Q1) If $ab \times cd$= 1073 and $ba \times cd$= 2117 then find the value of (ab + cd) given that ab, ba and cd are all two digit positive integers.

1) 66 2) 65 3) 63 4) 95

Q2) In a regular polygon, the number of diagonals is 'k' times the number of sides. If the interior angle of the polygon is θ then the value of k is

1) $\frac{3\theta-\pi}{2(\pi-\theta)}$ 2) $\frac{2(3\theta-\pi)}{\pi-\theta}$ 3) $\frac{2(\pi-\theta)}{3\theta-\pi}$ 4) $\frac{\pi-\theta}{2(3\theta-\pi)}$

Q3) Find the maximum value of $|30 + 9x - 3x^2|$ where $-1 \leq x \leq 4$

1) 93/4 2)147/4 3) 30 4) 18

Q4) If a, b, c are real numbers such that $a^3 + b^3 + c^3 = 3abc$ and $a + b + c \neq 0$ then the relation between a, b and c will be

1) a + b = c 2) a = b = c 3) a + c = b 4) b + c = a

Q5) If both the roots of the quadratic equation $-2x^2 + bx + c = 0$ are negative, then what is the sign of $\frac{b+c}{bc}$

1) Always Negative 2) Always Positive 3) Cannot be determined

4) Will vary according to the values of 'b' and 'c'

Q6) A shop stores x kg of rice. The first customer buys half this amount plus half a kg of rice. The second customer buys half the remaining amount plus half a kg of rice. The third customer also buys half the remaining amount plus half a kg of rice. Therefore, no rice is left in the shop. Which of the following best describes the value of x?

1) $2 \leq x \leq 6$ 2) $5 \leq x \leq 8$ 3) $9 \leq x \leq 12$ 4) $11 \leq x \leq 14$

Q7) The angles of a quadrilateral are in an arithmetic progression. If the largest angle of the quadrilateral is thrice of its smallest angle, find the value of the largest angle.

1) 45 2) 90 3) 135 4) 150

Q8) If $\frac{a}{b+c} = \frac{b}{c+a} = \frac{c}{a+b} = r$ then r cannot take any value except.

1) 1/2 2) -1 3) 1/2 or -1 4) -1/2 or -1

Q9) If $\log_{10} x - \log_{10} \sqrt{x} = 2 \log_x 10$ then the possible value of x is given by

1) 10 2) 1/100 3) 1/1000 4) None of these

Q10) What values of x satisfy $x^{2/3} + x^{1/3} - 2 \leq 0$?

1) $-8 \leq x \leq 1$ 2) $-1 \leq x \leq 8$ 3) $1 < x < 8$ 4) $1 \leq x \leq 8$

Q11) Find all the values of p, such that 6 lies somewhere between the roots of the equation $x^2 + 2(p-3)x + 9 = 0$ ('x' is a real number)

1) $p < \frac{-3}{4}$ 2) $p > 6$ 3) $0 < p < 6$ 4) $0 < p < \frac{3}{4}$

Q12) Three consecutive positive integers are raised to the first, second and third powers respectively and then added. The sun so obtained is a perfect square whose square root equals the total of the three original integers. Which of the following best describes the minimum, say m, of these three integers?

1) $1 \le m \le 3$ 2) $4 \le m \le 6$ 3) $7 \le m \le 9$ 4) $10 \le m \le 12$

Q13) At what time between 6 pm and 7 pm till the hands of the clock coincide?

1) 6:32:44 pm 2) 6:33:46 pm 3) 6:32:30 pm 4) 6:34:42 pm

Q14) Find the value of 36S if $S = \frac{6}{2\times3\times4} \times \frac{1}{2} + \frac{7}{3\times4\times5} \times \frac{1}{2^2} + \frac{8}{4\times5\times6} \times \frac{1}{2^3} + \cdots$ till infinite terms.

1) 4 2) 4.5 3) 5 4) 6

Q15) The infinite sum $1 + \frac{4}{7} + \frac{9}{7^2} + \frac{16}{7^3} + \frac{25}{7^4} + \cdots$ equals

1) 27/14 2) 21/13 3) 49/27 4) 256/147

Q16) If $x = a(b-c), y = b(c-a)$ and $z = c(a-b)$ then find the value of

$\frac{1}{abc}\left(\frac{x^2}{yz} + \frac{y^2}{xz} + \frac{z^2}{xy}\right)$ given that $xyz \neq 0$

1) $\frac{1}{abc}$ 2) $\frac{27}{abc}$ 3) $\frac{3}{abc}$ 4) $\frac{9}{abc}$

Q17) Sum of the first n terms of a geometric progression is given as $S_n = \alpha\left(\frac{1}{3}\right)^n + \beta$. If the sum of infinite terms of this series is unity, then

1) $\alpha + \beta = 1$ 2) $3\alpha + \beta = -1$ 3) $\alpha + 2\beta = -1$ 4) $2\alpha + 3\beta = 1$

Q18) Find the sum of $\sqrt{\left(1 + \frac{1}{1^2} + \frac{1}{2^2}\right)} + \sqrt{\left(1 + \frac{1}{2^2} + \frac{1}{3^2}\right)} + \cdots + \sqrt{\left(1 + \frac{1}{2007^2} + \frac{1}{2008^2}\right)}$

1) $2008 - \frac{1}{2008}$ 2) $2007 - \frac{1}{2007}$ 3) $2007 - \frac{1}{2008}$ 4) $2008 - \frac{1}{2009}$

Q19) A flight leaves Mumbai at 4:15 pm and reaches Dubai at 6:45 pm. Another flight leaves Dubai at 3:30pm and reaches Mumbai at 9pm. If their speed was 800 km/hr and they followed the same path. What is the distance (in km) between Mumbai and Dubai?

1) 3000 2) 3200 3) 3400 4) 3600

Q20) ΔABC is an isosceles right angled triangle right angled at B and the "in-circle" with center O touches the side BC at D. If AB=2 cm, find the length (in cm) of BD.

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

Q21) If $a_{n+1}=\sqrt{|{a_n}^2-16|}$ and $a_1=7$ then find the value of a_{79}

1) $\sqrt{15}$ 2) 1 3) $\sqrt{17}$ 4) 7

Q22) If $R=\frac{30^{65}-29^{65}}{30^{64}+29^{64}}$ then

1) $0<R\leq 0.1$ 2) $0.1<R\leq 0.5$ 3) $0.5<R\leq 1$ 4) $R>1$

Q23) Let $x=\sqrt{4+\sqrt{4-\sqrt{4+\sqrt{4-\cdots to\ \propto}}}}$

Then x equals

1) 3 2) $\frac{\sqrt{13}-1}{2}$ 3) $\frac{\sqrt{13}+1}{2}$ 4) $\sqrt{13}$

Q24) If the diagonals of a rhombus are in the ratio 3:4, what is the ratio of the side to the smaller diagonal of the rhombus?

1) 3:5 2) 5:3 3) 5:6 4) 6:5

Q25) Two circles, both of radii 1 cm, intersect such that the circumference of each one passes through the centre of the other. What is the area (in sq. cm.) of the intersecting region?

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

Q26) Consider a right circular cone of base radius 4 cm and height 10 cm. A cylinder is to be placed inside the cone with one of the flat surfaces resting on the base of the cone. Find the largest possible total surface area (in sq. cm.) of the cylinder.

1) $\frac{100\pi}{3}$ 2) $\frac{80\pi}{3}$ 3) $\frac{120\pi}{7}$ 4) $\frac{130\pi}{9}$ 5) $\frac{110\pi}{7}$

Q27) If a, b and c are non-zero real numbers such that $|a-b|=|c|$ and $|a-c|=|b|$ then what is the value of b^2+c^2?

1) a^2-2bc 2) 2bc 3) a^2 4) a^2+2bc

Q28) Let $n!=1\times 2\times 3\times \ldots .\times n$ for integers $n\geq 1$

If $p=(1\times 1!)+(2\times 2!)+(3\times 3!)+\cdots+(10\times 10!)$ then p+2 when divided by 11! Leaves a remainder of

1) 10 2) 0 3) 7 4) 1

Q29) A sprinter starts running on a circular path of radius r metres. Her average speed (in metres/minute) is πr during the first 30 seconds, $\frac{\pi r}{2}$ during next one minute, $\frac{\pi r}{4}$ during next 2 minutes, $\frac{\pi r}{8}$ during next 4 minutes, and so on. What is the ratio of the time taken for the nth round to that for the previous round?

1) 4 2) 8 3) 16 4) 32

Q30) Let $y = \cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{3+\cdots}}}}$

What is the value of y?

1) $\frac{\sqrt{11}+3}{2}$ 2) $\frac{\sqrt{11}-3}{2}$ 3) $\frac{\sqrt{15}+3}{2}$ 4) $\frac{\sqrt{15}-3}{2}$

Q31) A function f is defined for all whole numbers n by the following relation $f(n+2) + f(n) - 2f(n+1) = 0$. If $f(16) = 4$ and $f(24) = 7$ what is the value of $f(16+24)$?

1) 10 2) 13 3) 170 4) 3340

Q32) What is the area (in sq. units) bounded by the curve $|x| + |y| = \sqrt{2}$

1) 2 2) 4 3) 8 4) 16

Q33) A table of 'n' rows and 'n' columns is created such that the value of the cell in the i^{th} row and the j^{th} column is given by $(i + 1) + j$. Some numbers are selected from the table. If it is found that exactly one number has been selected from each row and each column, then the sum of the selected numbers will be equal to

1) $n^2 + 1$ 2) $\frac{n(n+1)}{2}$ 3) $n(n+2)$ 4) $n(n+1)$

Logical Reasoning

A vending machine, having five switches viz. 1, 2, 3, 4 and 5, when operated, dispenses Coca-cola, 7-up, Mirinda, Limca and Pepsi depending upon which switch is turned on. The machine is such that each switch dispenses two different drinks and each drink is dispensed by two different switches. If two or more switches are turned on, the common drink, if any, nullifies each other and will not come out at all. To get the drink that one wants, he/she has to turn on the right combination of switches, put in the money and press the delivery button. Turning on switches:

1) 1 and 3, we get 7-up and Mirinda.

2) 2,4 and 5, we get 7-up and Mirinda.

3) 1 and 2, we get Coca-cola and Pepsi.

4) 1 and 4, we get Coca-cola, Mirinda, Limca and Pepsi.

5) 3,4 and 5, we get Coca-cola and Pepsi.

6) 2,3 and 5, we get Coca-cola, Mirinda, Limca and Pepsi.

7) Switches 1, 2, 3, 4 and 5 do not supply 7-up, Limca, Coca-cola, Mirinda and Pepsi respectively.

Q1) One of the drinks which is dispensed by turning on switch 1 is

1) Limca 2) Coca-cola 3) Mirinda 4) 7-up

Q2) 7-up is one of the drinks that is dispensed by turning on switch

1) Switch 1 2) Switch 2 3) Switch 3 4) Switch 4

Q3) One of the drinks which is dispensed by turning on switch 2 is

1) 7-up 2) Mirinda 3) Limca 4) Pepsi

Q4) What drinks are dispensed by turning on switches 2 and 3?

1) Mirinda, Limca and 7-up 2) Pepsi, Limca and 7-up 3) Coca-cola and Mirinda

4) Coca-cola, Mirinda, Pepsi and 7-up

Answer Key

1-A	**2-D**	**3-B**	**4-B**	**5-D**	**6-B**	**7-C**	**8-C**	**9-B**	**10-A**
11-A	**12-A**	**13-A**	**14-D**	**15-A**	**16-C**	**17-D**	**18-A**	**19-B**	**20-B**
21-A	**22-D**	**23-C**	**24-C**	**25-D**	**26-**	**27-A**	**28-D**	**29-**	**30-B**
31-B	**32-D**	**33-C**	**34-C**	**35-C**	**36-B**	**37-D**			