GS FOUNDATION 2.0 (2023-24)
BOOKLET 28
Data Interpretation

Charts, Graphs, Tables, Data sufficiency, etc

Contents

1) INTRODUCTION TO STATISTICS

Statistics consists of a body of methods for collecting and analysing data

Statistical methods can be used to find answers to the questions like:

- What kind and how much data need to be collected?
- How should we organize and summarize the data?
- How can we analyse the data and draw conclusions from it?
- How can we assess the strength of the conclusions and evaluate their uncertainty?

That is, statistics provides methods for

- Design: Planning and carrying out research studies.
- Description: Summarizing and exploring data. (Descriptive statistics)
- Inference: Making predictions and generalizing about phenomena represented by the data (Inferential Statistics)

2) IMPORTANT TERMS

1. Population: Population is the collection of all individuals or items under consideration in a statistical study
2. Sample: Sample is that part of the population from which information is collected.

Always only a certain, relatively few, features of individual person or object are under investigation at the same time. Not all the properties are wanted to be measured from individuals in the population

3. Variable: A characteristic that varies from one person or thing to another is called a variable
4. Sample Range: The sample range of the variable is the difference between its maximum and minimum values in a data set: Range = Max − Min.

The measures that indicate where the centre or the most typical value

of the variable lies in collected set of measurements are called measures of

centre. Measures of centre are often referred to as averages and are of primarily 3 types – Mean, Mode and Median

5. **Mean**: The sample mean of the variable is the sum of observed values in a data divided by the number of observations.

6. **Mode**: Obtain the frequency of each observed value of the variable in a data and note the greatest frequency.
   1. If the greatest frequency is 1 (i.e. no value occurs more than once), then the variable has no mode.
   2. If the greatest frequency is 2 or greater, then any value that occurs with that greatest frequency is called a sample mode of the variable.

7. **Median**: Arrange the observed values of variable in a data in increasing order.
   1. If the number of observations is odd, then the sample median is the observed value exactly in the middle of the ordered list.
   2. If the number of observations is even, then the sample median is the number halfway between the two middle observed values in the ordered list.

3) DATA INTERPRETATION

Data interpretation refers to the process of using diverse analytical methods to review data and arrive at relevant conclusions. The interpretation of data helps researchers to categorize, manipulate, and summarize the information in order to answer critical questions.

We can be asked to interpret data given in the form of charts, tables, graphs or statements.

We simply have to plot the information and bring out relevant inferences as per the demand of the question.

4) PYQS

CSE 2017: Directions for the following 3 (three) items: consider the given information and answer the three items that follow.

A, B, C, D, E, F and G are Lecturers from different cities—Hyderabad, Delhi, Shillong, Kanpur, Chennai, Mumbai and Srinagar (not necessarily in the same order) who participated in a conference. Each one of them is specialized in a different subject, viz., Economics, Commerce, History, Sociology, Geography, Mathematics and Statistics (not necessarily in the same order). Further

1. Lecturer from Kanpur is specialized in Geography

2. Lecturer D is from Shillong

3. Lecturer C from Delhi is specialized in Sociology

4. Lecturer B is specialized in neither History nor Mathematics

5. Lecturer A who is specialized in Economics does not belong to Hyderabad

6. Lecturer F who is specialized in Commerce belongs to Srinagar

7. Lecturer G who is specialized in Statistics belongs to Chennai

Q. Who is specialized in Geography?

(a) B

(b) D

(c) E

(d) Cannot be determined as data are inadequate

Q. Lecturer B is specialized in Geography. To which city does the Lecturer specialized in Economics belong?

(a) Hyderabad

(b) Mumbai

(c) Neither Hyderabad nor Mumbai

(d) Cannot be determined as data are inadequate

Q. Lecturer A specializes in Economics and he belongs to Mumbai. Who of the following belongs to Hyderabad?

(a) B

(b) E

(c) Neither B nor E

(d) Cannot be determined as data are inadequate

Q.In a school, there are five teachers A, B, C, D and E. A and B teach Hindi and English. C and B teach English and Geography. D and A teach Mathematics and Hindi. E and B teach History and French. Who teaches maximum numb, of subjects?

(a) A

(b) B

(c) D

(d) E

Q. In a group of six women, there are four tennis players, four postgraduates in Sociology, one postgraduate in Commerce and three bank employees. Vimala and Kamla are the bank employees while Amala and Komala are unemployed. Komala and Nirmala are among the tennis players. Amala, Kamla, Komala and Nirmala are postgraduates in Sociology of whom two are bank employees.

If Shyamala is a postgraduate in Commerce, who among the following is both a tennis player and a bank employee?

(a) Amala

(b) Komala

(c) Nirmala

(d) Shyamala

Six boys A, B, C, D, E and F play a game of cards. Each has a pack of 10 cards. F borrows 2 cards from A and gives away 5 to C who in turn gives 3 to B while B gives 6 to D who passes 1 to E. Then the number of cards possessed by D and E is equal to the number of cards possessed by

(a) A, B and C

(b) B, C and F

(c) A, B and F

(d) A, C and F

Q.What is the total number of digits printed, if a book containing 150 pages is to numbered from 1 to 150?

(a) 262

(b) 342

(c) 360

(d) 450

CSE 2016: Direction for the following 3 (three) items: Consider the given information and answer the three items that follow.

When three friends A, B and C met, it was found that each of them wore an outer garment of a different colour. In random order, the garments are: jacket, sweater and tie; and the colours are: blue, white and black. Their surnames in random order Kumar and Singh.

Further, we know that:

1. neither B nor Ribeiro wore a white sweater

2. C wore a tie

3. Singh's garment was not white

4. Kumar does not wear a jacket

5. Ribeiro does not like to wear the black colour

6. Each of the friends wore only one outer garment of only one colour

14. What is C's surname?

(a) Ribeiro

(b) Kumar

(c) Singh

(d) Cannot be determined

15. What is the colour of the tie?

(a) Black

(b) Blue

(c) White

(d) Cannot be determined

16. Who wore the sweater?

(a) A

(b) B

(c) C

(d) Cannot be determined

CSE 2016: There were 50 faculty members comprising 30 males and the rest females. No male faculty member knew music, but many of the female faculty members did. The Head of the institution invited six faculty members to a tea party by draw of lots. At the party is was discovered that no members knew music. The conclusion is that:

(a) the party comprised male faculty members only

(b) the party comprised only those female faculty members who could not give renderings in music

(c) the party comprised both male and female faculty members

(d) nothing can be said about the gender composition of the party

CSE 2016: Directions for the following 5 (five) items: Consider the following information and answer the five items that follow:

There are five persons in a group — P, Q, R, S and T. The group has one doctor, one lawyer and one artist. P and S are unmarried students. T is a man married to one of the group members. Q is the brother of P and is neither doctor nor artist. R is not doctor.

55. Who is the doctor?

(a) T
(b) P
(c) Q
(d) R

56. Who is the artist?

(a) P

(b) Q

(c) R

(d) T

57. Who is the spouse of R?

(a) P

(b) T

(c) Q

(d) S

58. Who is the lawyer?

(a) P

(b) Q

(c) R

(d) S

59. Who of the following is definitely a man?

(a) P

(b) S

(c) Q

(d) None of the above

CSE 2016: Direction for the following 3 (three) items: Consider the given -formation and answer the three items that follow.

Six boxes A, B, C, D, E and F have been painted with six different colours viz., violet, indigo, blue, green, yellow and orange and arranged from left to right (not necessarily either kept or painted with the colours in the same order). Each box contains a ball of any one of the following six games: cricket, hockey, tennis, golf, football and volleyball (not necessarily in the same order). The golf ball is in violet box and is not in the box D. The box A which contains tennis ball is orange in colour and is at the extreme right. The hockey ball is neither in box D nor in box E. The box C having cricket ball is painted green. The hockey ball is neither in the box painted blue nor in the box painted yellow. The box C is fifth from right and next to box B. The box B contains volleyball. The box containing the hockey ball is between the boxes containing golf ball and volleyball.

74. Which one of the following boxes contains the golf ball?

(a) F

(b) E

(c) D

(d) None of the above

75. Which of the following statements is/are correct?

(a)	D	is	painted	yellow
(b)	F	is	painted	indigo
(c)	B	is	painted	blue

(d) All of the above

76. The football is in the box of which colour?

(a) Yellow

(b) Indigo

(c) Cannot be determined as data are inadequate

(d) Blue

CSE 2015: Two men, Anil and David, and two women, Shabnam and Rekha are in a sales group. Only two speak Tamil. The other two speak Marathi. Only one man and one woman can drive a car. Shabnam speaks Marathi. Anil speaks Tamil. Both Rekha and David can drive. Which of the following statements is true?

(a) Both the Tamil speakers can drive a car.

(b) Both the Marathi speakers can drive a car.

(c) Both of those who can drive a car speak Marathi.

(d) One of those who can drive a car speaks Tamil.

CSE 2015: A society consists of only two types of people fighters and cowards. Two cowards are always friends.

A fighter and a coward are always enemies. Fighters are indifferent to one another.

If A and B are enemies, C and D are friends, E and F are indifferent to each other, A and E are not enemies, while B and F are enemies.

Which of the following statements is correct?

(a) B, C and F are cowards.

(b) A, E and F are fighters.

(c) B and E are in the same category.

(d) A and F are in different categories.

CSE 2015: An automobiles owner reduced his monthly petrol consumption when the prices went up. The price consumption relationship is as follows:

Price (Rs/ltr)	40	50	60	75
Monthly consumption (in ltr)	60	48	40	30

If the price goes up to Rs. 80 per litre, his expected consumption (in litres) will be

(a) 30

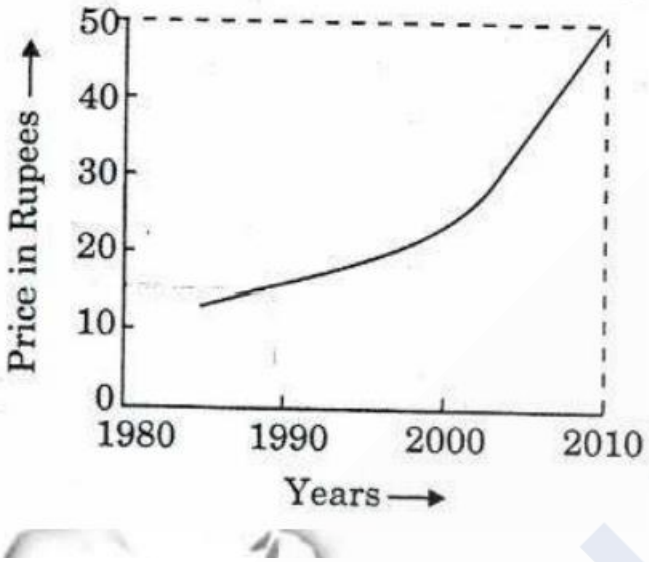
(b) 28

(c) 26

(d) 24

CSE 2015:

78. Year-wise variation of the price of a certain commodity is shown in the following graph:



The price of the commodity in the year 1990

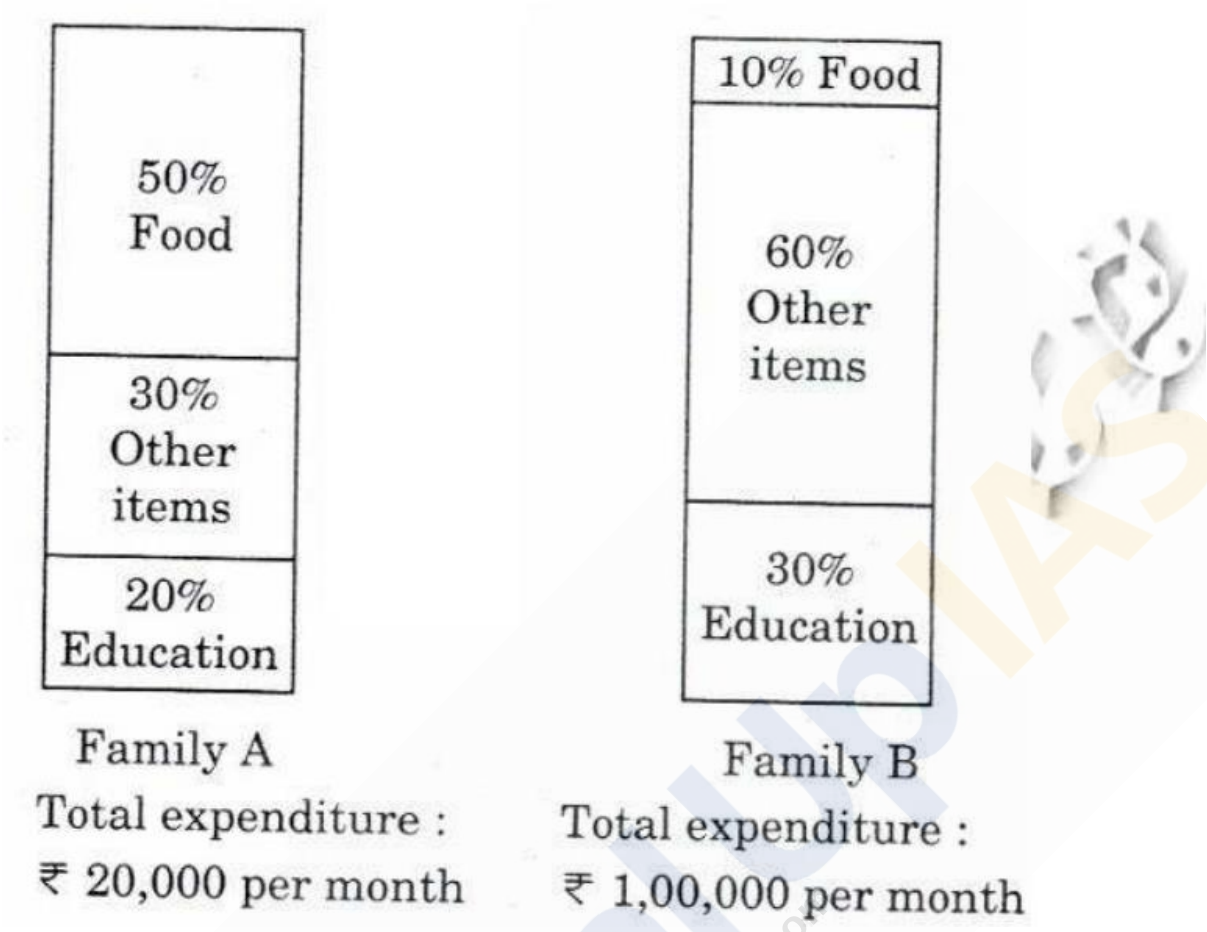
(a) must have been Rs. 10/-

(b) must have been Rs. 12/-

(c) must have been anywhere between Rs. 10/- and Rs. 20/-

(d) is higher than that in the year 1991

CSE 2015: The proportion of expenditure on various items by two families A and B are represented in the following Bar Charts:



From these charts, we can conclude that

(a) Family A spent more money on food than Family B.

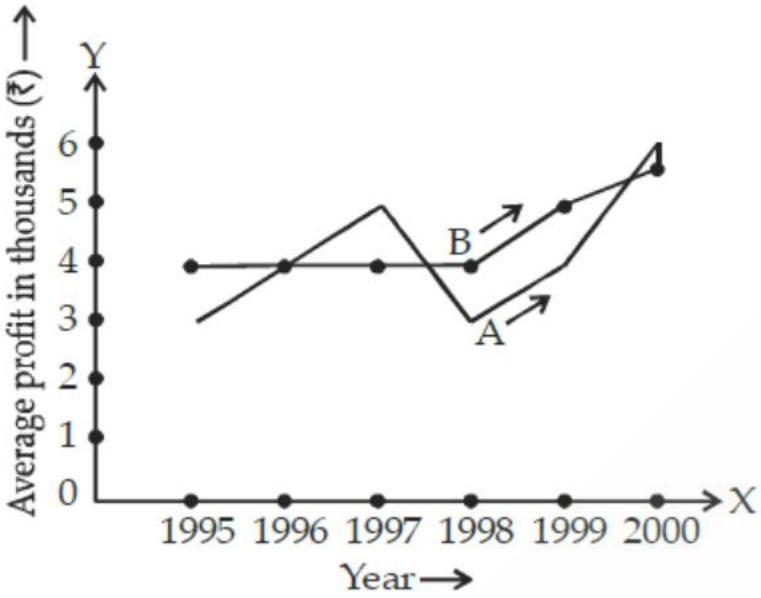
(b) Family B spent more money on food than Family A.

(c) Family A and Family B spent the same amount on food.

(d) The expenditure on food by Family A and Family B cannot be compared.

CSE 2014: Directions for the following 4 (four) items: The following graph shows the average profit of two fruit-sellers A and B in thousands (Rs.) per year from the year 1995 to 2000.

Consider the graph and answer the 4 (four) items that follow:



Q. In which year is the average profit of A and B same?

(a) 1995

(b) 1996

(c) 1997

(d) 1998

Q. What is the difference between the average profit of B and A in the year 1998?

(a) - Rs. 100

(b) - Rs. 1,000

(c) + Rs. 600

(d) - Rs. 300

Q. How much more average profit did A make in the year 2000 than in the year 1999?

(a) Rs. 200

(b) Rs. 1,000

(c) Rs. 1,500

(d) Rs. 2,000

Q. What is the trend of the average profit of B from the year 1997 to the year 2000?

(a) Non-increasing

(b) Non -decreasing

(c) Steady

(d) Fluctuating

CSE 2014: The following table gives population and total income of a city for four years:

Year	1992	1993	1994	1995
Population In lakhs	20	21	22	23
Income In crores (Rs.)	1010	1111	1225	1345

Which one of the following statements correct in respect of the above data?

(a) Population increased by 5% or more every year.

(b) Income increased by 10% or more every year.

(c) Per capita income was always above 5,000.

(d)Per capita income was highest in 1994.

CSE 2014: A question paper must have a question on one of the eight poets: A, B, C, D, E, F, G or H The first four belong to the medieval period while the rest are considered modern poets Generally, modern poets figure in the question paper in alternate years. Generally, those who like H like G also; and those who like F like E also. The paper-setter does not like to ask about F as he has written a book on F, but he likes F. Last year, the paper contained a question on A. On the basis of the information given, this year's paper is most likely to contain a question on

(a) C

(b) E

(c) F

(d) H

CSE 2014: The following table shows the marks obtained by two students in different subjects:

Subjects	Student A	Maximum marks	Student B	Maximum marks
English	60	100	80	150
Psychology	70	100	70	100
History	30	100	60	100
Sanskrit	50	50	15	25

The difference in the mean aggregate percentage marks of the students is

(a) 2.5%

(b) 13.75%

(c) 1.25%

(d) Zero

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CSE 2014: In a group of six women there are four dancers, four vocal musicians, one actress and three violinists. Girija and Vanaja are among the violinists while Jalaja and Shailaja do not know how to play on the violin. Shailaja and Tanuja are among the dancers. Jalaja, Vanaja, Shailaja and Tanuja are all vocal musicians and two of them are also violinists. If Pooja is an actress, who among the following is certainly a dancer and a violinist?

(a) Jalaja

(b) Pooja

(c) Shailaja

(d) Tanuja

CSE 2014: The letters L, M, N, 0, P, Q, R, S and T in their order are substituted by nine integers 1 to 9 but not in that order. 4 is assigned to P. The difference between P and T is 5. The difference between N and T is 3. What is the integer assigned to N?

(a) 7

(b) 5

(c) 4

(d) 6

CSE 2014: Six books are labelled A, B, C, D, E and F and are placed side by side. Books B, C, E and F have green covers while others have yellow covers. Books A, B and D are new while the rest are old volumes. Books A, Band Care law reports while the rest are medical extracts. Which two books are old medical extracts and have green covers?

(a) B and C

(b) E and F

(c) C and E

(d) C and F

CSE 2014: Direction for the following 5 (five) items:

Study the two figures given below and answer the five items that follow:

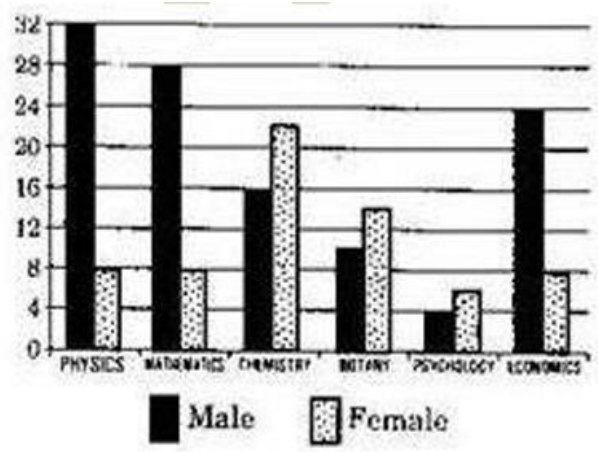


Figure 1 : Number of Professors in selected disciplines in a University by sex

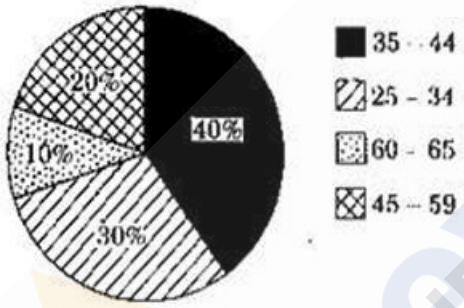


Figure 2 : Age of Physics Professors

25. How many Physics professors belong to the age group 35 - 44?

(a) 18

(b) 16

(c) 14

(d) 12

26. Which one of the following disciplines has the highest ratio of males to females?

(a) Physics

(b) Mathematics

(c) Chemistry

(d) Economics

27. What percentage of all Psychology professors are females?

(a) 40%

(b) 50%

(c) 60%

(d) 70%

28. If the number of female Physics professors in the age group 25 - 34 equals 25% of all the Physics professors in that age group, then what is the number of male Physics professors in the age group 25 - 34?

(a) 9

(b) 6

(c) 3

(d) 2

29. If the Psychology professors in the University constitute 2% of all the professors in the University, then what is the number of professors in the University?

(a) 400

(b) 500

(c) 600

(d) 700

CSE 2013: Directions for the following 3 (three) items:

Read the following passage and answer the three items that follow:

A tennis coach is trying to put together a team of four players for the forthcoming tournament. For these 7 players are available: males A, Band C; and females W, X, Y and Z. All players have equal capability and at least 2 males will be there in the team. For a team of four, all players must be able to play with each other. But, B cannot play with W, C cannot play with Z and W cannot play with Y.

Q. If Y is selected and B is rejected, the team will consist of which one of the following groups?

a) A, C, Wand Y

b) A, C, X and Y

c) A, C, Y and Z

d) A, W, Y and Z

Q. If B is selected and Y is rejected, the team will consist of which one of the following groups?

a) A, B, C and W

b) A, B, C and Z

c) A, B, C and X

d) A, W, Y and Z

Q. If all the three males' are selected, then how many combinations of four member teams are possible?

a) 1

b) 2

c) 3

d) 4

CSE 2013: Directions for the following 3 (three) items:

Examine carefully the following statements and answer the three items that follow.

Out of four friends A, B, C and D,

A and B play football and cricket,

B and C play cricket and hockey,

A and D play basketball and football,

C and D play hockey and basketball.

Q. Who does not play hockey?

a) D

b) C

c) B

d) A

Q. Who plays football, basketball and hockey?

a) D

b) C

c) B

d) A

Q. Which game do B, C and D play?

a) Basketball

b) Hockey

c) Cricket

d) Football

CSE 2013: Geeta is older than her cousin Meena, Meena's brother Bipin is older than Geeta. When Meena and Bipin visit Geeta, they like to play chess. Meena wins the game more often than Geeta. Based on the above information, four conclusions, as given below, have been made. Which one of these logically follows from the information given above?

a) While playing chess with Geeta and Meena, Bipin often loses.

b) Geeta is the oldest among the three.

c) Geeta hates to 10 the game.

d) Meena is the youngest of the three

CSE 2013: A, B, C, D and E belong to five different cities P, Q, R, Sand T (not necessarily in that order). Each one of them comes from a different city.

Q. Further it is given that:

1. B and C do not belong to Q.

2. B and E do not belong to P and R.

3. A and C do not belong to R, Sand T.

4. D and E do not belong to Q and T.

Q.Which one of the following statements is not correct?

a) C belongs to P

b) D belongs to R

c) A belongs to Q

d) B belongs to S

CSE 2013: Seven men, A, B, C, D, E, F and G are standing in a queue in that order. Each one is wearing a cap of a different colour like violet, indigo, blue, green, yellow, orange and red. D is able to see in front of him green and blue, but not violet. E can see violet and yellow, but not red. G can see caps of all colours other than orange. If E is wearing an indigo-coloured cap, then the colour of the cap worn by F is

a) Blue

b) Violet

c) Red

d) Orange

CSE 2013: Four cars are hired at the rate of Rs. 6 per km plus the cost of diesel at Rs. 40 a litre. In this context, consider the details given in the following table:

Car	Mileage (km/l)	Hours	Total Payment (Rs.)
A	8	20	2120
B	10	25	1950
C	9	24	2064
D	11	22	1812

Which car maintained the maximum average speed?

(a) Car A

(b) Car B

(c) Car C

(d) Car D

CSE 2012: Consider the following information regarding the performance of a class of 1000 students in four different tests.

Test	I	II	III	IV
Average Mars	60	60	70	80
Range Marks	30 to 90	45 to 75	20 to 100	0 to 100

If a student scores 74 marks in each of the four tests, in which one of the following tests in her performance the best comparatively?

(a) Test I

(b) Test II

(c) Test III

(d) Test IV

CSE 2012: Three persons A, B & C wear shirts of Black, Blue and Orange colours (not necessarily in the order) and pants of green, yellow and orange (not necessarily in that order). No person wore shirt and pant of the same colour. Further, it is given that,

1. A did not wear shirt of black colour.
2. B did not wear shirt of blue colour.
3. C did not wear shirt of orange colour.
4. A did not wear the pants of green colour
5. B wore pants of orange colour.

What were the colours of the pants and shirts worn by C respectively?

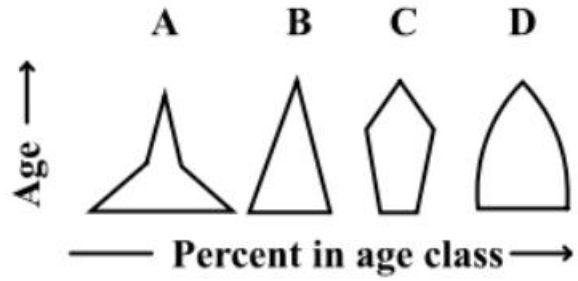
a) Orange and black

b) Green and blue

c) Yellow and blue

d) Yellow and black

CSE 2011: Consider the four age pyramids given below namely A, B, C and D representing four different countries



Which one of them indicates the declining population?

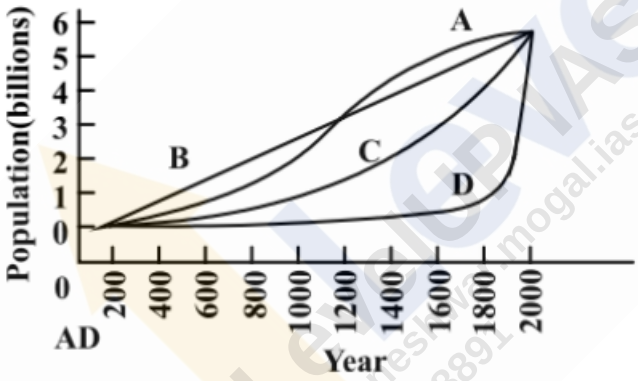
(a) A

(b) B

(c) C

(d) D

CSE 2011: The followings figures has four curves namely A, B, C and D, Study the figure and answer the item that follows



Q. Which curve indicates the exponential growth?

(a) A

(b) B

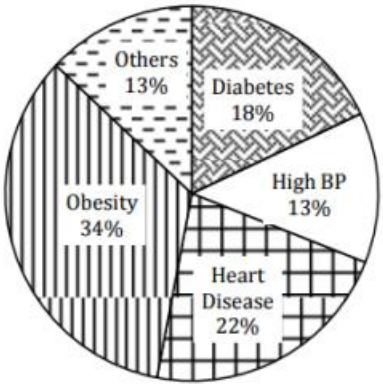
(c) C

(d) D

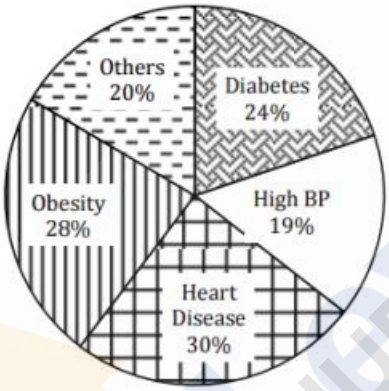
CSE 2011: Directions for the following 2 (two) items:

The following pie charts show the break-up of disease categories recorded in the patients from two towns, Town A and Town B. Pie charts plot the disease Categories as percentage of the total number of patients. Based on these, answer the two items that follow the charts.

Distribution of diseases in Town - A



Distribution of diseases in Town - B



Q. Which of the two towns has a higher number of persons with Diabetes?

(a) Town A

(b) Town B

(c) Same in Town A and Town B

(d) No inference can be drawn

Q. What can we say about persons with more than one disease from these graphs?

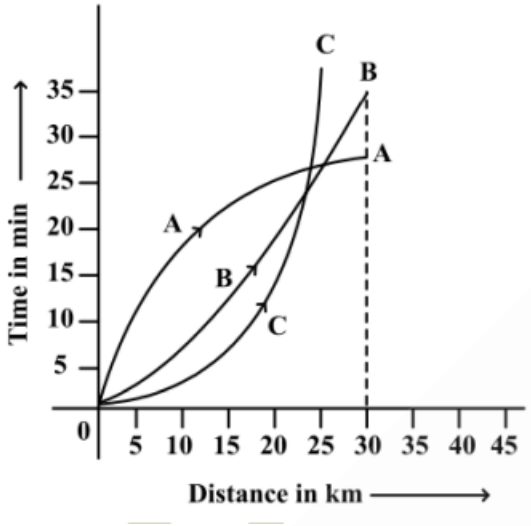
(a) There are likely to be persons with more than one disease in Town A.

(b) There are likely to be persons with more than one disease in Town B.

(c) There are likely to be persons with more than one disease in both Towns A and B.

(d) No inference can be drawn.

CSE 2011: Consider the following distance - time graph. The graph shows three athletes A, Band C running side by side for a 30 km race.



With reference to the above graph consider the following statements:

1. the race was won by A.

2. B was ahead of A up to 25 km 26 mark.

3. C ran very slowly from the begining.

Which of the statements given above is/are correct ?

(a) 1 only

(b) 1 and 2 only

(c) 2 and 3 only

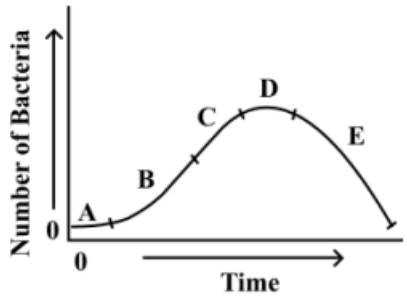
(d) 1, 2 and 3

CSE 2011: Directions for the following 3 (Three) items:

Read the passage given below, study the graph that follows and answer the three items given below the figure.

During a party, a person was exposed to contaminated water. A few days later, he developed fever and loose motions. He suffered for some days before going to a doctor for treatment. On starting the treatment, he soon became better and recovered completely a few days later.

The following graph shows different phases of the person's disease condition as regions A, B, C, D and E of the curve.



Q. Which region/regions of the curve correspond/corresponds to incubation phase of the infection?

(a) A only

(b) B only

(c) Band C

(d) No part of the curve indicates the incubation phase

Q. Which region of the curve indicates that the person began showing the symptoms of infection?

(a) A

(b) B

(c) C

(d) D

Q. Which region of the curve indicates that the treatment yielded effective relief?

(a) C

(b) D

(c) E

(d) The curve does not indicate the treatment