CAT 2016 QA Slot 1 Question Paper

Time Allowed :3 Hours	**Maximum Marks :**300	**Total questions :**100

General Instructions

Read the following instructions very carefully and strictly follow them:

1. **Duration of Section:** 40 Minutes
2. **Total Number of Questions:** 22 Questions (as per latest pattern, may vary slightly)
3. **Section Covered:** Quantitative Aptitude (QA)
4. **Type of Questions:**
   - Multiple Choice Questions (MCQs)
   - Type In The Answer (TITA) Questions – No options given, answer to be typed in
5. **Marking Scheme:**
   - +3 marks for each correct answer
   - -1 mark for each incorrect MCQ
   - No negative marking for TITA questions
6. **Syllabus Coverage:** Arithmetic, Algebra, Geometry, Number System, Modern Math, and Mensuration
7. **Skills Tested:** Numerical ability, analytical thinking, and problem-solving

1. Direction for questions: Answer the questions based on the following information. In a locality, there are five small cities: A, B, C, D, and E. The distances of these cities from each other are as follows. AB = 2 km; AC = 2 km; AD ¿ 2 km; AE ¿ 3 km; BC = 2 km; BD = 4 km; BE = 3 km; CD = 2 km; CE = 3 km; DE ¿ 3 km. If a ration shop is to be set up within 3 km of each city, how many ration shops will be required?

a. 1

b. 2

c. 3

d. 4

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2. A cube of side 12 cm is painted red on all the faces and then cut into smaller cubes, each of side 3 cm. What is the total number of smaller cubes having none of their faces painted?

a. 8

b. 27

c. 16

d. 64

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3. If ABCD is a square and BCE is an equilateral triangle, what is the measure of $\angle DEC$?

a. 15°

b. 30°

c. 20°

d. 45°

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4. Instead of a metre scale, a cloth merchant uses a 120 cm scale while buying, but uses an 80 cm scale while selling the same cloth. If he offers a discount of 20

a. 20b. 25c. 40d. 15

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5. From a circular sheet of paper with a radius 20 cm, four circles of radius 5 cm each are cut out. What is the ratio of the uncut to the cut portion?

a. 1:3

b. 4:1

c. 3:1

d. 4:3

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6. A wooden box (open at the top) of thickness 0.5 cm, length 21 cm, width 11 cm, and height 6 cm is painted on the inside. The expenses of painting are Rs. 70. What is the rate of painting per square centimetre?

a. Rs. 0.7

b. Rs. 0.5

c. Rs. 0.1

d. Rs. 0.2

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7. A, S, M, and D are functions of x and y, and they are defined as follows:

$$A(x, y) = x + y, \quad S(x, y) = x - y$$

$$M(x, y) = x \cdot y, \quad D(x, y) = \frac{x}{y}, \quad y \neq 0$$

What is the value of $M(M(A(M(x, y), S(x, y)), D(x, y)), A(x, y))$ for $x = 2$, $y = 3$?

a. 60

b. 140

c. 25

d. 70

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8. The cost of diamond varies directly as the square of its weight. Once, this diamond broke into four pieces with weights in the ratio 1:2:3:4. When the pieces were sold, the merchant got Rs. 70,000 less. Find the original price of the diamond.

a. Rs. 1.4 lakh

b. Rs. 2 lakh

c. Rs. 1 lakh

d. Rs. 2.1 lakh

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9. If n is any odd number greater than 1, then $n^2 - 1$ is

(A) divisible by 96 always

(B) divisible by 48 always

(C) divisible by 24 always

(D) None of these

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10. The figure shows a circle of diameter AB and radius 6.5 cm. If chord CA is 5 cm long, find the area of triangle ABC.

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11. A watch dealer incurs an expense of Rs. 150 for producing every watch. He also incurs an additional expenditure of Rs. 30,000, which is independent of the number of watches produced. If he is able to sell a watch during the season, he sells it for Rs. 250. If he fails to do so, he has to sell each watch for Rs. 100. If he is able to sell only 1,200 out of 1,500 watches he has made in the season, then he has made a profit of

(A) Rs. 90,000

(B) Rs. 75,000

(C) Rs. 45,000

(D) Rs. 60,000

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12. Once I had been to the post office to buy five-rupee, two-rupee and one-rupee stamps. I paid the clerk Rs. 20, and since he had no change, he gave me three more one-rupee stamps. If the number of stamps of each type that I had ordered initially was more than one, what was the total number of stamps that I bought?

(A) 10

(B) 11

(C) 13

(D) 14

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13. In ABC, B is a right angle, AC = 6 cm, and D is the mid-point of AC. The length of BD is

(A) 3 cm

(B) 4 cm

(C) 5 cm

(D) 22 cm

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14. A salesman enters the quantity sold and the price into the computer. Both the numbers are two-digit numbers. But, by mistake, both the numbers were entered with their digits interchanged. The total sales value remained the same, i.e. Rs. 1,148, but the inventory reduced by 54. What is the actual price per piece?

(A) Rs. 82

(B) Rs. 41

(C) Rs. 6

(D) Rs. 28

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15. In a locality, two-thirds of the people have cable TV, one-fifth have VCR, and one-tenth have both. What is the fraction of people having either cable-TV or VCR?

(A) 19/30

(B) 2/3

(C) 17/30

(D) 23/30

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16. Given the quadratic equation $x^2 - (A-3)x - (A-2)$, for what value of A will the sum of the squares of the roots be zero?

a. -2

b. 3

c. 6

d. None of these

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17. If $a_1 = 1$ and $a_{n+1} = 3a_n + 2$ for every positive integer n, then a_{100} equals:

(1) $3^{99} - 200$

(2) $3^{100} + 200$

(3) $3^{100} - 200$

(4) $3^{100} + 200$

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18. In a mile race, Akshay can be given a start of 128 m by Bhairav. If Bhairav can give Chinmay a start of 4 m in a 100 m dash, then who out of Akshay and Chinmay will win a race of one and half miles, and what will be the final lead given by the winner to the loser? (One mile is 1,600 m.)

a. Akshay, 1/12 mile

b. Chinmay, 1/32 mile

c. Akshay, 1/24 mile

d. Chinmay, 1/16 mile

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19. Two liquids A and B are in the ratio 5 : 1 in container 1 and 1 : 3 in container 2. In what ratio should the contents of the two containers be mixed so as to obtain a mixture of A and B in the ratio 1 : 1?

(a) 2 : 3

(b) 4 : 3

(c) 3 : 2

(d) 3 : 4

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20. A man travels three-fifths of a distance AB at a speed 3a, and the remaining at a speed 2b. If he goes from B to A and returns at a speed 5c in the same time, then:

(a) $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$

(b) $a + b = c$

(c) $\frac{1}{a} + \frac{1}{b} = \frac{2}{c}$

(d) None of these

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21. There are five machines A, B, C, D, and E situated on a straight line at distances of 10 metres, 20 metres, 30 metres, 40 metres, and 50 metres respectively from the origin of the line. A robot is stationed at the origin of the line. The robot serves the machines with raw material whenever a machine becomes idle. All the raw material is located at the origin. The robot is in an idle state at the origin at the beginning of a day. As soon as one or more machines become idle, they send messages to the robot-station and the robot starts and

serves all the machines from which it received messages. If a message is received at the station while the robot is away from it, the robot takes notice of the message only when it returns to the station. While moving, it serves the machines in the sequence in which they are encountered, and then returns to the origin. If any messages are pending at the station when it returns, it repeats the process again. Otherwise, it remains idle at the origin till the next message(s) is received.

Suppose on a certain day, machines A and D have sent the first two messages to the origin at the beginning of the first second, and C has sent a message at the beginning of the 5th second and B at the beginning of the 6th second, and E at the beginning of the 10th second. How much distance in metres has the robot travelled since the beginning of the day, when it notices the message of E? Assume that the speed of movement of the robot is 10 metres per second.

(1) 140

(2) 80

(3) 340

(4) 360

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22. Out of two-thirds of the total number of basketball matches, a team has won 17 matches and lost 3 of them. What is the maximum number of matches that the team can lose and still win more than three fourths of the total number of matches, if it is true that no match can end in a tie?

(1) 6

(2) 8

(3) 10

(4) 12

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23. What value of x satisfies the inequality $x^3 + x - 2 < 0$?

(1) $-8 \leq x \leq 1$

(2) $-1 < x < 8$

(3) $x \geq 2$

(4) $-8 \leq x \leq 8$

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24. The points of intersection of three lines $2X + 3Y - 5 = 0$, $5X - 7Y + 2 = 0$ and $9X - 5Y - 4 = 0$.

a. form a triangle

b. are on lines perpendicular to each other

c. are on lines parallel to each other

d. are coincident

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25. A man has 9 friends: 4 boys and 5 girls. In how many ways can he invite them, if there have to be exactly 3 girls in the invitees?

a. $\binom{5}{3} \times \binom{4}{2}$

b. $\binom{5}{3} \times \binom{4}{3}$

c. $\binom{5}{3} \times \binom{4}{4}$

d. $\binom{5}{3} \times \binom{4}{1}$

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26. In a watch, the minute hand crosses the hour hand for the third time exactly after every 3 hours 18 minutes and 15 seconds of watch time. What is the time gained or lost by this watch in one day?

a. 14 min 10 s lost

b. 13 min 50 s lost

c. 13 min 20 s gained

d. 14 min 40 s gained

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27. I sold two watches for Rs. 300 each, one at the loss of 10

a. (+)10

b. (-)1

c. (+)1

d. (-)10

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28. A series S_1 of five positive integers is such that the third term is half the first term, and the fifth term is 20 more than the first term. In series S_2, the nth term defined as the

difference between the $(n+1)$th term and the nth term of series S_1, is an arithmetic progression with a common difference of 30.

a. 50

b. 60

c. 70

d. None of these

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29. What is the average value of the terms of series S_1?

a. 60

b. 70

c. 80

d. Average is not an integer

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30. If $\log_{10} x - \log_{10} y = 2\log_{10} x$, then a possible value of x is given by:

a. 10

b. $\frac{1}{100}$

c. $\frac{1}{1000}$

d. None of these

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31. What is the sum of all two-digit numbers that give a remainder of 3 when they are divided by 7?

a. 666

b. 676

c. 683

d. 777

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32. There are 12 towns grouped into four zones with three towns per zone. It is intended to connect the towns with telephone lines such that every two towns are connected with three direct lines if they belong to the same zone, and with only one direct line otherwise. How many direct telephone lines are required?

a. 72

b. 90

c. 96

d. 144
