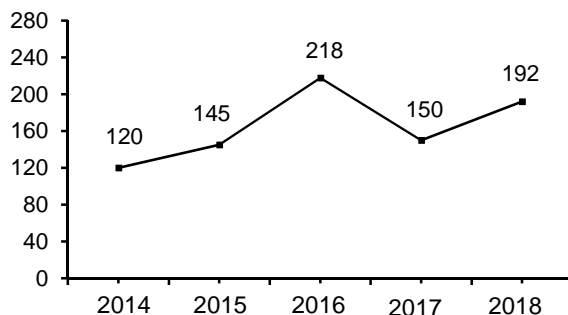
$$\text{Percentage of profit} = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100$$

16. In 2015, if the expenditure of company X is ₹15lakhs, what is the income of company X in that year?  
 (A) ₹18 × 10<sup>5</sup> (B) ₹18 × 10<sup>6</sup>  
 (C) ₹12 × 10<sup>5</sup> (D) ₹12 × 10<sup>6</sup>
17. If, in 2014, the ratio of incomes of the two companies X and Y is 2 : 3, then what is the ratio of expenditures?  
 (A) 27 : 34 (B) 33 : 21  
 (C) 23 : 33 (D) 34 : 29
18. If, in 2015, the expenditures of the two companies are equal, then what is the ratio of incomes?  
 (A) 12 : 11 (B) 24 : 23  
 (C) 21 : 23 (D) 12 : 13
19. In how many years the expenditure of company X is more than that of company Y?  
 (A) 2 (B) 3  
 (C) 4 (D) Cannot be determined
20. In how many years is the profit percentage of company X more than that of company Y?  
 (A) 2 (B) 4 (C) 3 (D) 1

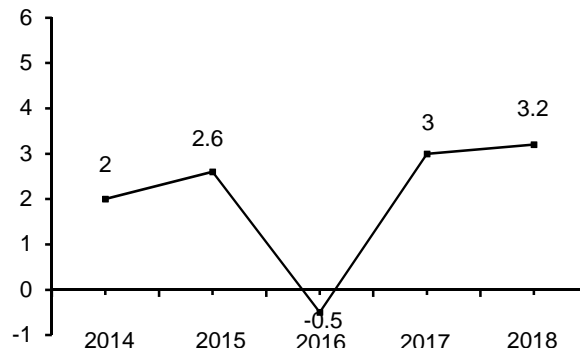
### Exercise – 4(b)

**Directions for questions 1 to 5:** The following two graphs show the number of employees and profit per employee per annum of company XYZ Ltd.

**Number of employees**



**Profit per employee per annum  
(₹ in lakhs)**



$$\text{Total profit} = (\text{Number of employees}) \times (\text{Profit per employee per annum})$$

**Directions for questions 1 to 5:** Type in your answer in the input box provided below the question.

1. In which year was the profit of the company, the highest?

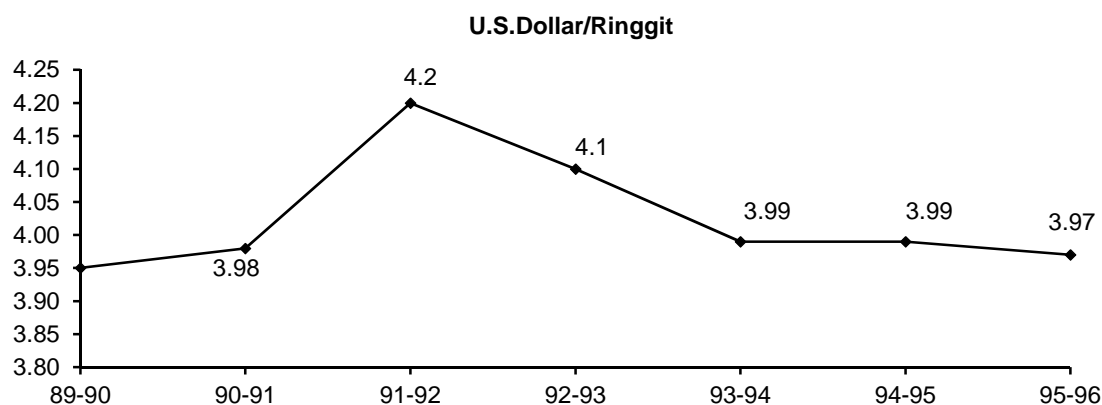
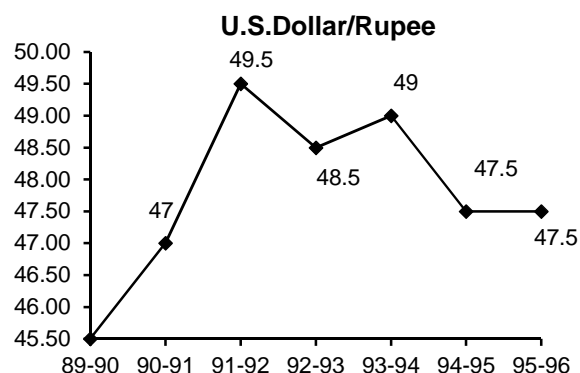
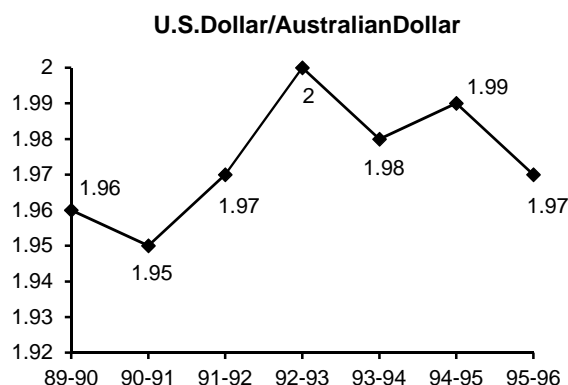
2. If the profit in the year 2015 was 30% of the total sales value, then what was the approximate total sales value (in cr) in that year?

3. In how many years was the number of employees more than the average number of employees for the given period?

4. The company wants to achieve a profit in the year 2019 such that the profit in the year 2018 is 64% of the profit in the year 2019. What should be the profit (in cr) of the company in the year 2019?

5. What was the approximate percentage increase in the profit of the company from 2014 to 2015?

**Directions for questions 6 to 10:** The following three graphs show the variation in the values of three different currencies with respect to the U.S.Dollar over 6 years.



6. Approximately, how many Ringgits would 12,000 Rupees amount to in 1993-94?

(A) 955 (B) 977  
(C) 1013 (D) 1034

7. In how many of the given years did the value of at least two of the three currencies (other than the U.S.Dollar) gain with respect to the U.S.Dollar? A currency X is said to gain with respect to another currency Y if the Y/X ratio decreases.

(A) 2 (B) 3  
(C) 4 (D) 5

8. A digital camera costs \$725. A person has ₹33,085, 2,880 Ringgits and 1,420 Australian dollars. With which of the above three currencies can the person buy the camera without any shortfalls in the year 1990-91?

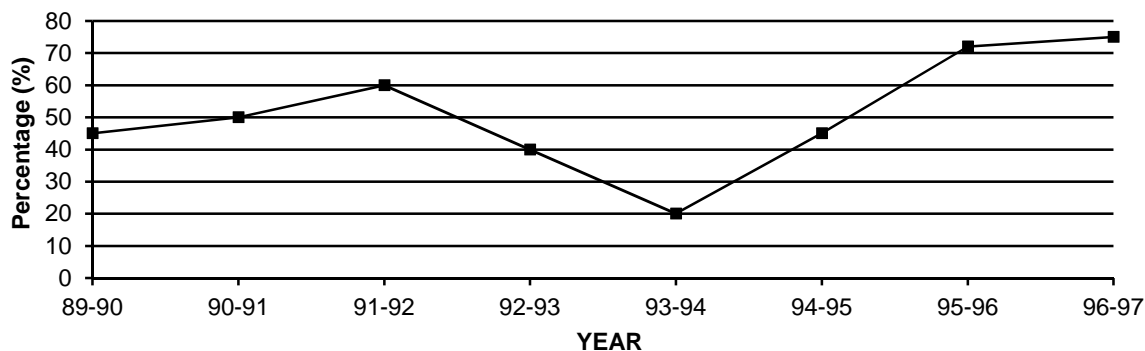
(A) 33,085 Rupees  
(B) 2,880 Ringgits  
(C) 1,420 Australian dollars  
(D) Both (A) and (C)

9. The difference in the average annual percentage increase in U.S.Dollar / Rupee and U.S.Dollar / Ringgit ratio during the period 1990-1991 to 1995-1996 is (in percentage point terms)
- (A) 0.0361 (B) 1.0098  
(C) 1.42 (D) 0.26

10. In 1994-1995, 94,525 Rupees would fetch how many Australian dollars?
- (A) 3,960 (B) 5,120  
(C) 3,581 (D) 4,481

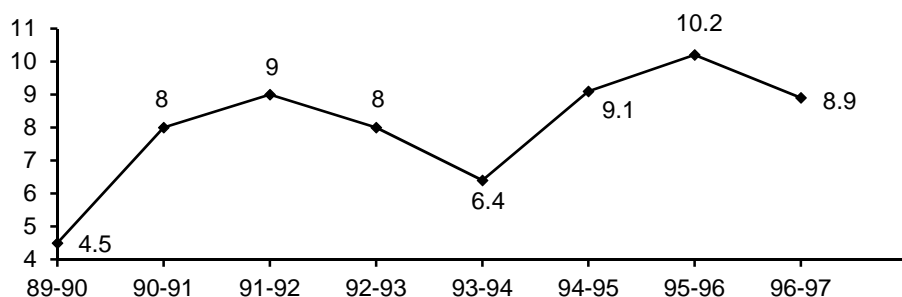
**Directions for questions 11 to 15:** These questions are based on the following line graph which show the statistics of Steel production and exports and imports of India.

**STEEL PLANT UTILIZATION AS PERCENTAGE OF TOTAL PLANT CAPACITY**

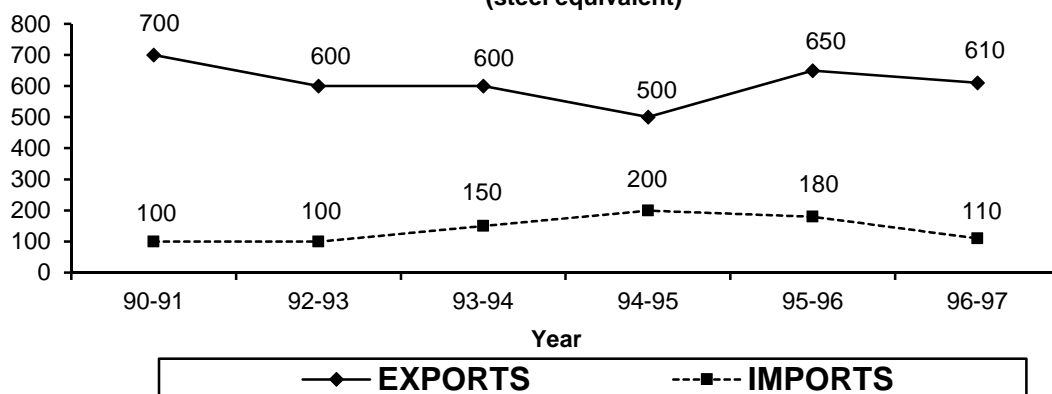


$$\text{Plant Utilization} = \frac{\text{Output}}{\text{Capacity}} \times 100$$

**STEEL OUTPUT IN BILLION TONNES**



**STEEL EXPORTS AND IMPORTS IN THOUSAND TONNES (steel equivalent)**

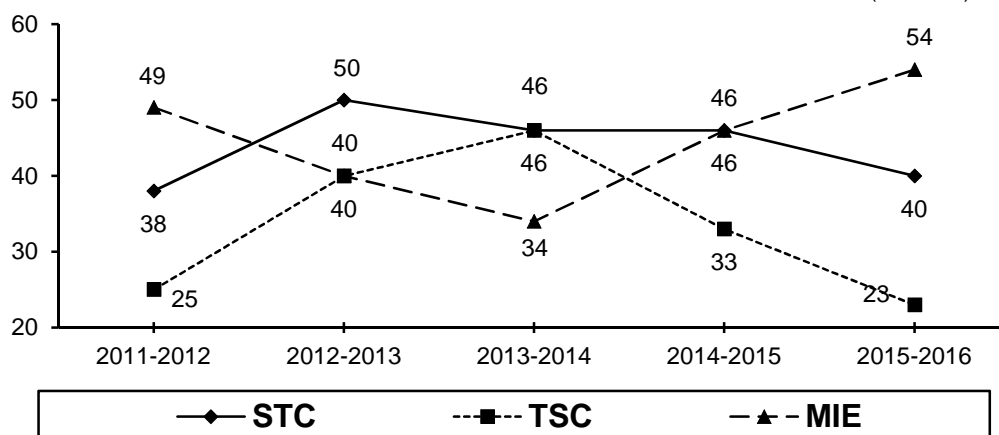


11. What was the total plant capacity of the steel plants in the year 1994-95?
- (A) 20.2 billion tonnes  
(B) 15.0 billion tonnes  
(C) 25.0 billion tonnes  
(D) Cannot be determined

12. In which year was the total plant capacity of the steel plants the lowest?
- (A) 1996-97  
(B) 1991-92  
(C) 1994-95  
(D) 1989-90

13. Which of the following statements is true.
- A decrease in the plant utilization was accompanied by a proportionate decrease in the output of steel between 1991-1992 to 1993-1994.
  - The total plant capacity increased between 1991-1992 to 1993-1994.
  - Output of steel was the highest when the plant utilization was the highest.
- (A) I, II, III (B) I & II  
(C) II Only (D) II & III
14. In the steel industry, how many times is an increase in the imports accompanied by a decrease in the exports?  
(A) 3 (B) 1  
(C) 4 (D) Cannot be determined
15. The average annual increase in the total plant capacity for the given period is  
(A) 4% (B) 4.6%  
(C) 3.1% (D) 2.7%

**Directions for questions 16 to 20:** These questions are based on the line graph given below which represents the Earnings Per Share (EPS) of three companies STC, TSC and MIE for the years 2011-2012 to 2015-2016. (EPS in ₹)



$$\text{EPS} = \frac{\text{Profit available for Shareholders}}{\text{Number of Shares}}$$

16. If TSC had 15,000 shares in 2014-2015 and 31,000 shares in 2015-2016, then find the approximate percentage change in profit available for shareholders from 2014-2015 to 2015-2016.  
(A) 35% (B) 59.6%  
(C) 44.1% (D) 61%
17. If the number of shares of TSC in 2013-2014 is the same as in 2014-2015, then which of the following is true.  
(A) Ratio of EPS for both these years is the same as that of the profit available for shareholders.  
(B) Profit available for shareholders for these two years is the same.  
(C) Ratio of EPS for these two years is half that of the profit available for the share holders.  
(D) Both (1) and (2)
18. If TSC, STC and MIE have 10,000, 25,000 and 15,000 shares respectively in 2011-2012, then which company has the maximum profit available for shareholders in that year?  
(A) TSC (B) STC  
(C) MIE (D) STC and TSC
19. If TSC and STC have ₹6 lacs each as profit available for shareholders in 2012-2013, then the ratio of the number of shares of STC and TSC is  
(A) 1 : 1 (B) 4 : 5 (C) 5 : 4 (D) 20 : 12
20. If STC has to pay 10% of the profit available for shareholders as tax in the year 2013-2014, then the tax payable for 12,000 shares is  
(A) ₹65,200 (B) ₹55,200  
(C) ₹60,000 (D) ₹50,000

### Key

#### Exercise – 4(a)

- |          |         |       |       |       |
|----------|---------|-------|-------|-------|
| 1. 1992  | 5. 1997 | 9. B  | 13. A | 17. C |
| 2. 47    | 6. D    | 10. B | 14. B | 18. B |
| 3. 36.36 | 7. B    | 11. D | 15. D | 19. D |
| 4. 1875  | 8. C    | 12. A | 16. A | 20. A |

#### Exercise – 4(b)

- |         |       |       |       |       |
|---------|-------|-------|-------|-------|
| 1. 2018 | 5. 57 | 9. D  | 13. C | 17. A |
| 2. 12.6 | 6. B  | 10. A | 14. B | 18. B |
| 3. 2    | 7. B  | 11. A | 15. D | 19. B |
| 4. 9.6  | 8. C  | 12. D | 16. C | 20. B |