CAT MOCK TEST SOLUTION

Quantitative Techniques

1. (a) :

$(x - y)^2 = \dfrac{4xy}{x + y - 1}$

$(x - y)^2 (x + y - 1) = 4xy$

$(x - y)^2 (x + y - 1) = (x + y)^2 - (x - y)^2$

$(x - y)^2 (x + y) = (x + y)^2$

$(x - y)^2 = x + y$

Since, $x + y \neq 0$

The above equation has infinitely many solution

2. (b) :

70% of x% of y = 350% of y% of z

$\dfrac{70}{100}, \dfrac{x}{100}, y = \dfrac{350}{100}, \dfrac{y}{100}, z$

$70 x = 350z$

$z = (x/5)$

3. (d) :

M = (2, 9, 16,….. 520) is an AP with a = 2 and d = 7

To find the number of terms we use the formula for nth term

$a_n = a + (n - 1)d$

$520 = 2 + (n - 1) (7)$

$(518/7) = n - 1$

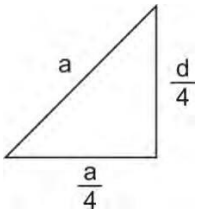
$n = 75$

Hence, n = 75 N = subset in which not sum of two element 522. So, N can be in which either the first half or the second half of the terms are present. So number of maximum possible elements in N = (75/2) = 37.6

= 38

4. (d) :

Now,



$$\left(\frac{d}{2}\right)^2 = a^2 - \left(\frac{a}{4}\right)^2$$

$$\frac{d^2}{4} = \frac{15a^2}{16}$$

$$d^2 = \frac{15a^2}{4}$$

$$d = \frac{\sqrt{15}a}{2}$$

Hence, required ratio = $\frac{\frac{\sqrt{15}a}{2}}{\frac{a}{2}}$

$= \sqrt{15} : 1$

5. (c) :

Area of $\Delta = (1/2) \times 5 \times 12 = 30\ cm^2$

$$S = \frac{5 + 12 + 13}{2} = 15cm$$

$$r = \frac{\Delta}{S}$$

$r = (30/15) = 2\ cm$

6. (d) :

Let L be the length of sheet and W be width of sheet

Then,

$L \times W = 6300$

Now it is folded in such way that L becomes circumference of the cylinder and W becomes height of the cylinder then only one can get the maximum volume

Hence,

$$r = \frac{L}{2\pi}$$

Volume of cylinder $= \pi r^2 h$

$$= \pi\left(\frac{L}{2\pi}\right)^2 \times W$$

$$= \frac{L^2}{4\pi} \times W$$

$$= \frac{6300 \times L}{4\pi}$$

$$= \frac{1575L}{\pi}$$

7. (c) :

$$\frac{4800 \times R_1 \times 3}{100} = \frac{4800 \times R_2 \times 3}{100} = 14.4$$

$$\frac{4800 \times 3}{100}[R_1 - R_2] = 14.4$$

$$144(R_1 - R_2) = 14.4$$

$$R_1 - R_2 = \frac{14.4}{144}$$

$R_1 – R_2 = 0.1$

8. (b) :

Assume CP of 1000 g = ₹ 1000

So, MP = ₹ 1500

Discount% = 20%

So, SP = 0.8 × 1500 = ₹ 1200

Now, when he sell 1000 g, he actually obtains the money for 750 g

So, New SP = 0.75 × 1200

= ₹ 900

So, loss% = $\frac{1000 - 900}{1000} \times 100$

= 10%

9. (c) :

Let the original speed be x km/hr

According to the question,

$$25\left(\frac{6}{5x}\right) - \frac{25}{x} = \frac{54 - 45}{60}$$

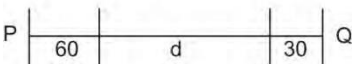
$$\frac{30}{x} - \frac{25}{x} = \frac{9}{60}$$

$$x = \frac{60 \times 5}{9}$$

x = 33.33 km/hr

10. (c) :
A has travelled 40 km when B starts.
B overtakes A in $\frac{40}{30 - 20}$ = 4 hours.
In this time B travels 4 × 30 = 120 km from the starting point.
C overtakes A at the same point
C takes = $\frac{120}{6}$ = 2 hours to reach there.
A takes = $\frac{120}{20}$ = 6 hours to reach there.
C starts = 6 – 2 = 4 hours after A.

11. (d) :



From both we can say that

$$\therefore \frac{60}{d + 30} = \frac{d + 120}{2d + 150} = \frac{\text{speed of Ravi}}{\text{speed of Samir}}$$

Solving the above equation we get,
d = 60
Required ratio = $\frac{60}{60 + 30} = \frac{2}{3}$

12. (c) :
Let the total capacity of a tank = 80 unit (LCM of 20, 40 and 80)
Pipe X discharges = 4 litres/minutes
Pipe Y discharges = 2 litres/minutes
Pipe Z discharges = 1 litres/minutes
Y and Z are kept open for 15 minutes
So, they fill = 15 × 3 = 45 litres
Now Y is shut and X is opened, this means that X and Z are filling the tank together. We don't yet know how long X and Z are open together.
Z is closed 5 minutes before the tank over flow. This means that only X works for the last 5 minutes.
So, it will fill 20 litre
Hence, remaining 15 litres water is filling by X and Z in 3 minutes
Total time taken = 15 + 3 + 5 = 23 minutes

13. (b) :

Let oil in containers be P and Q
After 1st operation
Container P = 0.30 P
Container Q = Q + 0.30 P
After second operation
Container P = 0.30 P + 0.5 Q + 0.15 P
Container Q = 0.5 Q + 0.115 P
According to question,

$$\frac{0.45P + 0.5Q}{0.5Q + 0.15P} = \frac{9}{7}$$

Solving the above equation we get,

$$\frac{P}{Q} = \frac{5}{9}$$

14. (c) :
Let the ratio of money that X, Y, Z and W had initially be 5 : 7 : 3 : 5. Therefore, Let's say they had 5k, 7k, 3k and 5k respectively.
After W distributed a% of the money that he had with other three, the ratio become 4 : 5 : 8 : 3
i.e., they had 4x, 5x, 8x and 3x respectively.
In both case, they have equal money
5k + 7k + 3k + 5k = 4x + 5x + 8x + 3x
20k = 20x
k = x
Hence, amount of money distributed by W

$$= \frac{5 - 3}{4} \times 100$$

= 40%

15. (a) :
CP = ₹ 380
SP = 1.25 × 380 = ₹ 475
MP = 475 + 75 = ₹ 550
Now,
New SP = 0.8 × 550 = ₹ 440
Hence, profit% = $\frac{440 - 380}{380} \times 100$ = 15.79%

16. (a) :
Le the 15 years ago age of Amit be 3x years
Then 15 years ago age of Rajni = 2x years
Now,

$$3x + 15 = \frac{6}{5}(2x + 15)$$

$15x + 75 = 12x + 90$
$x = 5$
So, present age of Amit = $3x + 15 = 30$ years
Present age of Rajni = $2x + 15 = 25$ years
Maximum age of a child = 14 years
Age of triplets = 14 years
Age of twins = 10 years
Age of sixth child = 6 years
Age of family = $30 + 25 + 14 \times 3 + 10 \times 2 + 6$
= 123 years

17. (a) :
The best scenario would be if a and c were very close to each other and far from C. let us try a = 1, b = 2 and c = 44.
In this case $|a - b| + |b - c| + |c - a|$
$= 1 + 43 + 42 = 86$
In second case a = 44, b = 43 and c = 1
In this case, $|a - b| + |b - c| + |c - a|$
$= 1 + 42 + 43 = 86$
Hence, the maximum value is 86.

18. (c) :
$$\log_{10} x^2 - \log_{10} \sqrt[4]{x} = 28\log_x 10$$
$$2\log_{10} x - \frac{1}{4}\log_{10} x = \frac{28}{\log_{10} x}$$
$$\frac{7}{4}\log_{10} x = \frac{28}{\log_{10} x}$$
$$(\log_{10} x)^2 = 16$$
$$\log_{10} x = \pm 4$$
log cannot be negative
$$\log_{10} x = 4$$
$x = 10000$
Hence, $\sqrt{x} = 100$

19. (d) :
$-10 < |3x - 6| + 4 < 10$
$-14 < |3x - 6| < 6$
$|3x - 6|$ is always greater than zero, so we need to look at only one part of this inequality
$|3x - 6| < 6$
$-6 < 3x - 6 < 6$
$0 < 3x < 12$

$0 < x < 4$

$x \in (0, 4)$

20. (d) :

$x^2 + 13x + 30 = 0$

$x^2 + 10x + 3x + 30 = 0$

$x(x + 10) + 3(x + 10) = 0$

$(x + 3)(x + 10) = 0$

$\alpha = -3$ and $\beta = -10$

Now,

Sum of root of equation $x^2 - ax + b = a$

$(\alpha + \beta) + \alpha\beta = a$

$(-3 - 10) + (-3)(-10) = a$

$a = 17$

Product of root of equation $x^2 - ax + b = b$

$(\alpha + \beta)\alpha\beta = b$

$(-3 - 10)(-3) \times (-10)$

$b = -390$

Sum of a and b = 17 – 390

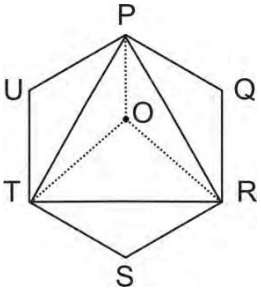
= –373

21. (d) :

$$R = \frac{54^{203} + 23^{203}}{66} = 0$$

Since $x^n + a^n$ is completely divisible by x + a when n is odd so, remainder is 0.

22. (d) :



Perimeter of hexagon = 6a

72 = 6a

a = 12 cm

Area of hexagon $\frac{\sqrt{3}}{4}(12)^2 = 36\sqrt{3}$ cm^2

Area of $\Delta PRT = \frac{36\sqrt{3}}{2} = 18\sqrt{3}$ cm^2

Data Interpretation and Logical Reasoning

Solutions for 1 to 5:

FALL OF WICKETS	TOTAL SCORE	RUNS OF BATSMAN GOT OUT	RUNS OF BATSMAN STILL PLAYING
1	32	Q-6	P-26
2	55	R-5	P-44
3	67	P-51 OR S-6	S-5 OR P-50
4	76	S-6 OR P-51	T-8
5	76	U-0	T-8
6	82	V-2	T-12
7	101	W-2	T-29
8	107	T-34 OR X-4	X-1 OR T-31
9	112	(X-4 or Y-2) OR (T-34 or Y-2)	(Y-2 or X-4) OR (Y-2 or T-34)
10	113	(Y-2 or Z-1) OR (X-4 or Z-1) OR (T-34 or Z-1)	(Z-1 or Y-2) OR (Z-1 or X-4) OR (Z-1 or T-34)

1. (b) : Fifth batsman(T) can be dismissed at the score of 107/112/113.

2. (c) : 19 runs partnership was between W & T as W got dismissed on 101

3. (b) : R got dismissed in the 23 runs partnership and he scored 5 runs. T didn't got dismissed in 9 runs partnership and scored 8 runs.
Hence, required percentage
(5/8)*100 = 62.5%

4. (b) : Dismissal of P,S,U and V will take place between the dismissal of R and W.

5. (d) : W is the 7^{th} wicket to fall.

Solutions for 6 to 10:

Following comparisons will represent the relation between the prices of chairs of the given different colours:
Red > Blue > Green > Black > Brown > Yellow
OR
Red > Blue > Black > Green > Brown > Yellow

Number of quantities purchased of the given different colours are as following:
Red = 21
Blue = 11 or 17

Green = 19
Black = 13
Brown = 11 or 17
Yellow = 15

6. (c) : As per statement(A)
Total amount spent by ramesh on buying brown chairs can be
1130*11 = 12430
OR
1130*17 = 19210
As per statement(B)
It can be clearly seen from the above comparison of prices
As per statement(C)
From the above comparison we know that cost price of green chair is either more or less than the cost price of black chair
So let the cost price of black chair be Rs. X
[(X + 24)/2] = 25
X = 26
As per statement(D)
It can be clearly seen from the above comparison of prices

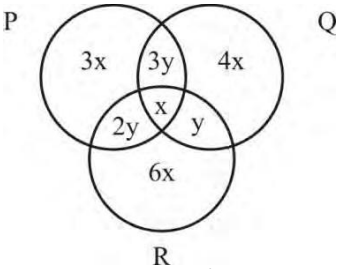
7. (c) : It can be clearly seen from the above comparison of prices

8. [(11 + 17 + 15)/3] = 14.33

9. (b) : Total number of blue and yellow chairs can be 26 or 32 and Number of red chairs are 21
So, 24 to 29 is that range of numbers which falls between this.

10. (c) : It can be clearly seen from the above comparison of prices

Solutions for 11 to 15:



[4x + y + 3y + x] | 3 = 3y + y + x
4x = 2(3y + y + x)
x = 4y
Now,
13x + x + 6y = 248

$14x + 6y = 248$
$56y + 6y = 248$
$y = 4$
$x = 4 \times 4$ i.e. 16

11. (d) : Q and R both = 16 + 4 = 20
All three = 16
Hence, required ratio = 20 : 16 i.e. 5 : 4

12. (d) : Required percentage = [16/24] × 100 = 66.66%

13. Exactly one scholarship = 48 + 64 + 96 = 208
Both P and R = 24
Hence required value = 208 – 24 = 184

14. (b) : As per option (b) Both P and Q = 12 + 16 = 28
Only R = 96
Hence required ratio = 7 : 24
So option (b) is not correct

15. Exactly two = 3y + 2y + y = 6y = 6 × 4 = 24

Solutions for 16 to 20:

With the given information we get the following completed table.

	Played	**Wins**	**Loss**	**Draw**	**Points**
Everton	38	16	8	14	32
Aberdeen	40	8	8	24	48
Livingston	38	16	10	12	60
Norwich city	42	10	22	10	40
Watford	36	10	12	14	42
Barnsley	38	8	14	16	40
Middlesbrough	40	18	12	10	64
Fulham	38	12	18	8	44
Liverpool	40	22	14	4	70
Rangers	36	10	4	22	52
Millwall	40	14	18	8	50
Tottenham	42	14	18	10	52

16. (b) : Each team has 10 draws in this case.

17. (b) : Liverpool leads the pack with 22 wins.

18. (a) : Everton and Aberdeen has scored a total of 110 points. While, Liverpool and Barnsley also has total of 110 points.

19. (c) : Aberdeen will be 5^{th} from bottom.

20. (b) : Norwich city and Tottenham have both played 42 matches so far.

Language Comprehension

1. (a) : As mentioned in the fourth paragraph "But they also decompose more readily, increasing carbon release back to the atmosphere.". Here, 'they' represents non-native plants. From this statement it can be inferred that non-native plants decompose faster than native plants.

2. (b) : As mentioned in the 9^{th} paragraph "their ability to grow depends on the nutritional quality of that food. We found that non-native plants provided a better food source for herbivores compared with native plants" this was one of the findings of the research conducted on 160 experimental plant communities. So, other mentioned findings are not correct except the second one.

3. (a) : As mentioned in the last lines of the 8^{th} paragraph "One soil contained microorganisms familiar to the plants and another was unfamiliar." This gives the clear indication about the purpose of the treatment that is mentioned in the next stated paragraph.

4. (d) : Apart from first 3 options, the author has not directly mentioned genetic behavior of plants as one of the factors responsible for carbon cycle.

5. (c) : As stated in the 2nd paragraph, it's evident that bats are swarming with zoonoses which is a disease or infection that can pass from animals to humans.

6. (c) : Both the statements can be inferred from the last lines of the third paragraph where the author has started by providing the information regarding various kinds of bat species and then later identified their positive role in various ways.

7. (c) : Third option is supported by the following lines "Many of the viruses that have plagued humans in recent decades are found in bats too—just absent typical symptoms." But other statements are weak in context of the passage.

8. (d) : Only last option is near to the author's argument and strengthens it further. As from the starting only, the author has described how bats are useful to humans in some ways.

9. (a) : 'Regular as clockwork' is a phrase which means very regularly. Here, as per the context of the passage only first options hold the meaning.

10. (d) : The last option is supported by these lines "This article gives an account of that discovery, the new theory of earthquakes that have flowed from it, and recent developments in our understanding."

Other options are far-fetched here.

11. (b) : As stated in the last paragraph “the surface (termed intermediate-focus earthquakes) are produced by a mechanism simply related to brittle fracture and frictional sliding”. Option D can’t be the answer as resilient means opposite of brittle.

12. (d) : All the statements can be rightly inferred from the passage but the last options is not one of the correct developments and findings mentioned by the author in the passage. As stated in the last paragraph “Deep-focus earthquakes (below 300 kilometres), however, follow an entirely different pattern and therefore probably stem from a separate mechanism”.

13. (a) : Option A is the best choice because it summarizes many of the statements made throughout the passage. But other options provide few details from the passage but couldn’t depict the whole idea.

14. (d) : All the statements except the last one can be inferred from the 2nd paragraph of the passage. The religious storybooks got the mention in 3rd paragraph for other Europe based books.

15. (a) : 4th paragraph makes the point clear that the manuscripts of this time explained the meaning of the text. It can be inferred from these lines “became more interpretive, actually illustrating passages from the book, with stylized figures looking rather severely out at the reader”.

16. (c) : Illuminations are a form of art, and are treated as such in the passage (there are many references to perspective and representation), it can be inferred that one would also learn about advancements in art. Hence, option C is correct.

17. 2341
2nd sentence presents the problem by giving an example of mosquito then 3rd sentence specifies one solution in respect of it. So, ‘23’ becomes a sequence and ‘41’ exaggerates the same thought.

18. 1234
All the sentences together describe the timeline of events related to burglary in a train. Connecting all the events will give ‘1234’ as a correct sequence.

19. 2134

We must trace the pronoun reference for ' them ' in 3rd sentence. There is no plural noun in the 2nd sentence to which it could point; so, 2 cannot come immediately before 3. This eliminates option C and D. 1st must come after 2nd.

20. (c) : Option A is too general. Option B also gives the reason of why songs are used as national anthems the world over which is unnecessary. Option D is too general and does not consider the ongoing debate over the English National Anthem.

21. (c) : Option C takes into account all three main points of the passage: orchids are difficult to grow, there are numerous orchid species, and orchids can grow in different environments, even cold climates, when cared for properly.

22. 5
The first four sentences talk about the approach of modern finance in business schools and the risk associated with it. Last sentence, talks about some becker theory related to workers and hence, is a misfit here.

23. 5
The main idea of the passage is how India is also emerging in the medical facilities and supporting liver and heart transplants. Last sentence slightly deviates from the main subject.

24. (c) : The given line best fits in the third blank. As the following lines after the third blank talk about those influences only.