Quantitative Ability Test

For The Common Admission Test 2006

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Instructions:

(1) This test is of 40 minutes duration.

(2) This sectional test has 30 questions, 10 in Part A and 20 in Part B.

Each question in Part A carries 1 mark, and each question in

Part B carries 2 marks.

(3) Wrong answers carry negative marks equivalent to 1/3 of that question's.

(4) Use of slide rule, calculator, and log table is not allowed. Use the blank

space in the booklet for rough work.

PART A

(1) A number of 3 digits in base 5 which when expressed in base 9 has its digits reversed in order. Then the sum of the digits of the original number in base 5 is

(a) 11 (b) 12 (c) 13 (d) 14

(2) A rectangle is such that it can be perfectly cut into smaller squares of maximum possible side of length 5 cm. It is known that perimeter of such a rectangle is 200 cm.

How many distinct rectangles are possible?

(a) 4 (b) 15 (c) 18 (d) none of the foregoing

(3) Let x be real such that $1 - 1/n < x <= 2 + 1/n$ for all positive integers n.

Then the range of x is

(a) $0 < x <= 3$ (b) $1 <= x <= 2$ (c) $1 < x <= 3$ (d) none of the foregoing

(4) A circular pizza is cut for eating into equal sectors by 6 friends. Two of the friends take out the maximum possible circle from their share while the other four eat all their pizza. How much of the pizza approximately was not eaten?

(a) 9% (b) 13% (c) 11% (d) 10%

(5) A mason employed a certain number of workers to finish constructing a house in a certain number of days. But soon he realises that work would get delayed by 1/4th of the time. He then increases the number of workers by a third and thus manages to finish the work on schedule. What percentage of work had got finished by the time new labour joined in between?

(a) 20 (b) 30 (c) 33.33 (c) 25

(6) In professor's study room at a B-school there are 20 empty chairs in a row. From time to time some professor enters the study room and sits on one of the free chairs and if either of the neighbouring chairs is occupied, one of the professor's neighbour stands up and leaves. What is the maximum number of chairs that can be occupied simultaneously?

(a) 10 (b) 11 (c) 19 (d) none of the foregoing

(7) There are 10 distinct natural numbers all of which are less than 12. The number of pairs of these numbers with the same positive difference is at least

(a) 4 (b) 5 (c) 11 (d) 12

(8) If the system of equations $x = by + az$, $y = z + bx$ and $z = ax + y$ has non-trivial solution, then

(a) $a+b = 0$ (b) $a^2 - b^2 = 1$ (c) $a-b = 0$ (d) $a^2 + b^2 = 1$

(9) The Indian hockey team has in all played x number of games. It did not lose y number of games, and it did not win z number of games. What fraction of the games has the Indian hockey team drawn?

(a) |z-y|/x + 1 (b) (z+y)/x - 1 (c) 1- (z+y)/x (d) can not be determined

(10) In a certain institute out of every 8 students learning marketing, 2 take finance as well. For every student taking at least one of these two courses there are 4 who take up neither. If 30% of the students only take marketing, then the percentage of students who have taken marketing is

(a) 37.5% (b) 60% (c) 40% (d) none of the foregoing

PART B

(11) Each vertex of a right angle triangle of area 1 is reflected in the opposite side. What is the area of the triangle formed by the three reflected points?

(a) 1 (b) 3^1/2 (c) 2 (d) 3

(12) The minimum value of |x - p| + |x - 10| + |x - p - 10| for x in the range p <= x <= 10,

where 0 < p < 10, is

(a) 10 (b) p (c) 10-p (d) none of the foregoing

(13) There is a circular track of length 100 m. Three persons A, B, C are standing at different points on the track. A and C are diametrically opposite to each other and B is exactly midway between A and C such that A, B, C are in clockwise order. The race starts and the speeds of A, B, and C are 7m/s, 4m/s, 9m/s respectively. After how long will B and C meet for the 10th time?

(a) 2 min 55 sec (b) 3 min 15 sec (c) 3 min 45 sec (d) none of the foregoing

(14) A shopkeeper makes a profit equal to the discount he gives on an article. He makes a profit of 25% on the selling price of the article. Then the discount percent is

(a) 33.33 (b) 25 (c) 16.33 (d) 20

(15) If gcd(a, b) = 1, ab = 20! and $0 < a/b < 1$, then total number of rational numbers a/b

are

(a) 96 (b) 112 (c) 128 (d) 144

(16) Consider a 7-pointed start which can be drawn using seven straight lines without having to lift the pencil even once. Let the sum of the angles of the corner of such a star be S. What can be said about S in degrees?

(a) S = 540 (b) S > 540 (c) S < 540 (d) S can not be ascertained

(17) Anand wounds a piece of string over a cylindrical block of wood and found that the string could be wound for exactly half a round more than an intergral number of rounds. He also figured out that if the string had been three times as long, the string would have wound for exactly 110 cm more than an integral number of rounds. Find the radius of cylindrical block of wood (assume pi = 22/7 and no inrease in radius due to winding of string).

(a) 45 cm (b) 35 cm (c) can not be determined (d) none of the foregoing

(18) Let [x] denotes the largest integer less than or equal to x, e.g. [1.23] = 1

The real number x satisfies [x + 0.15] + [x + 0.16] + [x + 0.17] + ... + [x + 0.51] = 102

Then [x+0.02] + [x+0.04] + [x+0.06] +...+ [x+1.0] equals

(a) 199 (c) 101 (c) 139 (d) 301

(19) Two circles of radii a, 2a respectively cut each other at 120 degrees. If the length of the common chord of the two circles is 1, the the value of a to the nearest one place of decimal is

(a) 1.2 (b) 1.6 (c) 1.8 (d) 2.4

(20) Suppose $0 < a(k) < 1$ for each k belonging to natural numbers.

If $s(n) = a(1) + a(2) + a(3) + \ldots + a(n)$ and $s(n) < 1$, then which among the following is never true?

(a) (1-a(1))*(1-(a(2))*...*(1-(a(n)) = 1/(1+s(n))

(b) (1+a(1))*(1+(a(2))*...*(1+(a(n)) = 1/(1-s(n))

(c) (1+a(1))*(1+(a(2))*...*(1+(a(n)) > 1/(1-s(n))

(d) all of the above

(21) In a round-robin tournament, each player plays against the other exactly once. The winner gets 1 point, and the loser get 0. There are no draws. Let S be the set of 6 lowest scoring players. It was found that every player got exactly 50% of his total score playing against players in S. How many players were in the tournament?

(a) 18 (b) 16 (c) 14 (d) 20

(22) Let x, y, z be integers such that $x + y + z = 3$. Then the minimum value of $1/x + 1/y + 1/z$ is

(a) -1 (b) 3 (c) -3 (d) none of the foregoing

(23) In X-Y plane let O(0,0) be the origin, A = (4, 0) and B = (0, 1). Let C be the point (x, y) in the 1st quadrant such that $x + 4y > 4$. If the area of triangle ABC is 4 sq. units and perimeter p, then

(a) $p > 2OC$ (b) $p <= 2OC$ (c) $p >= 2OC$ (d) $p < 2OC$

(24) While betting casino on a roulette of 100 numbers, Anupam learns that if the wheel stops at a multiple of 4, he wins Rs 30, if the wheel stops at a multiple of 6 he wins Rs 50, if it's a multiple of 4 and 6 he wins Rs 100. What is the maximum amount in whole number Anupam is willing to pay each time to turn the wheel, if in the long run he wants to make an average profit of more than Rs 10 every time he turns the wheel?

(a) Rs 4 (b) Rs 5 (c) Rs 7 (d) none of the foregoing

(25) The sequence 3, 15, 24, 48, ... is those multiples of 3 which are one less than a square. Let a(n) be the nth term of this sequence.

The remainder when the (a(33))^33 is divided by 33 is

(a) 1 (b) 15 (c) 27 (d) 30

(26) A square of 24cmX24cm is completely divided into a grid of cells of size 3cmX2cm. What is the total number of squares that can be located in the grid?

(a) 96 (b) 108 (c) 118 (d) 126

(27) If x is such that log(x^2 - 3x +6)/log(2x-1) < 1, then

(a) No such x exists (b) x > 1 (c) 1/2 < x < 1 (d) 0 < x < ½

(28) Let f(x) be a continous function from R->R where R is the set of real numbers. If {f(x) + f(y)}/2 = f{(x+y)/2} for all x, y and f(0) = 1, f(1) = 0 then which among the following is true about f(x)?

(a) f(x) is always positive for positive value of x

(b) f(x) is always negative for negative value of x

(c) f(x) is always positive for negative value of x

(d) f(x) is always negative for positive value of x

(29) The number of triplets (a,b,c) in whole numbers satisfying a^2 + b^2 = 2c, and 6b - 1 = c is/are

(a) 0 (b) 1 (c) 2 (d) 4

(30) In how many ways 4 apples, 4 oranges, and 4 guavas can be distributed among 2 children such that each child gets 6 fruit? (All the fruit of one kind are similar)

(a) 18 (b) 16 (c) 15 (d) 19