CAT Mock Paper 3

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Quantitative Ability

DIRECTIONS ***for questions 1 to 19:*** **Answer the questions independently of each other.**

Q 1. Each of four girls, A, B, C and D, had a few chocolates with her. A first gave 1/3rd of the chocolates with her to B, B gave 1/4th of what she then had to C and C gave 1/5th of what she then had to D. Finally, all the four girls had an equal number of chocolates. If A had 80 chocolates more than B initially, find the difference between the number of chocolates that C and D initially had.

(1) 20
(2) 30
(3) 15
(4) Cannot be determined

Q 2. In a survey conducted to find out the readership of three newspapers A, B and C, it was found that the number of people who read newspaper A is at least 20 and at most 40, the number of people who read newspaper B is at least 50 and at most 70, the number of people who read newspaper C is at least 70 and at most 83. It was also found that 8 people read all the three newspapers and 85 people read at least two of the three newspapers. Find the minimum number of people who read both A and B but not C.

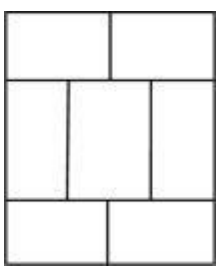
(1) 1
(2) 2
(3) 3
(4) 0

Q 3. There are twenty-five identical marbles to be divided among four brothers such that each of them gets no less than three marbles. In how many ways can the marbles be divided among the four brothers?

(1) 286
(2) 364
(3) 455
(4) 560

Q 4. Several identical cuboids of dimensions 4 cm · 3 cm · 2 cm are put together to form a large cube. What is the least possible volume (in cu.cm) of such a cube?

(1) 216
(2) 1728
(3) 5832
(4) 13824

Q 5. 

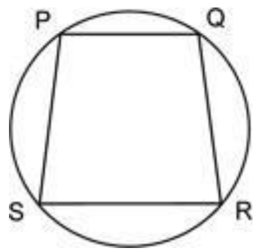
In the figure above, seven congruent rectangles are assembled together perfectly to form a bigger rectangle of perimeter 130 cm. Find the area (in sq.cm) of the bigger rectangle.

(1) 1000
(2) 1056
(3) 750
(4) 1050

Q 6. Three filling pipes R, S and T together, can fill an empty tank in 2 hours, S can fill the tank four times faster than T. Initially R alone is opened and after *x* hours, it is closed and immediately S and T are opened together. The tank is full after another *y* hours. If the tank was filled in a total of 4 hours, and *x* ≠ *y*, find the time (in hours) that T alone would take to fill the tank.

(1) 6

(2) 12
(3) 20
(4) 24

Q 7. 

In the figure above, PQRS is a cyclic quadrilateral, where PQ = *p* cm, QR = *q* cm, RS = *r* cm and PS = *s* cm. If (PQ) (QR) = 3(PS) (RS) and ∠PQR = 120°, then *s* =

(1) $P + R - Q$
(2) $Q + R - P$
(3) $P + Q - R$
(4) $\frac{p+q+r}{3}$

Q 8. Find the value of $\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{1+\ldots}}}}$.

(1) $\frac{\sqrt{5}-1}{2}$
(2) $\frac{\sqrt{3}-1}{2}$
(3) $\frac{\sqrt{2}+1}{2}$
(4) $\frac{\sqrt{5}+1}{2}$

Q 9. Vivek found the product, P, of two two-digit natural numbers, M and N. He then reversed the digits of each of M and N and found the product of the resultant numbers. Interestingly, he found both products to be the same. If the product of the tens digit of M and the tens digit of N is prime, find the sum of all the possible values of P that Vivek could have obtained.

(1) 2604
(2) 2712
(3) 2627
(1) 4684
(2) 4664

Q 10. Three circles of equal radii have been drawn inside an equilateral triangle, of side *a*, such that each circle touches the other two circles as well as two sides of the triangle. Then, the radius of each circle is

(1) $\frac{a}{2(\sqrt{3}+1)}$
(2) $\frac{a}{2(\sqrt{3}-1)}$
(3) $\frac{a}{\sqrt{3}+1}$
(4) $\frac{a}{\sqrt{3}-1}$
(5) $\frac{a}{4(\sqrt{3}-1)}$

Q 11. What is the minimum value of the expression $2x^2 + 3y^2 - 4x - 12y + 18$?

i. 18
ii. 10
iii. 4
iv. 0
v. -10

Q 12. Vibhu and Jayant are comp1eting in a 100 m race. Initially, Ramu runs at twice Jayant's speed for the first fifty metres. After the 50 m mark, Vibhu runs at 1/4th his initial speed while Jayant continues to run at his original speed. If Jayant catches up with Vibhu at a distance of '*x*' metres from the finish line, then find *x*.

(1) 37.5
(2) 25
(3) 75
(4) 42.5
(5) Somu will never catch up with Ramu

Q 13. When the curves $y = 10^x$ and $xy = 1$ are drawn in the X-Y plane, how many times do they intersect for values of y ³ 2?

(1) Never
(2) Once
(3) Twice
(4) Thrice
(5) More than thrice

Q 14. Thirty-six equally spaced points - P_1 through P_{36} - are plotted on a circle, and some of these points are joined successively to form a regular polygon. How many distinct such regular polygons are possible?

(1) 7
(2) 23
(3) 37
(4) 27
(5) None of these

Q 15. If $l + m + n$ ¹ 0, which of the following conditions must l, m and n satisfy so that the system of simultaneous linear equations $x + 3y - 4z = l$, $2x - y - z = m$, $x + y - 2z = n$ has at least one?

(1) $3l - 2m + 7n = 0$
(2) $3l - 2m - 7n = 0$
(3) $3l + 2m - 7n = 0$
(4) $2l + 3m + 7n = 0$
(5) $2l + 3m - 7n = 0$

Q 16. There are n terms in an arithmetic progression. The n terms of The arithmetic progression are now distributed into eight sub-series - S_1, S_2 >>and S_8 - as follows. The 1st, 9th, 17th terms and so on go into S_1; the 2nd ,

10^{th}, 18^{th} terms and so on go into S_2; the 3^{rd}, 11^{th}, 19^{th} terms and so on go into S_3, and so on for S_4 till S_8. If for exactly three of the eight sub-series, the average of the sub-series is a term of the same sub-series, which of the following could be a possible value of *n*?

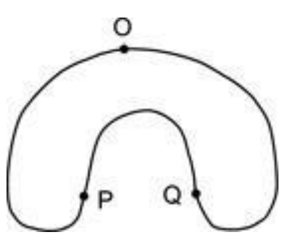
(1) 37
(2) 53
(3) 49
(4) 50
(5) 51

Q 17. One day the king summoned all the soldiers in his army and made them stand in a queue. To the first soldier, he gave three gold coins and to every subsequent soldier, he gave four gold coins more than what he gave to the previous soldier. Then the king ordered each soldier to distribute all the coins that he received among the peasants, if and only if it is possible to distribute the coins such that each peasant to whom the soldier distributes gets as many coins as the number of peasants to whom the soldier distributes the coins. If no two soldiers were allowed to distribute coins to the same peasant and there were a total of 4000 soldiers in the king's army, how many peasants received at least one gold coin?

(1) 386
(2) 284
(3) 576
(4) 4000
(5) None of these

Q 18. Two cyclists, Arjun and Bhim, started towards O from P and Q respectively, along the path shown below, in opposite directions. They met for the first time at 9:00 a.m. at O. At this moment, they reversed their directions but maintained their respective initial speeds and met for the second time at 10:30 a.m., following which

Arjun reached O for the second time 75 minutes after Bhim reached O for the second time. What is the ratio of the speeds of Arjun and Bhim?



(1) 1 : 2
(2) 2 : 3
(3) 3 : 4
(4) 1 : 3
(5) Cannot be determined

Q 19. Which of the following is NOT a possible number of regions into which three straight lines (of infinite extent) can divide a plane?

(1) 7
(2) 6
(3) 5
(4) 4
(5) None of these

DIRECTIONS *for questions 20 and 21:* Answer the questions on the basis of
the information given below.

The people of an island named Tingo use the number system to the base 5. The students of that island had recently taken an exam called BAT, a management entrance test, to gain admissions into their top B-schools. Answer the following two questions that appeared in that exam.

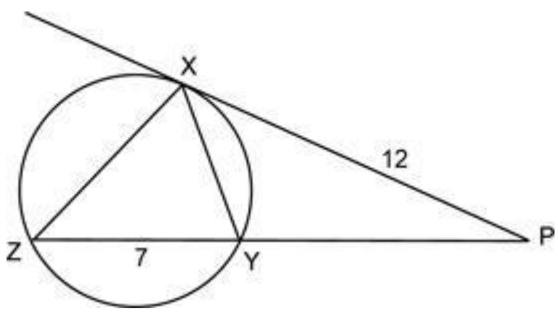
Q 20. The number N, expressed to the base five is 2323……23 upto a total of hundred digits. The remainder when N^{4231} is divided by 4 is

(1) 0
(2) 1
(3) 2
(4) 4

Q 21. A number written to the base five is called an *oven* number, if it is exactly divisible by 3. Which of the following is not an *oven* number?

(1) $(4213)^{2143}$
(2) $(1423)^{2143}$
(3) $(1243)^{2143}$
(4) $(3421)^{2143}$

Q 22. In the figure below, PX = 12 cm, YZ = 7 cm and the perimeter of PXY is 27 cm. Find the perimeter of PXZ.



(1) 36 cm

(2) 27 cm

(3) 22.5 cm

(4) 31.5 cm

Q 23. If a four-digit natural number is 7083 more than the number formed by reversing the order of its digits, then how many such natural numbers are possible?

(1) 18

(2) 24

(3) 27

(4) 36

Q 24. Two trains, T_1 and T_2, simultaneously pass through a station on two parallel tracks without stopping at the station. The platform P_2 passed by the train T_2 is 50% more in length than the platform P_1 passed by train T_1. The train T_1 runs at a speed of 72 kmph, while the other train is 25% slower and 50% longer. What is the ratio of the times taken by the trains T_1 and T_2 in passing the platforms P_1 and P_2 respectively?

(1) 4 : 3

(2) 3 : 1

(3) 1 : 2

(4) Cannot be determined

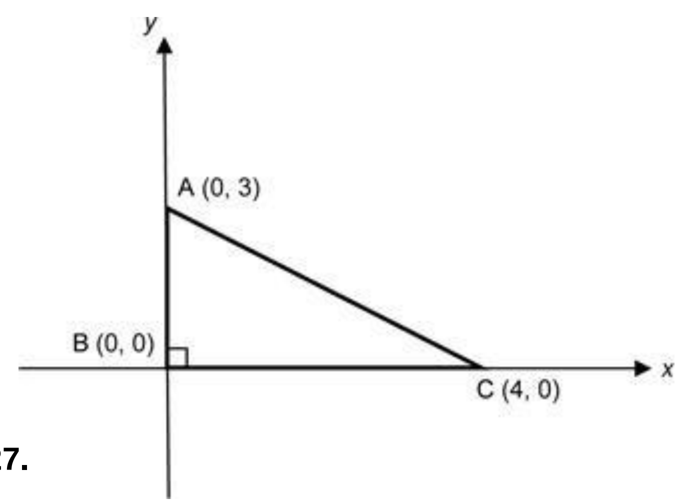
Q 25. P is a point outside the circle with centre O. If a straight line drawn through P intersects the circle at points A and B such that $AB = 4\sqrt{6}$ cm**and**

90° < ∠AOB < 120°, which of the following could be the radius (in cm) of the circle?

(1) 4
(2) 5
(3) 6
(4) 7

Q 26. Find the total number of ways in which a black square and a white square can be selected from a chessboard such that both the squares lie either in the same row or in the same column.

(1) 256
(2) 512
(3) 128
(4) 64



Q 27.

In the above triangle ABC, find the co-ordinates of the foot of the perpendicular drawn from B to AC.

(1) $\left(\frac{4}{5}, \frac{3}{5}\right)$

(2) $\left(\frac{32}{25}, \frac{24}{25}\right)$

(3) $\left(\frac{4}{5}, \frac{12}{5}\right)$

(4) $\left(\frac{36}{25}, \frac{48}{25}\right)$

Q 28. If $4^{[\log_2 \log_3 (4x+1)]} - \log_3(4x+1)^6 + 8 = 0$ and $x > 4$, find $\log_4(x - 4)$.

(1) 2
(2) 3
(3) 4
(4) 6

Q 29. Ours is a big family. I have thrice as many brothers as sisters and my sister Bharathi has four times as many brothers as sisters. How many children do my parents have?

(1) 15
(2) 16
(3) 21
(4) 20

Q 30. A and B have written an entrance exam and scored 55 marks and 85 marks respectively. Every question answered correctly fetches one mark but the negative marks per wrong answer for the first twenty wrong answers is different from that for the remaining wrong answers. A and B attempted 160 and 150 questions respectively. If A and B correctly answered 50% and
of the questions that they attempted respectively, find the negative mark for each wrong answer beyond the first twenty wrong answers.

(1) 1/2
(2) 1/3
(3) 1/4
(4) 2/3

Q 31. A certain sum is invested at simple interest. If the sum becomes *k* times itself in 16 years and 2*k* times itself in 40 years, in how many years will it become 4*k* times itself?

(1) 96 years

(2) 88 years
(3) 80 years
(4) 64 years

DIRECTIONS *for questions 32 to 34:* Answer the questions independently of each other.

Q 32. This year, during the months of January and February, every day Ramu went to a fruit shop and bought three varieties of fruits, such that when any two days are considered, he bought at least one variety of fruit on one of the days that was different from what he bought on the other day. What is the minimum number of different varieties of fruits he could have bought during that period?

(1) 9
(2) 8
(3) 18
(4) 60
(5) 14

Q 33. Little Euclid was playing with a cuboidal box, with a square base, and 14 identical wooden spheres. He observed that he could snugly and perfectly arrange exactly nine of the fourteen spheres at the bottom of the box in a single layer comprising three rows and three columns. He then placed another layer of four spheres, stably and symmetrically on top of the bottom layer (i.e., such that each sphere in the second layer touched exactly four spheres of the bottom layer). Finally he placed the last sphere, stably and symmetrically, on top of the second layer and observed that he could then just close the lid of the box. Find the ratio of the height of the box to the radius of each sphere.

(1) $2(2\sqrt{3}-1)$
(2) $2(\sqrt{2}+1)$
(3) $2(\sqrt{3}+1)$
(4) $3(2\sqrt{2}-1)$
(5) None of these

Q 34. In a triangle ABC, AB = AC, BC = 6 cm and BE and CF are the medians drawn to AC and AB respectively. If BE ^ CF, then find AC (in cm).

(1) $3\sqrt{10}$
(2) $6\sqrt{5}$
(3) $4\sqrt{10}$
(4) $8\sqrt{5}$
(5) Cannot be determined