BAR GRAPHS AND PIE CHARTS

Bar Graphs

A bar graph may be either horizontal or vertical. The important point to note about bar graphs is their bar length or height; the greater their length or height, the greater their value. Bar graphs usually present categorical and numeric variables grouped in class intervals. They consist of an axis and a series or labelled horizontal or vertical bars. The bars depict frequencies of different values of a variable or simply the different values or simply the different values themselves.

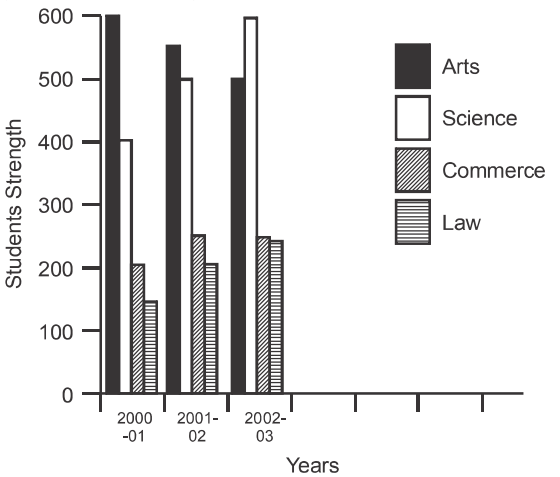
The numbers on the x-axis of a bar graph or the y-axis of a column graph are called the scale.

Pie Charts

A pie chart is a way of summarising a set of categorical data or displaying the different values of a given variable (*e.g.*, percentage distribution). This type of chart is a circle divided into series of segments. Each segment represents a particular category.

EXERCISE

Directions : *Shown below is the multiple bar diagram depicting the changes in the student's strength of a college in four faculties from* 2000-01 *to* 2002-03. (*Scale* 1 *cm* = 100)



Study the above multiple bar chart and mark a tick against the correct answer in each of the following questions.

1. The percentage of students in science faculty in 2000-01 was :
(*a*) 26.9 % (*b*) 27.8 %
(*c*) 29.6 % (*d*) 30.2 %

2. The percentage of students in law faculty in 2002-03 was :
(*a*) 18.5 % (*b*) 15.6 %
(*c*) 16.7 % (*d*) 14.8 %

3. How many times the total strength was of the strength of commerce students in 2001-02?
(*a*) 3 times (*b*) 4 times
(*c*) 5 times (*d*) 6 times

4. During which year the strength of arts faculty was minimum?
(*a*) 2000-01 (*b*) 2001-02
(*c*) 2002-03 (*d*) None of these

5. How much per cent was the increase in science students in 2002-03 over 2000-01?
(*a*) 50% (*b*) 150%
(*c*) $66\frac{2}{3}\%$ (*d*) 75%

6. A regular decrease in students' strength was in the faculty of
(*a*) Arts (*b*) Science
(*c*) Commerce (*d*) Law

EXPLANATORY ANSWERS

1. (c) : Total number of students in 2000-01
$= (600 + 400 + 200 + 150) = 1350$
Number of science students in 2000-01 was 400.
Percentage of science students in 2000-01
$= \left[\frac{400}{1350} \times 100\right]\% = 29.6\%$
So, answer (c) is correct.

2. (b) : Total number of students in 2002-03
$= (500 + 600 + 250 + 250) = 1600$
Number of law students in 2002-03 is 250.
Percentage of law students in 2002-03
$= \left[\frac{250}{1600} \times 100\right]\% = 15.6\%$
So, answer (b) is correct.

3. (d) : Total strength in 2001-02
$= (550 + 500 + 250 + 200) = 1500$
So, $\frac{\text{Total strength}}{\text{Strength of commerce students}}$
$= \frac{1500}{250} = 6.$

4. (c) : A slight look indicates that the strength in arts faculty in 2000-01, 2001-02 and 2002-03 was 600, 550 and 500 respectively. So, it was minimum in 2002-03. So, answer (c) is correct.

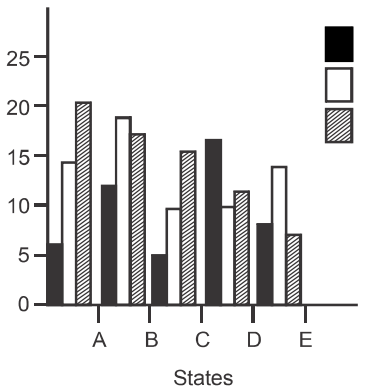
5. (a) : Number of science students in 2000 - 01 was 400.
Number of science students in 2002 - 03 was 600.
$\text{Percentage increase} = \left(\frac{200}{400} \times 100\right)\% = 50\%$
Answer (a) is correct.

6. (a) : [Just a look is sufficient.]

EXERCISE

Directions (Qs. 1 to 5) : *Examine the following graph carefully and answer the questions given below it.*

Production of Cotton bales of 100 kg. each in lacs in States *A,B, C,D, and E* during 1995-96, 1996-97, 1997-98



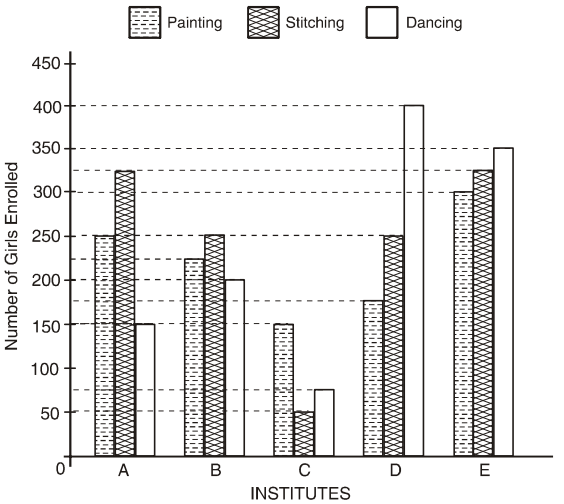
1. The production of State *D* in 1997-98 is how many times its production in 1996-97?
(*a*) 1.33 (*b*) 0.75
(*c*) 0.56 (*d*) 1.77
(*e*) None of these

2. In which states is there a steady increase in the production of cotton during the given period?
(*a*) *A* and *B*
(*b*) *A* and *C*
(*c*) *B* only
(*d*) *D* and *E*
(*e*) None of these

3. How many tonnes of cotton was produced by State *E* during the given period?
(*a*) 2900
(*b*) 290000
(*c*) 29000
(*d*) 2900000
(*e*) None of these

4. Which of the following statements is False?
(*a*) States *A* & *E* showed the same production in 1996-97.
(*b*) There was no improvement in the production of cotton in State *B* during.
(*c*) State *A* has produced maximum cotton during the given period.
(*d*) Production of states *C* and *D* together is equal to that of State *B* during 1996-97.
(*e*) None of these

Directions (Qs. 5 to 9): *Study the graph carefully to answer the questions that follow:*



5. What is the respective ratio of total number of girls enrolled in Painting in the institutes A and C together to those enrolled in Stiching in the institutes D and E together?
(a) 5 : 4 *(b)* 5 : 7
(c) 9 : 8 *(d)* 16 : 23
(e) None of these

6. What is the respective ratio of total number of girls enrolled in Painting, Stiching and Dancing from all the Institutes together?
(a) 43 : 47 : 48 *(b)* 44 : 47 : 48
(c) 44 : 48 : 47 *(d)* 47 : 48 : 44
(e) None of these

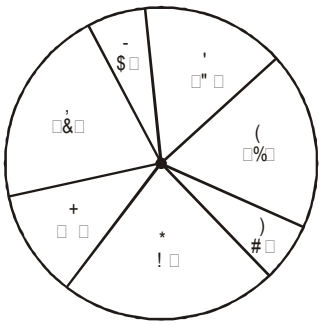
7. What is the total number of girls enrolled in Painting from all the Institutes together?
(a) 1100 *(b)* 1150
(c) 1200 *(d)* 1275
(e) None of these

8. Number of girls enrolled in Stitching in Institute B forms approximately what per cent of the total number of girls enrolled in Stitching in the Institutes together?
(a) 21% *(b)* 29%
(c) 33% *(d)* 37%
(e) None of these

9. Number of girls enrolled in Dancing in Institute A forms what per cent of total number of girls enrolled in all the Hobby classes together in that Institute?
(a) 17.76% *(b)* 20.69%
(c) 31.23% *(d)* 33.97%
(e) None of these

Directions (Qs. 10 to 14): *Study the following graph and table carefully and answer the questions given below it:*

Distribution of Candidates appeared in a competitive examination from seven states
Total Candidates appeared = 3 lakh



State-wise percentage and ratio of male and female qualified candidates

State	*% Qualified over appeared from a state*	*Ratio of qualified Candidates*
A	49	4 : 5
B	61	6 : 4
C	54	7 : 8
D	45	3 : 2
E	65	7 : 6
F	57	11 : 8
G	48	9 : 11

10. What is the number of male candidates qualified from State 'G'?
(a) 4536 *(b)* 4568
(c) 5454 *(d)* 5544
(e) None of these

11. Which of the following pair of states have equal number of qualified male candidates?
(a) A and E *(b)* B and F
(c) C and E *(d)* C and G
(e) None of these

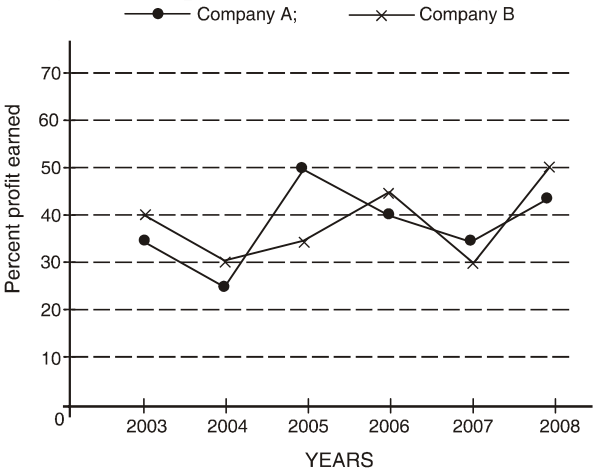
12. What is the total number of candidates qualified from states E and D together?
(a) 45540 *(b)* 54410
(c) 54450 *(d)* 54540
(e) None of these

13. What is the total number of female candidates qualified from states A and B together?
(a) 24526 *(b)* 25426
(c) 26426 *(d)* 26526
(e) None of these

14. What is the percentage of candidates qualified from states 'A' and 'B' together of the total candidates appeared?
(a) 16.23% *(b)* 18.33%
(c) 22.23% *(d)* 25.33%
(e) None of these

Directions (Qs. 15 to 19): *Study the following graph carefully and answer the questions given below it.*

Per cent profit earned by two Companies A and B over the years



$$\text{Profit} = \text{Income} - \text{Expenditure}$$

$$\text{Profit}\% = \frac{\text{Profit}}{\text{Expenditure}} \times 100$$

15. If the income of company A in 2005 was ₹ 1,42,500, what was its expenditure in that year?
(a) ₹ 95000 *(b)* ₹ 95500
(c) ₹ 99,500 *(d)* ₹ 1,05,000
(e) None of these

16. If the expenditure of Company 'A' in 2004 was ₹ 75 lakhs and income of Company A in 2004 was equal to its expenditure in 2005. What was the total income (in lakhs ₹) of the Company A in 2004 and 2005 together?
(a) 131.25 *(b)* 175
(c) 218.75 *(d)* 234.37
(e) None of these

17. Total expenditure of companies A & B together in 2008 was ₹ 13.5 lakhs. What was the total income of the two companies (in lakh Rs.) in that year?
(a) 19.75
(b) 20.25
(c) 19.575
(d) Cannot be determined
(e) None of these

18. Expenditure of company 'B' in 2006 was 90% of its expenditure in 2005. Income of Company 'B' in 2006 was what per cent of its income in 2005?
(a) $96\frac{2}{3}$ *(b)* $99\frac{1}{3}$
(c) 121.5 *(d)* 130.5
(e) None of these

19. Expenditure of company 'B' in years 2003 and 2004 were in the ratio of 5 : 7 respectively. What was the respective ratio of their incomes?
(a) 8 : 13 *(b)* 10 : 13
(c) 11 : 14 *(d)* 13 ; 14
(e) None of these

EXPLANATORY ANSWERS

1. (*b*) : Suppose, it is x times

$$x = \frac{12}{9} = \frac{4}{3}$$

2. (*b*) : It is clear by graph.

3. (*b*) : $8 + 14 + 7 = 29$ lakhs

$$\text{Its weight} = \frac{29 \times 100000}{1000} \times 100$$

4. (*c*) : State B = 48 lakh bales State A = 41 lakh bales

5. (*d*) : Total number of girls enrolled in Painting in the Institutes A and C = 250 + 150 = 400

Total number of girls enrolled in Stitching in the Institutes D and E = 250 + 325 = 575

Required ratio = 400 : 575 = 16 : 23

6. (*c*) : Total number of girls enrolled in Painting = 250 + 225 + 150 + 175 + 300 = 1100

Total number of girls enrolled in Stitching = 325 + 250 + 50 + 250 + 325 = 1200

Total number of girls enrolled in Dancing = 150 + 200 + 75 + 400 + 350 = 1175

Hence, required ratio = 1100 : 1200 : 1175 = 44 : 48 : 47

7. (*a*) : Total number of girls enrolled in Painting = 250 + 225 + 150 + 175 + 300 = 1100

8. (*a*) : Number of girls enrolled in Stitching in Institute B = 250

Total number of girls enrolled in Stitching in all the Institutions = 325 + 250 + 50 + 250 + 325 = 1200

Hence, required percentage

$$= \frac{250}{1200} \times 100 = 20.83 \approx 21\%$$

9. (*b*) : Number of girls enrolled in Dancing in Institute A = 150

Total number of girls enrolled in all the Hobby classes together in Institute A = 250 + 325 + 150 = 725

$$\text{Hence, required percentage} = \frac{150}{725} \times 100$$

$$= 20.69\%$$

10. (*a*) : Number of candidates qualified from State

$$G = \frac{48}{100} \times \frac{7}{100} \times 3{,}00{,}000 = 10080$$

Number of male candidates qualified from

$$\text{State G} = \frac{9}{9+11} \times 10080 = \frac{9}{20} \times 10080$$

$$= 4536$$

11. (*d*) : Qualified Male Candidates from different states:

$$A \rightarrow \frac{4}{9} \times \frac{49}{100} \times \frac{15}{100} \times 300000 = 9800$$

$$B \rightarrow \frac{6}{10} \times \frac{61}{100} \times \frac{18}{100} \times 300000 = 19764$$

$$C \rightarrow \frac{7}{15} \times \frac{54}{100} \times \frac{6}{100} \times 300000 = 4536$$

$$D \rightarrow \frac{3}{5} \times \frac{45}{100} \times \frac{23}{100} \times 300000 = 18630$$

$$E \rightarrow \times \frac{7}{13} \times \frac{65}{100} \times \frac{12}{100} \times 300000 = 12600$$

$$F \rightarrow \frac{11}{19} \times \frac{57}{100} \times \frac{19}{100} \times 300000 = 18810$$

$$G \rightarrow \frac{9}{20} \times \frac{48}{100} \times \frac{7}{100} \times 300000 = 4536$$

Hence, states C and G have equal number of qualified male candidates.

12. (*c*) : Required number of candidates

$$= \frac{65}{100} \times \frac{12}{100} \times 300000 + \frac{45}{100} \times \frac{23}{100} \times 300000$$

$$= 23400 + 31050 = 54450$$

13. (*b*) : Required number of female candidates

$$= \frac{5}{9} \times \frac{49}{100} \times \frac{15}{100} \times 300000 + \frac{4}{10} \times \frac{61}{100} \times \frac{18}{100} \times 300000$$

$$= 12250 + 13176 = 25426$$

14. (*b*) : Number of candidates qualified from states A and B together

$$= \frac{49}{100} \times \frac{15}{100} \times 300000 + \frac{61}{100} \times \frac{18}{100} \times 300000$$

$= 22050 + 32940 = 54990$

$$\text{Required percentage} = \frac{54990}{300000} \times 100$$

$= 18.33\%$

15. (*a*) : Let expenditure of Company A in 2005 = ₹ x; then

$$x + \frac{50}{100} \times x = 1{,}42{,}500 \Rightarrow \frac{3x}{2} = 1{,}42{,}500$$

$$\therefore\ x = \frac{2 \times 1{,}42{,}500}{3} = ₹\ 95000$$

16. (*d*) : In 2004, expenditure of Company 'A' = ₹ 75 lakh

Since, income of the Company 'A' in 2004

$$= 75 + \frac{25}{100} \times 75 = ₹\ 93.75 \text{ lakhs}$$

Now, expenditure of the Company 'A' in 2005 = ₹ 93.75 lakhs

Since, income of the Company A in 2005

$$= 93.75 + \frac{50}{100} \times 93.75$$

= ₹ 140.62 lakhs

Hence, total income for both the years = 93.75 + 140.62 = ₹ 234.37 lakhs

17. (*d*) : Here total expenditure of both companies are given while their individual expenditures are needed to determine their incomes. So, the total income of the two companies cannot be determined by the given datas.

18. (*a*) : Let expenditure of Company B in 2005 = ₹ x; then

$$I_1 \text{ (Income)} = x + \frac{35}{100}x = \text{Rs.}\frac{27x}{20}$$

Since, expenditure of Company B in 2006

$$= \frac{90}{100} \times ₹\ x = ₹\frac{9x}{10}, \text{ then}$$

$$I_2 \text{ (Income)} = \frac{9x}{10} + \frac{45}{100} \times \frac{9x}{10}$$

$$= \frac{9x}{10} + \frac{81x}{200} = ₹\frac{261x}{200}$$

Hence, required percentage

$$= \frac{261x/200}{27x/20} \times 100 = \frac{290}{3} = 96\frac{2}{3}\%$$

19. (*b*) : Let expenditures of Company B in 2003 and 2004 are ₹ $5x$ and ₹ $7x$ respectively; then

their income in 2003, I_1

$$= 5x + \frac{40}{100} \times 5x = ₹\ 7x$$

Also their income in 2004,

$$I_2 = 7x + \frac{30}{100} \times 7x = ₹\frac{91x}{10}$$

$$\text{Hence, the required ratio} = 7x : \frac{91x}{10}$$

$= 10 : 13.$