MBA PIONEER 2024

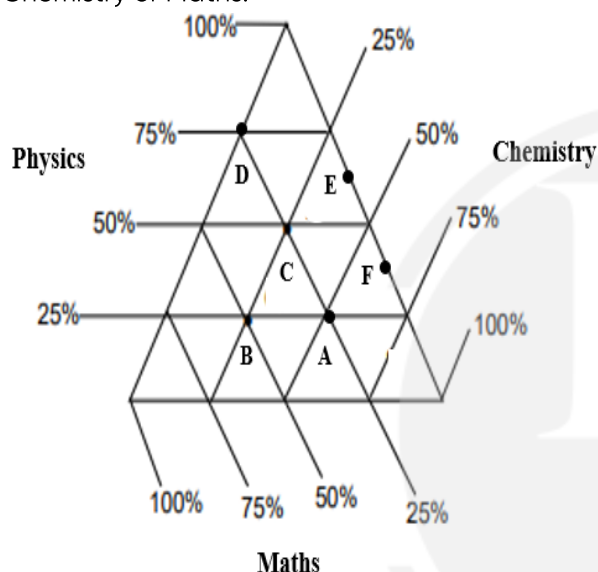## Data Interpretation & Logical Reasoning

Miscellaneous Charts - 2

Directions (1-5) Read the following passage and answer the given questions.

The following ternary diagram shows the percentage of students in six cities – A, B, C, D, E and F whose favourite subject is Physics, Chemistry or Maths.

Q1 If the total number of students in city C is 120 and that in city D is 100, find the number of students whose favourite subject is Physics.

(A) 100

(B) 115

(C) 135

(D) Cannot be determined

Q2 Find the difference between the number of students whose favourite subject is Maths from city B and the number of students whose favourite subject is Chemistry from city A.

(A) 12

(B) 15

(C) No difference

(D) Cannot be determined

Q3 If the number of students in city B is 96 and that in city C is 120, then the number of students in city B whose favourite subject is Physics is what percent of the number of students in city C whose favourite subject is Chemistry?

(A) 96%   (B) 86%

(C) 80%   (D) None of these

Q4 If the number of students in city A, B, C, D, E and F are 80, 96, 120, 100, 80 and 120 respectively, find the total number of students of these six cities whose favourite subject is Chemistry.

(A) 299   (B) 108

(C) 199   (D) 188

Q5 If the number of students in city A, B, C, D, E and F are 80, 96, 120, 100, 80 and 120 respectively, identify the city in which the highest number of students have their favourite subject as Physics.

(A) D   (B) E

(C) A   (D) C

Directions (6-10) Read the following passage and answer the given questions.

The chart given below shows the mileage of 5 vehicles and the distance that can be covered by them with the quantity of fuel in their tanks respectively.

Note: Tank of vehicles might be filled completely or partially.
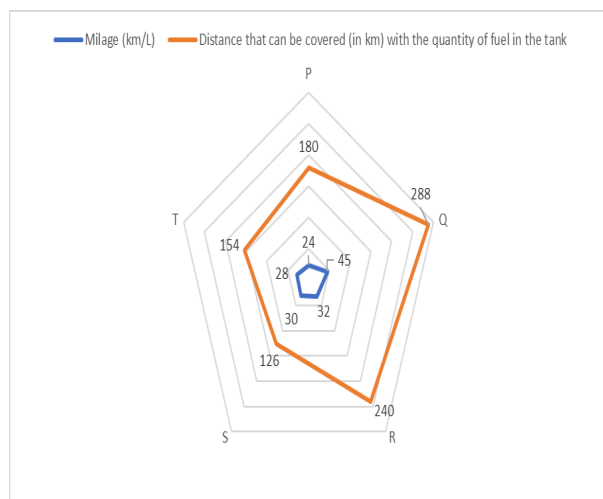
Quantity (in L) of fuel used in traveling in the tank as a percent of total capacity of the tank are 62.5%, 40%, 83.33%, 52.5% and 50% respectively for the vehicles P, Q, R, S & T.

Q6 Out of the four options mark the one which is the ratio of the capacity of fuel tank of vehicle P to that of S.
(A) 7 : 9   (B) 5 : 7
(C) 4 : 7   (D) 3 : 2

Q7 The quantity of fuel used in the tank of vehicle S is what percent of quantity of fuel used in the tank of vehicle R? (numerical value only)

Q8 Find the difference between the volume (in L) of empty part of the fuel tank of vehicle Q and that of T. (approximate to nearest integer)

Q9 If the fuel tank of vehicle R is emptied completely and the rate of fuel is Rs. 90/L, then find the amount (in Rs.) needed to completely fill the fuel tank of vehicle R.

Q10 If the cost of fuel is Rs. 90/L, then find the cost/km of running the vehicle Q.

Directions (11-15) Read the following passage and answer the given questions.
During an experiment five power generators P, Q, R, S, and T are used and the experiment is conducted for a limited time. The graph given below shows the maximum and minimum power (MW) of power generated by those generators and it also shows the power generated by those generators when the experiment starts and when it ends.

Note. All the power measures are calculated in MW (megawatt) and are integers.
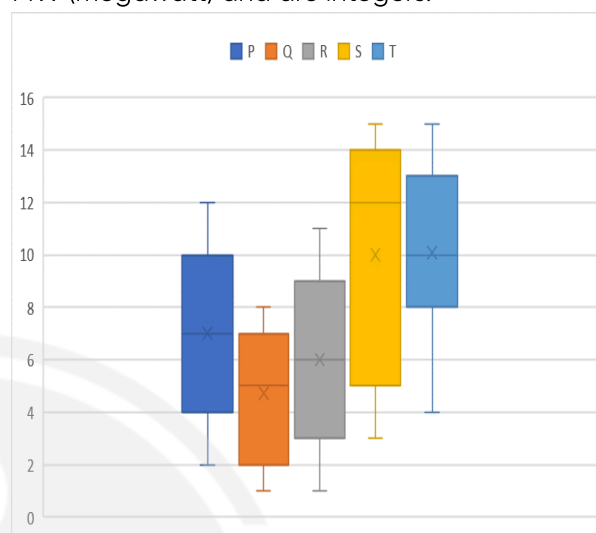
The ceiling (top) of the rectangle shows the power generated when the experiment starts, and floor (bottom) of the rectangle shows the power generated when the experiment ends.
The ceiling (top) of the line shows the maximum power generated by the generators while the floor (bottom) of the line shows the minimum power generated by the generators during the experiment.
There is also some loss of power generated by the generator: Loss in power when the generator generates more than 5 MW is 20% and otherwise, it is 25%.
Note: 1 MW = 1000 KW and 1 KW = 1000 W

Q11 If the generator P when generating minimum power can run 'x' machine that uses 12 KW power and generator Q at the end of the experiment can run 'y' machines that uses 10 KW power, then what is the ratio of 'x' to 'y'?
(A) 3: 8   (B) 5 : 6
(C) 4 : 9   (D) 2 : 5

Q12

Generator R when generating maximum power can run 'x' machines that uses 88 KW power when there is no problem in the machines. If because of some problem, those machines started consuming 12 KW more power, then by what percent number of machines are decreased to use power generated by R at that time?

(A) 10%   (B) 12%

(C) 14%   (D) 15%

Q13 Type A machines use 12 KW power and type B machines use 13 KW power. If the ratio of total type A to type B machines that can be run from the generator S when the experiment ends is 1: 1, then what is the total number of machines used?

(A) 392   (B) 300

(C) 312   (D) 320

Q14 If the generator S when generating minimum power can run 'x' machine that uses 15 KW power and generator T when generating maximum power can run 'y' machines that uses 24 KW power, then what is the ratio of 'x' to 'y'?

(A) 3 : 5   (B) 3 : 10

(C) 2 : 7   (D) 2 : 21

Q15 Generator T when generating maximum power can run 'x' machines that use 60 KW power when there is no problem in the machines. If because of some problem, those machines started consuming 40 KW more power, then by what percent number of machines are decreased to use power generated by T at that time?

(A) 50%   (B) 45%

(C) 40%   (D) 35%

Directions (16-20) Read the following passage and answer the given questions.

The sale and profit of eleven companies P, Q, R, S, T, U , V, W, X, Y and Z are observed by the GST inspector and the change in sales and profit of these companies is represented by the following Scattered Diagram from 2021 to 2022.
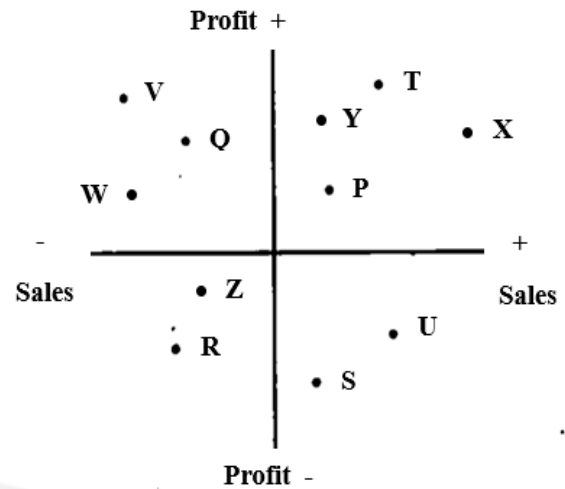
Expenses = Sales – Profits

Q16 Find the number of companies for which, did the expenses decrease definitely from 2021 to 2022?

(A) 5

(B) 4

(C) 2

(D) Cannot be determined

Q17 Find the number of companies for which, did the expenses decrease definitely from 2021 to 2022?

(A) 3   (B) 5

(C) 4   (D) 2

Q18 What could be the expense of company X in 2022, if it was ₹1000 Crores in 2021?

(A) ₹ 990 Crores   (B) ₹ 1100 Crores

(C) ₹ 1050 Crores   (D) Either B or C

Q19 What could be the expense of company Q in 2022, if it was ₹100 Crores in year 2021?

(A) ₹ 110 Crores   (B) ₹ 85 Crores

(C) ₹ 125 Crores   (D) ₹ 100 Crores

**Q20** The expenditure of all the companies were the same in the year 2021. What

can be said about their expenditure in 2022?

(A) Expenditure of S = Expenditure of Q

(B) Expenditure of S > Expenditure of Q

(C) Expenditure of S < Expenditure of Q

(D) None of these

Directions (21-25) Read the following passage and answer the given questions.

Two shopkeepers P and Q bought 5 different types of items at different prices. Following bubble chart represents the data regarding discounts given by these shopkeepers on the marked price of different items and profit earned by them on respective items. X-Y coordinates at the center of each bubble represents the discount given (in rupees) and profit earned (in rupees) on each item. Numerical value of area of bubble represents the marked price of each item. (Take π = 3.14)
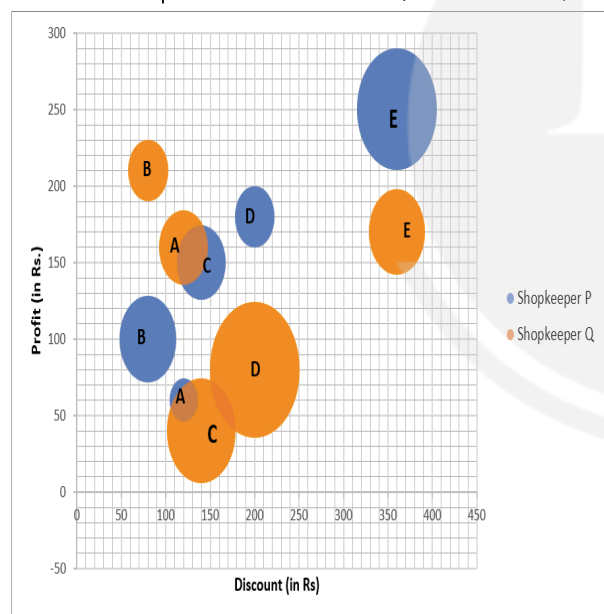
The following table represents the ratio of the radius of the bubble for each item for shopkeeper P and Q and their difference –

Item	Ratio of radius (Shopkeeper P : Shopkeeper Q)	Difference between radius of bubble for shopkeeper P and Q
A	1 : 3	50
B	2 : 1	50
C	1 : 2	75
D	1 : 5	200
E	2 : 1	100

Q21 What is the difference between the CP of Product C for shopkeeper P and Q?

(A) 54545   (B) 52335

(C) 53097.5   (D) 53000

Q22 Cost price of all given items taken together for shopkeeper P is approximately what percent more/less than the cost price of all given items taken together for shopkeeper Q?

(A) 45%   (B) 44%

(C) 43%   (D) 42%

Q23 If the radius of bubble D for shopkeeper P and Q are decreased by 15% and 40% respectively, then what will be the approximate difference between new selling price (Rs.) of item D sold by shopkeeper P and Q?

(A) 63867   (B) 64978

(C) 65089   (D) 66180

Q24 If shopkeeper P and Q allows an additional discount of Rs.4500 and Rs.5200 respectively on CP of item D , then the average of new selling price of item D for shopkeeper P and Q together is how much (in INR)?

(A) 97680   (B) 96870

(C) 97860   (D) 98760

Q25 What is the difference between the cost prices of item B for the shopkeeper P and Q?

(A) 21640   (B) 22650

(C) 23660   (D) 24670

Directions (26–30) Read the following passage and answer the given questions.

Three groups of students, A, B and C each comprising of 3 members, participate in a Maths competition. Each member of all the groups gets a set of 10 objective questions to solve. A group's performance is evaluated by calculating the ratio of total number of questions answered correctly to the total number of questions attempted by all members combined. The group with the best performance wins.

Following graph shows the percent accuracy of a member against the number of questions correctly attempted by him.
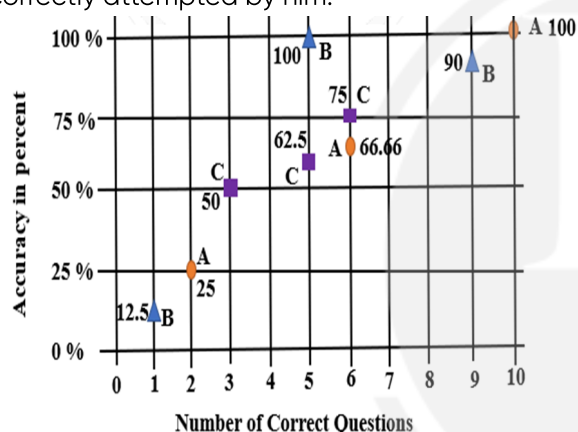
Q26   The winner of the Maths Competition is–
(A) Group C
(B) Group A
(C) Group B

(D) Cannot be determined

Q27   Maximum number of attempts made by–
(A) Group A
(B) Group B
(C) Group C
(D) Cannot be determined

Q28   If exactly one member from Group A and exactly one member from Group C had swapped their groups, then the performance of Group C would have been higher than that of Group A. What was the percent accuracy of the member from Group C who moved to Group A to make this happen?
(A) 75%
(B) 50%
(C) 62.5%
(D) More than one of the above

Q29   If '4' marks are to be awarded for every correct answer and there is a penalty of '1' mark for every incorrect answer, what is the total score of Group B?

Q30   At least how many more questions (out of attempted questions only) should be answered correctly by the worst performer of Group B so that Group B would have the winner?
(A) 1   (B) 2
(C) 3   (D) 4

Answer Key

Q1	(C)		Q16	(C)
Q2	(D)		Q17	(A)
Q3	(C)		Q18	(D)
Q4	(C)		Q19	(B)
Q5	(A)		Q20	(B)
Q6	(D)		Q21	(C)
Q7	56		Q22	(C)
Q8	4		Q23	(B)
Q9	810		Q24	(B)
Q10	2		Q25	(C)
Q11	(B)		Q26	(B)
Q12	(B)		Q27	(A)
Q13	(B)		Q28	(D)
Q14	(B)		Q29	52
Q15	(C)		Q30	(A)

Hints & Solutions

Q1. **Text Solution:**

Topic: Miscellaneous Charts

From the given Ternary diagram one can conclude the following table.

↓Cities Subjects →	Physics	Chemistry	Maths
A	25 %	50 %	25 %
B	25 %	25 %	50 %
C	50 %	25 %	25 %
D	75 %	0 %	25 %
E	62.5 %	37.5 %	0 %
F	37.5 %	62.5 %	0 %

Number of students in city C whose favourite subject is Physics
= 50% of 120 = 60
Number of students in city D whose favourite subject is Physics
= 75% of 100 = 75
The total number of students whose favourite subject is Physics from both the cities = 60 + 75 = 135. Hence, Option C.

Q2. **Text Solution:**

Topic: Miscellaneous Charts

Number of students in city A whose favourite subject is Chemistry = 50% of total students in city A
Number of students in city B whose favourite subject is Maths = 50% of total students in city B
As, total number of students in city A and B is not given, we cannot calculate the required difference. Hence, Option D.

Q3. **Text Solution:**

Topic: Miscellaneous Charts

Number of students in city B whose favourite subject is Physics

$$= 25\% \text{ of } 96 = 24$$

Number of students in city C whose favourite subject is Chemistry

$$= 25\% \text{ of } 120 = 30.$$

Required percentage $= \frac{24}{30} \times 100 = 80\%$.
Hence, Option C.

Q4. **Text Solution:**

Topic: Miscellaneous Charts

Number of students whose favourite subject is Chemistry in −
City A = 50% of 80 = 40.
City B = 25% of 96 = 24.
City C = 25% of 120 = 30.
City D = 0% of 100 = 0.
City E = 37.5% of 80 = 30.
City F = 62.5% of 120 = 75.
Total = 40 + 24 + 30 + 30 + 75 = 199.
Hence, Option C.

Q5. **Text Solution:**

Topic: Miscellaneous Charts

Number of students whose favourite subject is Physics in −
City A = 25% of 80 = 20
City B = 25% of 96 = 24
City C = 50% of 120 = 60
City D = 75% of 100 = 75
City E = 62.5% of 80 = 50
City F = 37.5% of 120 = 45
Maximum 75 students are from city D.
Hence option A.

Q6. **Text Solution:**

Topic: Miscellaneous Charts

Mileage of vehicle $P = 24 km/L$
Distance that can be covered by vehicle P with the fuel in its tank $= 180 km$
Fuel in the tank of vehicle $P = \frac{180}{24} = 7.5 L$
Capacity of tank of vehicle $P = 7.5 \times \frac{100}{62.5} = 12 L$
Similarly, we can calculate for other vehicles as well:

Vehicles	Mileage (Km/L)	Distance that can be covered (km) with fuel in the tank	Fuel in the tank (L)	Capacity of tank (L)
P	24	180	7.5	12
Q	45	288	6.4	16
R	32	240	7.5	9
S	30	126	4.2	8
T	28	154	5.5	11

The capacity of fuel tank of vehicle P = 12 L
The capacity of fuel tank of vehicle S = 8 L
Required ratio = 12: 8 = 3 : 2

Q7. Text Solution:
Topic: Miscellaneous Charts
Mileage of vehicle $P = 24 km/L$
Distance that can be covered by vehicle P with the fuel in its tank $= 180 km$
Fuel in the tank of vehicle $P = \frac{180}{24} = 7.5L$
Capacity of tank of vehicle $P = 7.5 \times \frac{100}{62.5} = 12L$
Similarly, we can calculate for other vehicles as well:

Vehicles	Mileage (Km/L)	Distance that can be covered (km) with fuel in the tank	Fuel in the tank (L)	Capacity of tank (L)
P	24	180	7.5	12
Q	45	288	6.4	16
R	32	240	7.5	9
S	30	126	4.2	8
T	28	154	5.5	11

Quantity of fuel in vehicle $S = 4.2L$ Quantity of fuel in vehicle $R = 7.5L$ Required percent $= \frac{4.2}{7.5} \times 100 = 56\%$

Q8. Text Solution:
Topic: Miscellaneous Charts
Mileage of vehicle $P = 24 km/L$
Distance that can be covered by vehicle P with the fuel in its tank $= 180 km$
Fuel in the tank of vehicle $P = \frac{180}{24} = 7.5L$
Capacity of tank of vehicle $P = 7.5 \times \frac{100}{62.5} = 12L$
Similarly, we can calculate for other vehicles as well:

Vehicles	Mileage (Km/L)	Distance that can be covered (km) with fuel in the tank	Fuel in the tank (L)	Capacity of tank (L)
P	24	180	7.5	12
Q	45	288	6.4	16
R	32	240	7.5	9
S	30	126	4.2	8
T	28	154	5.5	11

Volume of empty part of fuel tank of vehicle Q =
16 – 6.4 = 9.6 L

Volume of empty part of fuel tank of vehicle T =
11 – 5.5 = 5.5 L

Required difference = 9.6 – 5.5 = 4.1 L = 4 L(approx)

Q9. Text Solution:

Topic: Miscellaneous Charts

Mileage of vehicle $P = 24 km/L$

Distance that can be covered by vehicle P with the fuel in its tank $= 180 km$

Fuel in the tank of vehicle $P = \frac{180}{24} = 7.5L$

Capacity of tank of vehicle $P = 7.5 \times \frac{100}{62.5} = 12L$

Similarly, we can calculate for other vehicles as well:

Vehicles	Mileage (Km/L)	Distance that can be covered (km) with fuel in the tank	Fuel in the tank (L)	Capacity of tank (L)
P	24	180	7.5	12
Q	45	288	6.4	16
R	32	240	7.5	9
S	30	126	4.2	8
T	28	154	5.5	11

The total capacity of the fuel tank of vehicle R =
9 L

Cost of fuel = Rs. 90/L

Total amount needed to completely fill the fuel tank of vehicle R

= 90 × 9

= Rs. 810

Q10. Text Solution:

Topic: Miscellaneous Charts

Mileage of vehicle $P = 24 km/L$

Distance that can be covered by vehicle P with the fuel in its tank $= 180 km$

Fuel in the tank of vehicle $P = \frac{180}{24} = 7.5L$

Capacity of tank of vehicle $P = 7.5 \times \frac{100}{62.5} = 12L$

Similarly, we can calculate for other vehicles as well:

Vehicles	Mileage (Km/L)	Distance that can be covered (km) with fuel in the tank	Fuel in the tank (L)	Capacity of tank (L)
P	24	180	7.5	12
Q	45	288	6.4	16
R	32	240	7.5	9
S	30	126	4.2	8
T	28	154	5.5	11

Cost of fuel = Rs. 90/L

Mileage of Q = 45 km/L

Cost/km of running the vehicle Q = 90 / 45 = Rs. 2/km.

Q11. **Text Solution:**

Topic: Miscellaneous Charts

Minimum power generated by $P = 2MW = 2000KW$

Remaining power after loss $= 75\%$ of $2000 = 1500KW$

$$x = \frac{1500}{12}$$
$$x = 125$$

Power generated by Q at the end of experiment $= 2MW = 2000KW$

Remaining power after loss $= 75\%$ of $2000 = 1500KW$

$$Y = \frac{1500}{10}$$
$$Y = 150$$

Required ratio $= x : y = 125 : 150 = 5 : 6$

The answer is option B.

Q12. **Text Solution:**

Topic: Miscellaneous Charts

Maximum power generated by $R = 11MW = 11000KW$

Remaining power after loss $= 80\%$ of $11000 = 8800KW$

According to the question:

$$x = \frac{8800}{88}$$
$$x = 100$$

Now, the number of machines that can be run when each machine starts consuming $12kw$ more power.

$$= \frac{8800}{88 + 12}$$
$$= 88$$

Required percent $= \frac{100-88}{100} \times 100 = 12\%$

The answer is option B.

Q13. **Text Solution:**

Topic: Miscellaneous Charts

Power generated by S when the experiment starts $= 5MW = 5000KW$

Remaining power after loss $= 75\%$ of $5000 = 3750KW$.

Let the number of type A and type B machines are 'x' each.

According to the question:

$$12x + 13x = 3750$$
$$x = 150$$

Required number of machines

$$= 2x$$
$$= 300$$

The answer is option B.

Q14. **Text Solution:**

Topic: Miscellaneous Charts

Power generated by S when generating minimum power $= 3MW = 3000$ KW

Remaining power after loss $= 75\%$ of $3000 = 2250KW$

$$x = \frac{2250}{15}$$
$$x = 150$$

Power generated by T when generating maximum power $= 15MW = 15000$ KW

Remaining power after loss $= 80\%$ of $15000 = 12000KW$

So, $y = \frac{12000}{24}$

$$\Rightarrow y = 500$$

Hence, $x : y = 150 : 500$

$$= 3 : 10$$

The answer is option B.

Q15. **Text Solution:**

Topic: Miscellaneous Charts

Maximum power generated by $T = 15MW = 15000KW$

Remaining power after loss $= 80\%$ of $15000 = 12000KW$

According to the question:

$$x = \frac{12000}{60}$$
$$x = 200$$

Now, the number of machines that can be run when there is problem in the machines

$$= \frac{12000}{60 + 40}$$
$$= 120$$

Required percent $= \frac{200-120}{200} \times 100 = 40\%$

The answer is option C.

Q16. **Text Solution:**

Topic: Miscellaneous Charts

In quadrant I, Sale and Profit both increase from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant II, Profit increases despite of decrease in Sales from 2021 to 2022 , so there is a conclusion that Expense decreases definitely.

In quadrant III, Sale and Profit, both decrease from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant IV, Profit decreases despite of increase in Sale from 2021 to 2022, so there is a conclusion that Expense increases definitely.

By the above discussion, companies falling under quadrant IV has definite increase in Expense. There are only 2 companies in quadrant IV.

So option C.

Q17. **Text Solution:**

Topic: Miscellaneous Charts

In quadrant I, Sale and Profit both increaseS from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant II, Profit increases despite of decrease in Sale from 2021 to 2022 , so there is a conclusion that Expense decreases definitely.

In quadrant III, Sale and Profit, both decrease from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant IV, Profit decreases despite of increase in Sale from 2021 to 2022, so there is a conclusion that Expense increases definitely.

By the above discussion, companies falling under quadrant II has definite decrease in Expense. There are only 3 companies in quadrant II.

So option A.

Q18. **Text Solution:**

Topic: Miscellaneous Charts

In quadrant I, Sale and Profit both increase from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant II, Profit increases despite of decrease in Sales from 2021 to 2022 , so there is a conclusion that Expense decreases definitely.

In quadrant III, Sale and Profit, both decrease from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant IV, Profit decreases despite of increase in Sale from 2021 to 2022, so there is a conclusion that Expense increases definitely.

Company X is in quadrant I where Sales and Profit both increase, but we can observe by the

positioning of X that increase in sales in company X is more than increase in profit so expenses may increase slightly.

Hence Option D.

Q19. **Text Solution:**

Topic: Miscellaneous Charts

In quadrant I, Sale and Profit both increase from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant II, Profit increases despite of decrease in Sale from 2021 to 2022 , so there is a conclusion that Expense decreases definitely.

In quadrant III, Sale and Profit, both decrease from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant IV, Profit decreases despite of increase in Sale from 2021 to 2022, so there is a conclusion that Expense increases definitely.

Company Q is in quadrant II, where there is a definite decrease in expenditure.

So out of all the options we have only option B which is less than 100 crores. Hence option B will be the correct choice.

Q20. **Text Solution:**

Topic: Miscellaneous Charts

In quadrant I, Sale and Profit both increase from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant II, Profit increases despite of decrease in Sale from 2021 to 2022 , so there is a conclusion that Expense decreases definitely.

In quadrant III, Sale and Profit, both decrease from 2021 to 2022, so there is no definite conclusion about Expenses.

In quadrant IV, Profit decreases despite an increase in Sale from 2021 to 2022, so there is a conclusion that Expense increases definitely.

Since the expenditure of company S (S in quadrant III) increases in the year 2022 and that of Q (Q in II quadrant) decreases in the year 2022. So, only option B can be the conclusion.

Q21. **Text Solution:**

Topic: Miscellaneous Charts

Item	Bubble Radius	
	For shopkeeper P	For shopkeeper Q
A	$50 \times \frac{1}{3-1} = 25$	$25 + 50 = 75$
B	$50 \times \frac{2}{2-1} = 100$	$100 - 50 = 50$
C	$75 \times \frac{1}{2-1} = 75$	$75 + 75 = 150$
D	$200 \times \frac{1}{5-1} = 50$	$200 + 50 = 250$
E	$100 \times \frac{2}{2-1} = 200$	$200 - 100 = 100$

For shopkeeper P :

Item	Discount (in Rs.)	Profit (in Rs.)	Marked Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	60	$3.14 \times 25^2 =$ 1962.5	$1962.5 - 120$ $= 1842.5$	$1842.5 - 60$ $= 1782.5$
B	80	100	$3.14 \times 100^2 =$ 31400	$31400 - 80 =$ 31320	$31320 - 100$ $= 31220$
C	140	150	$3.14 \times 75^2 =$ 17662.5	$17662.5 -$ $140 =$ 17522.5	$17522.5 - 150$ $= 17372.5$
D	200	180	$3.14 \times 50^2 =$ 7850	$7850 - 200 =$ 7650	$7650 - 180$ $= 7470$
E	360	250	$3.14 \times 200^2 =$ 125600	$125600 - 360$ $= 125240$	$125240 - 250$ $= 124990$

For Shopkeeper Q :

Item	Discount (in Rs.)	Profit (in Rs.)	Marker Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	160	$3.14 \times 75^2 =$ 17662.5	$17662.5 - 120$ $= 17542.5$	$17542.5 - 160$ $= 17382.5$
B	80	210	$3.14 \times 50^2 =$ 7850	$7850 - 80$ $= 7770$	$7770 - 210$ $= 7560$
C	140	40	3.14×150^2 $= 70650$	$70650 - 140$ $= 70510$	$70510 - 40$ $= 70470$
D	200	80	3.14×250^2 $= 196250$	$196250 - 200$ $= 196050$	$196050 - 80$ $= 195970$
E	360	170	3.14×100^2 $= 31400$	$31400 - 360$ $= 31040$	$31040 - 170$ $= 30870$

For shopkeeper P:

CP of product C = 17372.5

For shopkeeper Q:

CP of product C = 70470

Required Difference = 70470 – 17372.5 = 53097.5

The answer is option C.

Q22. **Text Solution:**

Topic: Miscellaneous Charts

Item	Bubble Radius	
	For shopkeeper P	For shopkeeper Q
A	$50 \times \frac{1}{3-1} = 25$	$25 + 50 = 75$
B	$50 \times \frac{2}{2-1} = 100$	$100 - 50 = 50$
C	$75 \times \frac{1}{2-1} = 75$	$75 + 75 = 150$
D	$200 \times \frac{1}{5-1} = 50$	$200 + 50 = 250$
E	$100 \times \frac{2}{2-1} = 200$	$200 - 100 = 100$

For shopkeeper P :

Item	Discount (in Rs.)	Profit (in Rs.)	Marked Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	60	$3.14 \times 25^2 = 1962.5$	$1962.5 - 120 = 1842.5$	$1842.5 - 60 = 1782.5$
B	80	100	$3.14 \times 100^2 = 31400$	$31400 - 80 = 31320$	$31320 - 100 = 31220$
C	140	150	$3.14 \times 75^2 = 17662.5$	$17662.5 - 140 = 17522.5$	$17522.5 - 150 = 17372.5$
D	200	180	$3.14 \times 50^2 = 7850$	$7850 - 200 = 7650$	$7650 - 180 = 7470$
E	360	250	$3.14 \times 200^2 = 125600$	$125600 - 360 = 125240$	$125240 - 250 = 124990$

For Shopkeeper Q :

Item	Discount (in Rs.)	Profit (in Rs.)	Marker Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	160	$3.14 \times 75^2 = 17662.5$	$17662.5 - 120 = 17542.5$	$17542.5 - 160 = 17382.5$
B	80	210	$3.14 \times 50^2 = 7850$	$7850 - 80 = 7770$	$7770 - 210 = 7560$
C	140	40	$3.14 \times 150^2 = 70650$	$70650 - 140 = 70510$	$70510 - 40 = 70470$
D	200	80	$3.14 \times 250^2 = 196250$	$196250 - 200 = 196050$	$196050 - 80 = 195970$
E	360	170	$3.14 \times 100^2 = 31400$	$31400 - 360 = 31040$	$31040 - 170 = 30870$

Cost price of all given items taken together for shopkeeper P

$$= 1782.5 + 31220 + 17372.5 + 7470 + 124990 = 182835$$

Cost price of all given items taken together for shopkeeper Q

$$= 17382.5 + 7560 + 70470 + 195970 + 30870 = 322252.5$$

Difference $= 322252.5 - 182835 = 139417.5$

Therefore, percentage $= \frac{139417.5}{322252.5} \times 100 = 43\%$ (approx.)

The answer is option C.

Q23. **Text Solution:**

Topic: Miscellaneous Charts

Item	Bubble Radius	
	For shopkeeper P	For shopkeeper Q
A	$50 \times \frac{1}{3-1} = 25$	$25 + 50 = 75$
B	$50 \times \frac{2}{2-1} = 100$	$100 - 50 = 50$
C	$75 \times \frac{1}{2-1} = 75$	$75 + 75 = 150$
D	$200 \times \frac{1}{5-1} = 50$	$200 + 50 = 250$
E	$100 \times \frac{2}{2-1} = 200$	$200 - 100 = 100$

For shopkeeper P :

Item	Discount (in Rs.)	Profit (in Rs.)	Marked Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	60	$3.14 \times 25^2 = 1962.5$	$1962.5 - 120 = 1842.5$	$1842.5 - 60 = 1782.5$
B	80	100	$3.14 \times 100^2 = 31400$	$31400 - 80 = 31320$	$31320 - 100 = 31220$
C	140	150	$3.14 \times 75^2 = 17662.5$	$17662.5 - 140 = 17522.5$	$17522.5 - 150 = 17372.5$
D	200	180	$3.14 \times 50^2 = 7850$	$7850 - 200 = 7650$	$7650 - 180 = 7470$
E	360	250	$3.14 \times 200^2 = 125600$	$125600 - 360 = 125240$	$125240 - 250 = 124990$

For Shopkeeper Q :

Item	Discount (in Rs.)	Profit (in Rs.)	Marker Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	160	$3.14 \times 75^2 = 17662.5$	$17662.5 - 120 = 17542.5$	$17542.5 - 160 = 17382.5$
B	80	210	$3.14 \times 50^2 = 7850$	$7850 - 80 = 7770$	$7770 - 210 = 7560$
C	140	40	$3.14 \times 150^2 = 70650$	$70650 - 140 = 70510$	$70510 - 40 = 70470$
D	200	80	$3.14 \times 250^2 = 196250$	$196250 - 200 = 196050$	$196050 - 80 = 195970$
E	360	170	$3.14 \times 100^2 = 31400$	$31400 - 360 = 31040$	$31040 - 170 = 30870$

For shopkeeper P:

New radius for bubble D = 85% of 50 = 42.5

Then, new marked price of D = 3.14 × 42.5 × 42.5 = 5671.625

And, new selling price of D = 5671.625 – 200 = 5471.625

For shopkeeper Q:

New radius for bubble D = 60% of 250 = 150

Then, new marked price of D = 3.14 × 150 × 150 = 70650

And, new selling price of D = 70650 – 200 = 70450

Therefore, required difference = 70450 – 5471.625 = Rs. 64978 (approx.)

The answer is option B.

Q24. Text Solution:

Topic: Miscellaneous Charts

Item	Bubble Radius	
	For shopkeeper P	**For shopkeeper Q**
A	$50 \times \frac{1}{3-1} = 25$	$25 + 50 = 75$
B	$50 \times \frac{2}{2-1} = 100$	$100 - 50 = 50$
C	$75 \times \frac{1}{2-1} = 75$	$75 + 75 = 150$
D	$200 \times \frac{1}{5-1} = 50$	$200 + 50 = 250$
E	$100 \times \frac{2}{2-1} = 200$	$200 - 100 = 100$

For shopkeeper P :

Item	Discount (in Rs.)	Profit (in Rs.)	Marked Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	60	$3.14 \times 25^2 =$ 1962.5	1962.5 – 120 = 1842.5	1842.5 – 60 = 1782.5
B	80	100	$3.14 \times 100^2 =$ 31400	31400 – 80 = 31320	31320 –100 = 31220
C	140	150	$3.14 \times 75^2 =$ 17662.5	17662.5 – 140 = 17522.5	17522.5 – 150 = 17372.5
D	200	180	$3.14 \times 50^2 =$ 7850	7850 – 200 = 7650	7650 – 180 = 7470
E	360	250	$3.14 \times 200^2 =$ 125600	125600 – 360 = 125240	125240 – 250 = 124990

For Shopkeeper Q :

Item	Discount (in Rs.)	Profit (in Rs.)	Marker Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	160	$3.14 \times 75^2 =$ 17662.5	17662.5 – 120 = 17542.5	17542.5 – 160 = 17382.5
B	80	210	$3.14 \times 50^2 =$ 7850	7850 – 80 = 7770	7770 – 210 = 7560
C	140	40	$3.14 \times 150^2 =$ 70650	70650 – 140 = 70510	70510 – 40 = 70470
D	200	80	$3.14 \times 250^2 =$ 196250	196250 – 200 = 196050	196050 – 80 = 195970
E	360	170	$3.14 \times 100^2 =$ 31400	31400 – 360 = 31040	31040 – 170 = 30870

Average of new selling price of item D for shopkeeper P and Q together
$= \frac{(7470 - 4500 + 195970 - 5200)}{2} = 96870$

The answer is option B.

Q25. Text Solution:

Topic: Miscellaneous Charts

Item	Bubble Radius	
	For shopkeeper P	**For shopkeeper Q**
A	$50 \times \frac{1}{3-1} = 25$	$25 + 50 = 75$
B	$50 \times \frac{2}{2-1} = 100$	$100 - 50 = 50$
C	$75 \times \frac{1}{2-1} = 75$	$75 + 75 = 150$
D	$200 \times \frac{1}{5-1} = 50$	$200 + 50 = 250$
E	$100 \times \frac{2}{2-1} = 200$	$200 - 100 = 100$

For shopkeeper P :

Item	Discount (in Rs.)	Profit (in Rs.)	Marked Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	60	$3.14 \times 25^2 =$ 1962.5	1962.5 – 120 = 1842.5	1842.5 – 60 = 1782.5
B	80	100	$3.14 \times 100^2 =$ 31400	31400 – 80 = 31320	31320 –100 = 31220
C	140	150	$3.14 \times 75^2 =$ 17662.5	17662.5 – 140 = 17522.5	17522.5 – 150 = 17372.5
D	200	180	$3.14 \times 50^2 =$ 7850	7850 – 200 = 7650	7650 – 180 = 7470
E	360	250	$3.14 \times 200^2 =$ 125600	125600 – 360 = 125240	125240 – 250 = 124990

For Shopkeeper Q :

Item	Discount (in Rs.)	Profit (in Rs.)	Marker Price (in Rs.)	Selling Price (in Rs.)	Cost Price (in Rs.)
A	120	160	$3.14 \times 75^2 =$ 17662.5	17662.5 – 120 = 17542.5	17542.5 – 160 = 17382.5
B	80	210	$3.14 \times 50^2 =$ 7850	7850 – 80 = 7770	7770 – 210 = 7560
C	140	40	$3.14 \times 150^2 =$ 70650	70650 – 140 = 70510	70510 – 40 = 70470
D	200	80	$3.14 \times 250^2 =$ 196250	196250 – 200 = 196050	196050 – 80 = 195970
E	360	170	$3.14 \times 100^2 =$ 31400	31400 – 360 = 31040	31040 – 170 = 30870

The difference of the cost prices of the item B for the shopkeeper P and Q
= Rs. (31220 – 7560)
= Rs. 23660

The answer is option C.

Q26. Text Solution:

Topic: Miscellaneous Charts

Accuracy % is defined as $\frac{\text{Number of Correct Questions}}{\text{Total number of questions attempted}} \times 100$

By the graph, we can calculate the total number of attempts by each member.

For Group A member 1: - Accuracy = 25%, Number of correct answers = 2

Total attempts = 8, Number of incorrect questions = 8 – 2 = 6

For Group A member 2: - Accuracy = 66.66%, Number of correct questions = 6

Total attempts = 9, Number of incorrect questions = 9 – 6 = 3.

Similarly, we can calculate for each member of all the groups.

Let us summarise the result in the following table-

Member	Attempt	Correct	Incorrect	Un-attempted
Group A member 1	8	2	6	2
Group A member 2	9	6	3	1
Group A member 3	10	10	0	0
Group B member 1	8	1	7	2
Group B member 2	5	5	0	5
Group B member 3	10	9	1	0
Group C member 1	6	3	3	4
Group C member 2	8	5	3	2
Group C member 3	8	6	2	2

Accuracy for Group $A = \frac{2+6+10}{8+9+10} \times 100 = 66.66\%$

Accuracy for Group $B = \frac{1+5+9}{8+5+10} \times 100 = 65.22\%$

Accuracy for Group $C = \frac{3+5+6}{6+8+8} \times 100 = 63.64\%$

Accuracy of Group A is highest. So, group A is the winner. Hence, Option B.

Q27. Text Solution:

Topic: Miscellaneous Charts

Accuracy % is defined as $\frac{\text{Number of Correct Questions}}{\text{Total number of questions attempted}} \times 100$

By the graph, we can calculate the total number of attempts by each member.

For Group A member 1: - Accuracy = 25%, Number of correct answers = 2

Total attempts = 8, Number of incorrect questions = 8 – 2 = 6

For Group A member 2: - Accuracy = 66.66%, Number of correct questions = 6

Total attempts = 9, Number of incorrect questions = 9 – 6 = 3.

Similarly, we can calculate for each member of all the groups.

Let us summarise the result in the following table-

Member	Attempt	Correct	Incorrect	Un-attempted
Group A member 1	8	2	6	2
Group A member 2	9	6	3	1
Group A member 3	10	10	0	0
Group B member 1	8	1	7	2
Group B member 2	5	5	0	5
Group B member 3	10	9	1	0
Group C member 1	6	3	3	4
Group C member 2	8	5	3	2
Group C member 3	8	6	2	2

By the above table

Total attempts of Group A = 8+9+10 = 27

Total attempts of Group B = 8+5+10 = 23

Total attempts of Group C = 6+8+8 = 22.

Hence maximum attempt is made by Group A. Option A

Q28. Text Solution:

Topic: Miscellaneous Charts

As of now, accuracy of Group A = 66.66% and that of Group C = 63.64%

After swapping, to keep the accuracy of Group C higher than Group A, the member who moved out from Group C should have lower accuracy than the member who joined Group C.

Let us consider the following possibilities-

Possibility {i}

The member with 100% accuracy from Group A is swapped with the member with 50% accuracy from Group C.

New accuracy of Group $A = \frac{2+6+3}{8+9+6} \times 100 = 47.83\%$

New accuracy of Group $C = \frac{10+5+6}{10+8+8} \times 100 = 80.76\%$

Hence it is one of the possible swapping.

Possibility {ii}

The member with 100% accuracy from Group A is swapped with the member with 62.5% accuracy from Group C.

New accuracy of Group $A = \frac{2+6+5}{8+9+8} \times 100 = 52\%$

New accuracy of Group $C = \frac{3+10+6}{6+10+8} \times 100 = 79.16\%$

Hence it is also one of the possible swapping.

Therefore, more than one member can be swapped to make this happen. Option D

Q29. **Text Solution:**

Topic: Miscellaneous Charts

Accuracy % is defined as $\frac{\text{Number of Correct Questions}}{\text{Total number of questions attempted}} \times 100$

By the graph, we can calculate the total number of attempts by each member.

For Group A member 1: - Accuracy = 25%, Number of correct answers = 2

Total attempts = 8, Number of incorrect questions = 8 − 2 = 6

For Group A member 2: - Accuracy = 66.66%, Number of correct questions = 6

Total attempts = 9, Number of incorrect questions = 9 − 6 = 3.

Similarly, we can calculate for each member of all the groups.

Let us summarise the result in the following table-

Member	Attempt	Correct	Incorrect	Un-attempted
Group A member 1	8	2	6	2
Group A member 2	9	6	3	1
Group A member 3	10	10	0	0
Group B member 1	8	1	7	2
Group B member 2	5	5	0	5
Group B member 3	10	9	1	0
Group C member 1	6	3	3	4
Group C member 2	8	5	3	2
Group C member 3	8	6	2	2

Total correct answers of Group B = 1+5+9 =15

Total incorrect answers of Group B = 7+0+1 = 8

Hence, total score of Group B = 15(4) + 8(−1) = 52.

Q30. **Text Solution:**

Topic: Miscellaneous Charts

Accuracy % is defined as $\frac{\text{Number of Correct Questions}}{\text{Total number of questions attempted}} \times 100$

By the graph, we can calculate the total number of attempts by each member.

For Group A member 1: - Accuracy = 25%, Number of correct answers = 2

Total attempts = 8, Number of incorrect questions = 8 − 2 = 6

For Group A member 2: - Accuracy = 66.66%, Number of correct questions = 6

Total attempts = 9, Number of incorrect questions = 9 − 6 = 3.

Similarly, we can calculate for each member of all the groups.

Let us summarise the result in the following table-

Member	Attempt	Correct	Incorrect	Un-attempted
Group A member 1	8	2	6	2
Group A member 2	9	6	3	1
Group A member 3	10	10	0	0
Group B member 1	8	1	7	2
Group B member 2	5	5	0	5
Group B member 3	10	9	1	0
Group C member 1	6	3	3	4
Group C member 2	8	5	3	2
Group C member 3	8	6	2	2

Accuracy for Group A = 66.66%

Accuracy for Group B = 65.21%

If 1 more question is correct out of attempted questions by the worst performer of Group B:

Accuracy for Group B = $\frac{2+5+9}{8+5+10} \times 100$ = 69.57%

Hence at leat 1 more question should be answered correctly.

Option A is correct.

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