CAT Quantitative Aptitude Questions for Practice Set 4 - Solutions

Difficulty Level – Difficult

1. (A)
Let PS = x
PR + PQ = 7x and PR = x + 18
So,
PQ = 6x – 18, QR = PS = x
In rectangle PQR
$(18 + x)^2 = (6x – 18)^2 + x^2$
X = 7cm
PQ = 42 – 18 = 24cm
Area of rectangle = 7 × 24
= 168sq.cm

2. (B)
Let the no. of student taking only physics = 8
10% of T = 8
T = 80
Required percentage = 14/80
= 17.5%

3. (D)
Total time = 182s
2 + 4 + 6 + 8 +……+ n terms = 182
i.e. n=13
Total distance covered = $2\times [1^2 + 2^2 + 3^2 + \ldots\ldots\ldots\ldots + 13^2]$
$= 2 \times 13 \times 14 \times \frac{27}{6} = 9 \times 13 \times 14$m
Average speed $= 9 \times 13 \times \frac{4}{182} = 9$m/s

4. (C)
Let fare for business class and economy class be Rs. 3x and Rs. 2x respectively. Let the passenger in business class and economy class be 12y and 25y respectively.
Total fare = 3x × 12y + 2x × 25y
=86xy = 430000
xy = 5000
Absolute difference = (50 – 36) × 5000
= Rs.70, 000

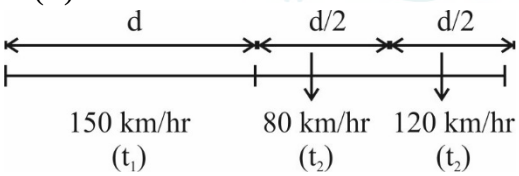
5. (B)
Let the CP of apple be p
Then, px + (p + 4)y – 8 = p × 3x + (p+4) (y–6)
px +py +4y = 3px + py – 6p + 4y – 24 + 8
2px – 6p = 16

p(x–3) = 8
The maximum value of p is 8 at x = 4
Then, CP of an apple and mango is 8 + 12 = 20 Rs.

6. (B)
Let us find the pattern
$10^4 - 21 = 9979$
$10^6 - 21 = 999979$
$10^8 - 21 = 99999979$
.. .. ..
.. .. ..
.. .. ..
$10^n - 21 = 999(n–2\text{times})\ 79$
When, n = 78
$10^{78} - 21 = 999(76\text{times})\ 79$
Sun of all digit = 77 × 9 + 7
= 693 + 7 = 700

7. (A)
Total volume = 2800 cubic feet
Area of ceiling = 2800/28 = 100sqfeet
Total time taken = $\frac{100}{0.125}$ = 800min
= 13hr 20min
Time taken to paint four walls= $40 - 13 \times \frac{1}{3}$ = 26hr 40min

8. (A)



So, $d = 150t_1$
$t_1 = \frac{d}{150}$
$d = (80+120)\ t_2$
$t_2 = \frac{d}{200}$
Total time = $t_1 + 2t_2$
$\frac{d}{150} + \frac{2d}{200}$
$= \frac{d}{150} + \frac{d}{100}$
$= \frac{2d+3d}{300}$

$= \frac{5d}{300} = \frac{d}{60}$

Average speed = $\frac{2d}{\frac{d}{60}}$ = 120km/hr.

Average distance covered in one hour is same as average speed.

9. **(A)**

CP of wheat be Rs.100/kg So, when shopkeeper pays for 1kg wheat, he get 1.1kg of wheat.

CP of shopkeeper is Rs. $\frac{100}{1.1}$ per kg

While selling, he sells 10% less

So, 5p = Rs. $\frac{100}{0.9\text{kg}}$

Profit percent = $\frac{\frac{100}{0.9} - \frac{100}{1.1}}{\frac{100}{1.1}}$

=22.22percent

10. (B)

Sum of square of even natural number n = $2^2 + 4^2 + 6^2 + \ldots\ldots\ldots\ldots + n^2$

= $2^2 [1^2 + 2^2 + 3^2 + \ldots\ldots\ldots\ldots + (n/2)^2]$

4. $\frac{(n/2)\left(\frac{n}{2}+1\right)\left(\frac{2n}{2}+1\right)}{6} = 51 \times n$

(n+1)(n+2) = 51×6

$n^2 + 3n + 2 = 306$

(n–16)(n+19) = 0

n=16

11. (B)

Given equation is

$x^2 - 25 | < 5$

$-5 < x^2 - 25 < 5$

$20 < x^2 < 30$

$\sqrt{20} < |x| < \sqrt{30}$

Hence |x| = 5

x = ± 5

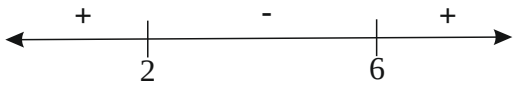
12. (B)

$x(x - 6) > 2x - 12$

$x^2 - 6x > 2x - 12$

$x^2 - 8x > 12x > 0$

$(x - 2)(x - 6) > 0$



x < 2 or x >6

13. (C)

$$\frac{1}{2\log_a 10}+\frac{1}{2\log_b 10}+\frac{1}{2\log_c 10}+\frac{1}{2\log_d 10}$$

$$=\frac{\log_{10} a}{2}+\frac{\log_{10} b}{2}+\frac{\log_{10} c}{2}+\frac{\log_{10} d}{2}$$

$$=\frac{\log_{10} a+\log_{10} b+\log_{10} c+\log_{10} d}{2}$$

$$=\frac{\log_{10} abcd}{2}$$

$$=\frac{\log_{10} 10^8}{2}$$

=8 × ½ = 4

14. (A)

Let the airline has a free luggage allowance →'f' kg

Luggage by M →m kg

Luggage by S →s kg

Rate charger beyond f kg →'e'/kg

Extra luggage of m = (m – f) kg

Extra luggage of s = (s – f) kg

ATQ

e(2m – f) = 2400 _____equation 1

e(2s – f) = 900 _____equation 2

add 1 and 2

e(m + s –f) = 1650

Also, e (m – f) + e(s – f) = 1050

e(m + s –f) – ef = 1050

1650 – ef= 1050

ef = 600

Extra luggage from m = e(m – f)

$$= \frac{e(2m-2f)}{2} = \frac{e(2m-f)-ef}{2}$$

$$=\frac{2400-600}{2}$$

= Rs. 900

15. (C)

f (a) = $a^2 – 2ax + y$

f (x) = $x^2 – 2x^2 + y = 0$

$– x^2 + y =0$

$y = x^2$ …….. (1)

f (y) = $y^2 – 2xy + y = 0$

$y^2 - 2xy + x^2 = 0$

$(y - x)^2 = 0$

$y - x = 0$

$y = x$

Put value of y in equation 1

We get

$x = y = 1$

So, $f(4) = 4^2 - 2(4\times1) + 1$

$= 16 - 8 + 1$

$= 9$

16. (B)

Let the distance between Delhi (D) and Jaipur (J) be 8x and Akbar's initial speed be 4a and final speed be 7a.

Let the point where he increased his speed at P and let Q be the point on DJ such that $DP = \frac{5}{8}(DJ)$

$\frac{PQ}{PJ} = \frac{4}{7}$

Let PQ = 4y,

PJ = 7y

QJ = 7y – 4y = 3x

3y = 3x

y= x

PQ = 4x and PJ =7x

Required ratio = $\frac{DP}{DJ}$

$= \frac{x}{8x} = 1/8$

17. **(A)**

Let the price of 1 apple, 1 banana and 1 orange is a, b and c respectively.

3a + 5b + 3c = 85 equation 1

4a + 4b + 5c = 87 equation 2

5a + 3b + 7c =?

Multiply equation 1 and 2 by m and n respectively and adding will given the required equation

3m+5n = 7 equation 3

5m+4n = 3 equation 4

3m+4n = 5 equation 5

Equation 4 – equation 5

2m= –2

m= –1 and n = 2

Substituting these values in equation 3 which also satisfy

Equation 1 × (–1) + equation 2 ×2

= 5a + 3b + 7c

= 85(–1) + 87(2)
5a + 3b + 7c = 89Rs.
Price of 5 apple, 3 bananas and 7 oranges is Rs. 89.

18. (B)
Assuming that
$\rightarrow b - c = p \Rightarrow b = c + p$
$\rightarrow c - a = q \Rightarrow c = a + q$
Hence b = c + p
= a + q + p
$\because y + \frac{1}{(b-c)a(c-a)}$ can be written as $a + q + p + \frac{1}{a.p.q}$
Apply AM ≥ GM in equally concept in above equation

$$\frac{a + q + p + \frac{1}{a.p.q}}{4} \geq 4\sqrt{a \times p \times q \times \frac{1}{a.p.q}}$$

$$\frac{a + q + p + \frac{1}{a.p.q}}{4} \geq 1$$

$$a + q + p + \frac{1}{a.p.q} \geq 4$$

Hence, minimum value is 4

19. (A)
Since the two train meet after one hour, their relative speed (sum of their speeds as they are travelling in opposite direction) is 138km/hr. The speed of faster train is asked; we know it has to be greater than 69km/hr. as B takes more time to cover the same distance.
Option (a) is correct.

20. **(D)**
Let the quotient obtained when the numbers is divided by 3, 5 and 6 be x_1, x_2 and x_3
Respectively
$N = 3x_1 + 1$
$x_1 = 5x_2 + 3$
$x_2 = 6x_3 + 2$
$N = 3[5(6x_3 + 2) + 3] + 1$
$=90x_3 + 40 < 1000$
x_3 can take 11 values