

Number of Questions : 25

Directions for questions 1 to 4: Answer the questions on the basis of the information given below.

Five contestants Samir, Ranvir, Milind, Sahil and Arjun are awarded points by each of the five judges J_1 , J_2 , J_3 , J_4 and J_5 . In the table given below: Numbers mentioned in parentheses against the name of contestants are the points awarded to that particular contestant by the judge mentioned in the corresponding row. 'X' is the sum of the points earned by three contestants mentioned in any particular row of the table as a percentage of total points awarded to all the contestants by the judge mentioned in the same row. Each judge awards distinct points to all the 5 contestants and points awarded by the judges are non negative integers. For example, the aggregate points given to Samir, Milind and Ranvir by the judge J_1 is 80% of the total points given by judge J_1 to all the five contestants.

Judge	Contestants			X
J_1	Samir (9)	Milind (6)	Ranvir(5)	80
J_2	Sahil (8)	Arjun (6)	Samir (4)	90
J_3	Milind (11)	Arjun (7)	Sahil (6)	80
J_4	Sahil (8)	Samir (7)	Arjun (2)	85
J_5	Ranvir (8)	Milind (5)	Samir (3)	80

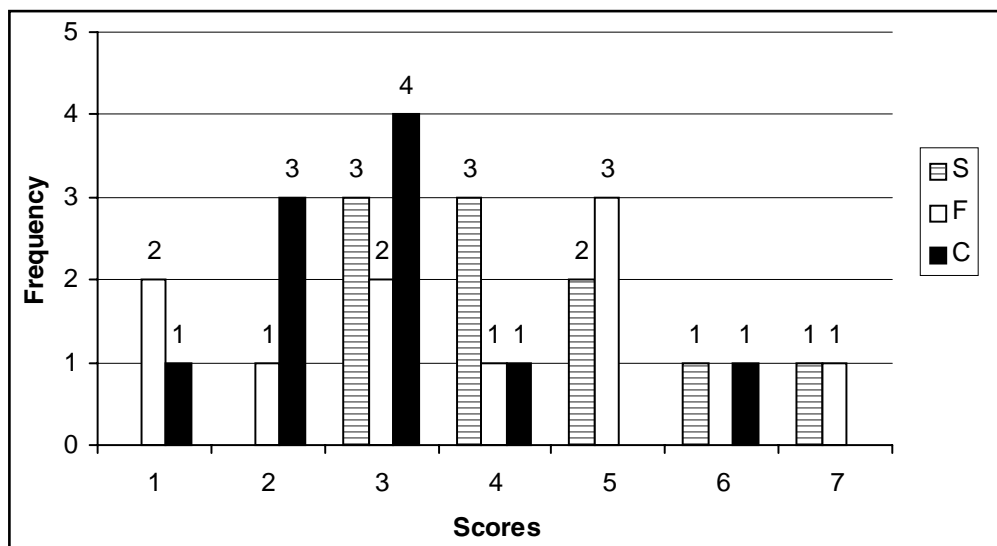
- The minimum possible aggregate number of points earned by Sahil can be
 (1) 25 (2) 22 (3) 23 (4) 24
- If the points given to Milind by judges J_2 and J_4 are the same, and if the judge J_3 gave 4 points to Samir, then the total points earned by Ranvir is
 (1) 18 (2) 19 (3) 21 (4) 20
- Which of the following mentioned contestants would definitely not earn more aggregate points than Sahil?
 (1) Ranvir (2) Arjun (3) Milind (4) Both (1) and (2)
- If sum of total points earned by Ranvir and Arjun is 30, then sum of total points earned by Milind and Sahil is
 (1) 55 (2) 57 (3) 56 (4) None of these

Directions for questions 5 to 8: Answer the questions on the basis of the information given below.

Simple Happiness index (SHI) of a country is computed on the basis of three parameters: social support (S), freedom to life choices (F) and corruption perception (C). Each of these three parameters is measured on a scale of 0 to 8 (integers only). A country is then categorised based on the total score obtained by summing the scores of all the three parameters, as shown in the following table:

Total Score	0-4	5-8	9-13	14-19	20-24
Category	Very Unhappy	Unhappy	Neutral	Happy	Very Happy

Following diagram depicts the frequency distribution of the scores in S, F and C of 10 countries - Amada, Benga, Calla, Delma, Eppa, Varsa, Wanna, Xanda, Yanga and Zooma.



Further, the following are known:

1. Amada and Calla, both have the lowest total score, 7, with identical scores in all the three parameters.
2. Zooma has a total score of 17.
3. All the 3 countries, which are categorised as happy, have the highest score in exactly one parameter.
5. What is Amada's score in F?
6. What is Zooma's score in S?
7. Benga and Delma, two countries categorised as happy, are tied with the same total score. What is the maximum score they can have?
 (1) 14 (2) 15 (3) 16 (4) 17

8. If Benga scores 16 and Delma scores 15, then what is the maximum number of countries with a score of 13?
- (1) 0 (2) 1 (3) 2 (4) 3

Directions for questions 9 to 12: Answer the questions on the basis of the information given below.

Each of the five friends namely Michelle, Luc, Niki, William and Sophia own exactly one distinct company from among the five companies namely P, Q, R, S and T not necessarily in that particular order. The revenue of the five companies generated in a particular quarter is Rs.50 million, Rs.45 million, Rs.40 million, Rs.35 million and Rs. 30 million not necessarily in the order in which the names of the companies are mentioned.

Additional Information Given:

- I. Niki does not own S.
 - II. The revenue generated by P is greater than the revenue generated by the company owned by Niki by Rs.5 million.
 - III. The revenue generated by the company owned by Michelle is greater than the revenue generated by Q by Rs. 10 million.
 - IV. The revenue generated by the company owned by William is greater than the revenue generated by R by Rs. 10 million.
 - V. Luc does not own T.
 - VI. The revenue generated by S is greater than the revenue generated by the company owned by Sophia by Rs. 5 million.
9. If Michelle owns R, then which of the following can be true?
- (1) William owns P and the revenue generated by P is Rs. 50 million.
(2) The revenue generated by the company owned by Luc is Rs. 35 million.
(3) The revenue generated by the company owned by Sophia is Rs. 30 million.
(4) All of the above
10. What is the revenue generated by the company owned by Luc?
- (1) Rs.35 million (2) Rs.40 million (3) Rs.45 million (4) Rs.30 million
11. If William owns the company having revenue of Rs.50 million, then which company owned by Michelle?
- (1) Q (2) R (3) T (4) P
12. Which of the following company is owned by Luc?
- (1) Q (2) P (3) S (4) Either (2) or (3)

Directions for questions 13 to 16: Answer the questions on the basis of the information given below.

Four cars need to travel from Akala (A) to Bakala (B). Two routes are available, one via Mamur (M) and the other via Nanur (N). The roads from A to M, and from N to B, are both short and narrow. In each case, one car takes 6 minutes to cover the distance, and each additional car increases the travel time per car by 3 minutes because of congestion. (For example, if only two cars drive from A to M, each car takes 9 minutes.) On the road from A to N, one car takes 20 minutes, and each additional car increases the travel time per car by 1 minute. On the road from M to B, one car takes 20 minutes, and each additional car increases the travel time per car by 0.9 minute.

The police department orders each car to take a particular route in such a manner that it is not possible for any car to reduce its travel time by not following the order, while the other cars are following the order.

13. How many cars would be asked to take the route A-N-B, that is Akala-Nanur-Bakala route, by the police department?
14. If all the cars follow the police order, what is the difference in travel time (in minutes) between a car which takes the route A-N-B and a car that takes the route A-M-B?
(1) 1 (2) 0.1 (3) 0.2 (4) 0.9
15. A new one-way road is built from M to N. Each car now has three possible routes to travel from A to B: A-M-B, A-N-B and A-M-N-B. On the road from M to N, one car takes 7 minutes and each additional car increases the travel time per car by 1 minute. Assume that any car taking the A-M-N-B route travels the A-M portion at the same time as other cars taking the A-M-B route, and the N-B portion at the same time as other cars taking the A-N-B route.

How many cars would the police department order to take the A-M-N-B route so that it is not possible for any car to reduce its travel time by not following the order while the other cars follow the order? (Assume that the police department would never order all the cars to take the same route.)

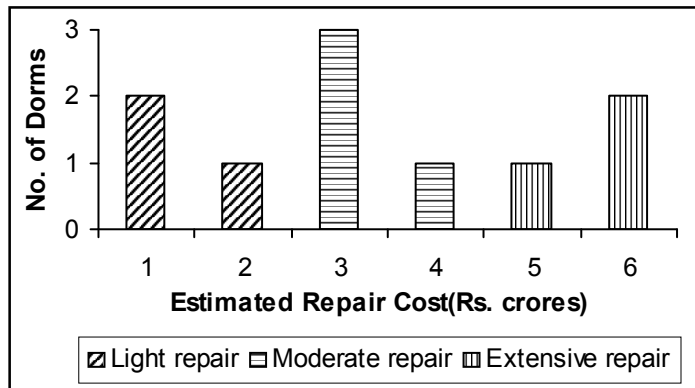
16. A new one-way road is built from M to N. Each car now has three possible routes to travel from A to B: A-M-B, A-N-B and A-M-N-B. On the road from M to N, one car takes 7 minutes and each additional car increases the travel time per car by 1 minute. Assume that any car taking the A-M-N-B route travels the A-M portion at the same time as other cars taking the A-M-B route, and the N-B portion at the same time as other cars taking the A-N-B route.

If all the cars follow the police order, what is the minimum travel time (in minutes) from A to B? (Assume that the police department would never order all the cars to take the same route.)

- (1) 26 (2) 32 (3) 29.9 (4) 30

Directions for questions 17 to 20: Answer the questions on the basis of the information given below.

At a management school, the oldest 10 dorms, numbered 1 to 10, need to be repaired urgently. The following diagram represents the estimated repair costs (in Rs. crores) for the 10 dorms. For any dorm, the estimated repair cost (in Rs. crores) is an integer. Repairs with an estimated cost of Rs. 1 or 2 crores are considered light repairs, repairs with an estimated cost of Rs. 3 or 4 are considered moderate repairs and repairs with an estimated cost of Rs. 5 or 6 crores are considered extensive repairs.



Further, the following are known:

1. Odd-numbered dorms do not need light repair; even-numbered dorms do not need moderate repair and dorms, whose numbers are divisible by 3, do not need extensive repair.
2. Dorms 4 to 9 all need different repair costs, with Dorm 7 needing the maximum and Dorm 8 needing the minimum.

17. Which of the following is NOT necessarily true?

- (1) Dorm 1 needs a moderate repair
- (2) Dorm 5 repair will cost no more than Rs. 4 crores
- (3) Dorm 7 needs an extensive repair
- (4) Dorm 10 repair will cost no more than Rs. 4 crores

18. What is the total cost of repairing the odd-numbered dorms (in Rs. crores)?

19. Further suppose that:

- (1) 4 of the 10 dorms needing repair are women's dorms and need a total of Rs.20 crores for repair
- (2) Only one of Dorms 1 to 5 is a women's dorm.

What is the cost for repairing Dorm 9 (in Rs. crores)?

20. Suppose further that:

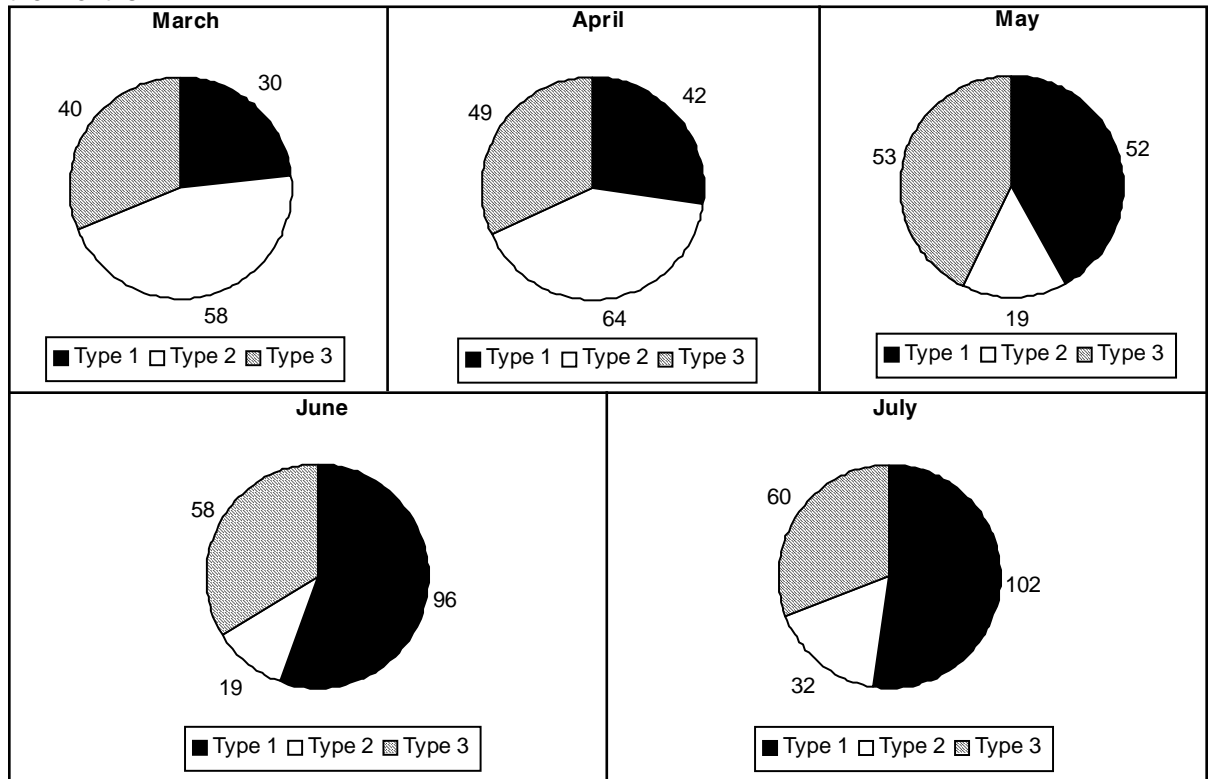
- (1) 4 of the 10 dorms needing repair are women's dorms and need a total of Rs.20 crores for repair.
- (2) Only one of Dorms 1 to 5 is a women's dorm.

Which of the following is a women's dorm?

- (1) Dorm 2 (2) Dorm 5 (3) Dorm 8 (4) Dorm 10

Directions for questions 21 to 24: Answer the questions on the basis of the information given below.

A cold-storage unit was set up in the year 2007. Three types of fresh cauliflowers were put into the storage at the end of the month of February: low-quality, medium-quality and high-quality. Low quality cauliflower decays exactly after two months after putting it in the cold-storage, medium quality after three months and high quality after four months. Decayed cauliflowers are removed and fresh cauliflowers are added to the storage at the end of each month. The following figures indicate the number of cauliflowers of the above three types disguised as type 1, type 2 and type 3 present in the storage at the start of March, April, May, June and July. Also, it is known that 86 fresh cauliflowers were added to the storage at the end of one of the months.



21. Which of the following correctly represents 'high-quality' cauliflowers in the given figures?
 (1) Type 1 (2) Type 2 (3) Type 3 (4) Either (1) or (2)
22. How many fresh 'low-quality' cauliflowers were added to the storage at the end of the month of May?
 (1) 0 (2) 3 (3) 6 (4) 13
23. How many decayed cauliflowers were removed from the storage at the end of the month of June?
 (1) 36 (2) 46 (3) 52 (4) 65
24. What can be the minimum number of cauliflowers remaining in the storage at the end of the month of July before fresh cauliflowers were added and after decayed ones were removed?
 (1) 169 (2) 172 (3) 176 (4) 180
25. At the end of which month 86 fresh cauliflowers were added to the storage?
 (1) June (2) April (3) May (4) March

LRDI - 12

Answers and Explanations

CEX-D-0284/18

1	3	2	4	3	4	4	2	5	1	6	6	7	2	8	2	9	4	10	1
11	2	12	4	13	2	14	2	15	2	16	2	17	4	18	19	19	3	20	4
21	3	22	3	23	4	24	1	25	1										

For questions 1 to 4:

The total points given by the judges J_1, J_2, J_3, J_4 and J_5 is 25, 20, 30, 20 and 20 respectively. It is also given that judges awarded distinct points to the candidates. The range of the possible points earned by the five contestants can be calculated using the following table.

Judge	Samir	Milind	Ranvir	Sahil	Arjun
J_1	9	6	5	1 or 2 or 3 or 4	1 or 2 or 3 or 4
J_2	4	0 or 2	0 or 2	8	6
J_3	1 or 2 or 4 or 5	11	1 or 2 or 4 or 5	6	7
J_4	7	0 or 3	0 or 3	8	2
J_5	3	5	8	0 or 4	0 or 4

The range of the total points earned by all the five contestants is given below.

Samir : 24 – 28
 Milind : 22 – 27
 Ranvir : 14 – 23
 Sahil : 23 – 30
 Arjun : 16 – 23

1. 3 Minimum possible points earned by Sahil
 $= 1 + 8 + 6 + 8 + 0 = 23$.
2. 4 Given that the judge J_2 and J_4 gave the same points to Milind. This is only possible if both the judges gave 0 points to Milind because if Milind got 1 point from the judge J_2 , then Ranvir will also get 1 point from the judge J_2 and this is not possible.
 Given that Samir got 4 points from judge J_3 , which means that Ranvir got $6 - 4 = 2$ points from judge J_3 .
 \therefore Total points earned by Ranvir
 $= 5 + 2 + 2 + 3 + 8 = 20$.
3. 4 As total points of both Ranvir and Arjun cannot be more than 23, which is least for Sahil, therefore, both Ranvir and Arjun will definitely not earn more points than Sahil.

4. 2 Points of Ranvir and Arjun can add up to 30 only when they both earned minimum points.
 In that case sum of points earned by Milind and Sahil
 $= 27 + 30 = 57$.

For questions 5 to 8:

Let's create a table for the value that S, F and C take in total 10 countries.

$S \rightarrow$ 3 times 3, 3 times 4, 2 times 5, 1 time 6, 1 time 7

$F \rightarrow$ 2 times 1, 1 time 2, 2 times 3, 1 time 4, 3 times 5, 1 time 7

$C \rightarrow$ 2 times 1, 3 times 2, 4 times 3, 1 time 4, 1 time 6

S	3	3	3	4	4	4	5	5	6	7
F	1	1	2	3	3	4	5	5	5	7
C	1	2	2	2	3	3	3	3	4	6

5. 1 Since Amda and Calla have scored lowest which is 7, and equal in all parameters, there is two ways to attribute values to S, F, C for Amda & Calla

	S	F	C	or		S	F	C
Amda	3	1	3		Amda	4	1	2
Calla	3	1	3		Calla	4	1	2

\therefore Amda's score in F is 1.

6. 6 Zooma has total = 17 and Given that all '3' countries which are happy (and have highest total scores) have highest in exactly one parameter.

\therefore Z has 6 in S.

If 'Z' has 6 in S, then its $F + C = 11$

Which can be F C or F C

5 6 7 4

It can't be '5', since then $F + C$ has to be 12, which is not possible.

If $S = 7$, then $F + C$ can maximum be '9' so total for Z = 16, not possible.

7. 2 Benga & Delma are happy and have same score which is less than 17.
Both have highest in 1 of F & S, which is 7.
Taking cases with Benga as highest in S = 7, Delma in F = 7

	Case I				Case II		
	S	F	C		S	F	C
Benga	7	5	4	Benga	7	5	3
Delma	5	7	3	Delma	5	7	4

In both cases above, Benga and Delma are not equal in total.

Since 'C' has only one value of '4'.

∴ To make Benga & Delma equal the case would be

	S	F	C
Benga	5/7	5/7	3
Delma	5/7	7/5	3

∴ Total = 15

8. 2 If Benga scores 16 and Delma scores 15, then distribution is

	S	F	C
Benga	7/5	5/7	4
Delma	5/7	7/5	3

∴ The frequency table left is

S	3	3	3	4	4	4	5
F	1	1	2	3	3	4	5
C	1	2	2	2	3	3	3

∴ Maximum one can get 13, where

S = 5, F = 5, C = 3

9. 4 Let the revenue generated by the companies P, Q, R, S and T in that particular quarter be p, q, r, s and t million respectively.

Based on the additional information we can have this table:

Owner of the company	Turnover
Michelle	q + 10
Luc	
Niki	p - 5
William	r + 10
Sophia	s - 5

Now, we know that the combined turnover of all these companies is p + q + r + s + t but the combined turnover of the companies owned by Michelle, Niki, William and Sophia is q + 10 + p - 5 + r + 10 + s - 5 = p + q + r + s + 10. Therefore turnover of the company owned by

Luc is p + q + r + s + t - (p + q + r + s + 10) = t - 10.

The new table is:-

Owner of the company	Turnover
Michelle	q + 10
Luc	t - 10
Niki	p - 5
William	r + 10
Sophia	s - 5

So, we now know that q + 10, t - 10, p - 5, r + 10 and s - 5 are 30, 35, 40, 45 and 50(not necessarily in the order).

None of t, p and s can be 30 as otherwise revenue of one of the companies will becomes less than 30 which is impossible.

Hence one of q and r has to be 30.

Again None of t - 10, p - 5 and s - 5 can be 50 as otherwise one of p, t and s will become more than 50, which again is impossible.

∴ One of q + 10 and r + 10 has to be 50.

⇒ one of q and r is equal to 40.

∴ q and r are 30 and 40(not necessarily in the order).

∴ Turnovers of the companies owned by Michelle and William are 30 + 10 and 40 + 10 millions (not necessarily in the order).

Now the turnover of the company owned by Luc can be one of 30, 35 and 45 millions.

but if t - 10 = 30, t = 40 (impossible, as one of q and r is 40)

if t - 10 = 45, t = 55(impossible, as it is not the revenue of any of these companies).

⇒ t - 10 = 35 or t = 45.

Therefore a total of four cases are possible:-

	p	q	r	s	t
Case I	35	30	40	50	45
Case II	50	30	40	35	45
Case III	35	40	30	50	45
Case IV	50	40	30	35	45

Accordingly we can prepare the table below:-

	Case I	Case II	Case III	Case IV
Michelle	40 (R)	40 (R)	50 (S)	50 (P)
Luc	35 (P)	35 (S)	35 (P)	35 (S)
Niki	30 (Q)	45 (T)	30 (R)	45 (T)
William	50 (S)	50 (P)	40 (Q)	40 (Q)
Sophia	45 (T)	30 (Q)	45 (T)	30 (R)

Alphabets in the parentheses indicate the company owned by the person in that particular case.

10. 1

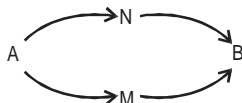
11. 2

12. 4

For question 13 and 14:

Following table summarizes time taken per car on each road for different number of cars on the road.

Cars	AM	MB	AN	NB
1	6	20	20	6
2	9	20.9	21	9
3	12	21.8	22	12
4	15	22.7	23	15



Refer the table above, if we increase the number of cars on any of the two routes beyond two then one car switching the route will reduce the time hence maximum number of cars traveling through AMB can be two only.

13. 2 cars would be asked to take the route ANB.

14. 2 Time taken by cars through AMB = 29.9
 Time taken by cars through ANB = 30
 \therefore The required difference = $30 - 29.9 = 0.1$ minutes.

Additional information for question 15 and 16:

Following scenario is possible after the given additional route MN.

1 car via AMB takes $\rightarrow 12 + 20 = 32$

2 car via AMNB takes $\rightarrow 12 + 8 + 12 = 32$

1 car via ANB takes $\rightarrow 20 + 12 = 32$

15. 2 cars will travel via route AM-N-B.

16. 2 Time taken by any car from A to B = 32 minutes.

For questions 17 to 20:

Dorms 1, 3, 5, 7, 9 – either need moderate repair

Or

Extensive repair

Dorms 2, 4, 6, 8, 10 – either need light repair or extensive repair

Since 3/6, 3/9, dorm 6, light repair dorm 9 – moderate repair.

Since, dorm 8 needing the minimum repair = 1 crore.

We gather following information from the data given.

Dorms	Estimated repair cost (crore)
1	3
2	1–6
3	3
4	5
5	3–4
6	2
7	6
8	1
9	3–4
10	1–6

17. 4 Dorm 10 estimated repair cost is 6 crore

18. 19 9 Odd number dorms are 1, 2, 5, 7, 9
 Since there are 3 dorms whose repair cost is 3 crore and 1 dorm with repair cost of 4 crore
 \therefore total cost for odd-numbered dorms = $3 \times 3 + 4 + 6 = 19$ crore.

19. 3 Since total cost for repairing 4 women's dorm = 20 crores
 The only possible combination is repair cost of dorm 4, 7, 9, 10.
 \therefore dorm 4 + dorm 7 + dorm 9 + dorm 10 = 20 crore
 $5 + 6 + \text{dorm 9} + 6 = 20$.
 Dorm 9 = 3 crore.

20. 4 Dorm 10 is a women's dorm

For questions 21 to 24:

At the end of February, all the cauliflowers were fresh. It should be noted that:

Decay of low quality cauliflowers would happen in the end of the month of April, which would reflect in the data for the start of May.

Decay of medium quality cauliflowers would happen in the end of the month of May, which would reflect in the data for the start of June.

Decay of high quality cauliflowers would happen in the end of the month of June, which would reflect in the data for the start of July.

In the start of May, only Type 2 cauliflowers are reducing. Hence, type 2 corresponds to low quality cauliflowers.

For identifying high and medium type cauliflowers, we do not see any direct reduction in the number of cauliflowers in any month over the previous month.

Therefore, two possibilities arise

Case I: Type 1 = medium and Type 3 = high

	Feb		March		April		May		June		July
	End	Start	End	Start	End	Start	End	Start	End	Start	
Type 1	30	30	+12	42	+10	52	-30 + 74	96	-12 + 18	102	
Type 2	58	58	+6	64	-58 + 13	19	-6 + 6	19	-13 + 26	32	
Type 3	40	40	+9	49	+4	53	+5	58	-40 + 42	60	

Case II: Type 1 = high and Type 3 = medium

	Feb		March		April		May		June		July
	End	Start	End	Start	End	Start	End	Start	End	Start	
Type 1	30	30	+12	42	+10	52	+44	96	-30 + 36	102	
Type 2	58	58	+6	64	-58 + 13	19	-6 + 6	19	-13 + 26	32	
Type 3	40	40	+9	49	+4	53	-40 + 45	58	-9 + 11	60	

But only in Case I, we are getting an increment of 86 fresh cauliflowers in the end of June. Hence case II is discarded.

21. 3 Type 3 cauliflowers are high quality cauliflowers.
22. 3 Six low quality cauliflowers were added at the end of May.
23. 4 Adding all negatives for the month of June, total comes out to be 65.
24. 1 By July end, the number of cauliflowers is $= (102 + 32 + 60) - (10 + 6 + 9) = 169$.
25. 1 In case I, increment of 86 fresh cauliflowers takes place in the end of June.