Q1

If $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$, then the sum of the first 24 terms of the arithmetic progression $a_1,\ a_2,\ a_3.....$ is equal to

(1) 450

(2) 675

(3) 900

(4) 1200

Q2

If $2,\ 7,\ 9$ and 5 are subtracted respectively from four numbers in geometric progression, then the resulting numbers are in arithmetic progression. The smallest of the four numbers is

(1) – 24

(2) – 12

(3) 6

(4) 3

Q3

If $a,\ b\ \&\ 3c$ are in arithmetic progression and $a,\ b\ \&\ 4c$ are in geometric progression, then the possible values of $\frac{a}{b}$ are

(1) $\left\{\frac{2}{3}, 2\right\}$

(2) $\left\{\frac{3}{2}, \frac{1}{2}\right\}$

(3) $\left\{\frac{2}{3}, \frac{3}{2}\right\}$

(4) $\left\{\frac{1}{2}, 2\right\}$

Q4

Let a_1, a_2, a_3 be three positive numbers which are in geometric progression with common ratio r. The inequality $a_3 > a_2 + 2a_1$ holds true if r is equal to

(1) 2

(2) 1.5

(3) 0.5

(4) 2.5

Q5

If $|x| < 1,\ |y| < 1,$ the sum to infinity of the series $(x + y), \left(x^2 + xy + y^2\right), \left(x^3 + x^2y + xy^2 + y^3\right), \ldots$ Is -

(1) $\frac{x+y-xy}{1-x-y+xy}$

(2) $\frac{x+y+xy}{1-x-y+xy}$

(3) $\frac{x}{1-x} + \frac{y}{1-y}$

(4) $\frac{(x-y)(x+y-xy)}{1-x-y+xy}$

Q6

If $|3x - 1|, 3, |x - 3|$ are the first three terms of an arithmetic progression, then the sum of the first five terms can be

(1) 5

(2) 10

(3) 20

(4) 30

Q7

If $x,\ y,\ z \in R^{+}$ and $16\left(16x^2 + y^2 - 4xy\right) = z\left(16x + 4y - z\right)$, then

(1)

$y,\ z,\ x$ are in $A.P.$

(2)

$y,\ z,\ x$ are in $G.P.$

(3)

$x,\ y,\ z$ are in $A.P.$

(4) $x,\ y,\ z$ are in $G.P.$

Q8

In a sequence of 21 terms first 11 terms are in A.P. with common difference 2 and last 11 terms are in G.P. with common ratio 2. If middle term of A.P. is equal to middle term of G.P. then, middle term in the complete sequence is

(1) $\frac{10}{1-2^5}$

(2) $\frac{10\left(1-2^{11}\right)}{\left(2^{10}-1\right)}$

(3) $\frac{1-2^{11}}{2^{10}-1}+10$

(4) $\frac{20}{2^{10}-1}$

Q9

If $a_1, a_2, \ldots\ldots a_{10}$ are positive numbers in an arithmetic progression such that $\frac{1}{a_1 a_2}+\frac{1}{a_2 a_3}+\ldots..+\frac{1}{a_9 a_{10}}=\frac{9}{64}$

and $\frac{1}{a_1 a_{10}}+\frac{1}{a_2 a_9}+\ldots..\frac{1}{a_{10} a_1}=\frac{1}{10}\left(\frac{1}{a_1}+\ldots.+\frac{1}{a_{10}}\right)$, then sum of digits of $\left(4\left(\frac{a_1}{a_{10}}+\frac{a_{10}}{a_1}\right)\right)$ is

Q10

Three numbers $a,\ b$ and c are in between 2 and 18 such that $2,\ a,\ b$ are in arithmetic progression and $b,\ c,\ 18$ are in geometric progression. If $a+b+c=25$, then the value of $c-a$ is

(1) 4

(2) 3

(3) 7

(4) 0

Q11

The harmonic mean of two positive numbers a and b is 4, their arithmeitc mean is A and the geometric mean is G. If $2A+G^2=27,\ \ a+b=\alpha$ and $|a-b|=\beta$, then the value of $\frac{\alpha}{\beta}$ is equal to

(1) 1

(2) 3

(3) $\frac{5}{2}$

(4) 5

Q12

If 11 arithmetic means are inserted between 28 and 10, then the number of integral arithmetic means are

(1) 5

(2) 6

(3) 7

(4) 8

Q13

There are n sets of observations given as $(1),\ (2, 3),\ (4, 5, 6),\ (7, 8, 9, 10), \ldots\ldots$ The mean of the 13^{th} set of observations is equal to

(1) 70

(2) 80

(3) 75

(4) 85

Q14

The sum of the first 20 terms common between the series $3+7+11+15+\ \ldots\ldots$ and $1+6+11+16+\ \ldots\ldots$ is

(1) 4000

(2) 4200

(3) 4220

(4) 4020

Q15

The sum to infinity of the series $1+\frac{4}{5}+\frac{7}{5^2}+\frac{10}{5^3}+\ldots$ is

(1) $\frac{16}{25}$

(2) $\frac{11}{5}$

(3) $\frac{35}{16}$

(4) $\frac{8}{11}$

Q16

The sum (upto two decimal places) of the infinite series $\frac{7}{17}+\frac{77}{17^2}+\frac{777}{17^3}+\ldots\ldots.$ is

(1) 1.06

(2) 2.06

(3) 3.06

(4) 4.06

Q17

It is given that $\frac{1}{1^4}+\frac{1}{2^4}+\frac{1}{3^4}+\ldots.\infty=\frac{\pi^4}{90}$ then $\frac{1}{1^4}+\frac{1}{3^4}+\frac{1}{5^4}+\ldots+\infty$ is equal to -

(1) $\frac{\pi^4}{96}$

(2) $\frac{\pi^4}{45}$

(3) $\frac{89\pi^4}{90}$

(4) None of these

Q18

If $S=1(25)+2(24)+3(23)+\ldots\ldots+24(2)+25(1)$, then the value of $\frac{S}{900}$ is equal to

Q19

$0.2+0.22+0.222+\ldots$ upto n terms is equal to

(1) $\left(\frac{2}{9}\right) - \left(\frac{2}{81}\right)\left(1 - 10^{-n}\right)$

(2) $n\left(\frac{1}{9}\right)\left(1 - 10^{-n}\right)$

(3) $\left(\frac{2}{9}\right)\left[n - \left(\frac{1}{9}\right)\left(1 - 10^{-n}\right)\right]$

(4) $\left(\frac{2}{9}\right)$

Q20

If the sum $\frac{3}{1^2} + \frac{5}{1^2+2^2} + \frac{7}{1^2+2^2+3^2} + ... +$ up to 20 terms is equal to $\frac{k}{21}$, then k is equal to

(1) 240

(2) 120

(3) 60

(4) 180

Q21

If $S = \sum_{n=1}^{9999} \frac{1}{\left(\sqrt{n}+\sqrt{n+1}\right)\left(\sqrt[4]{n}+\sqrt[4]{n+1}\right)}$, then the value of S is equal to

(1) 9

(2) 99

(3) 999

(4) 9999

Q22

If $S=\sum_{r=1}^{80}\frac{r}{\left(r^4+r^2+1\right)}$, then the value of $\frac{6481S}{1000}$ is

Q23

For the series $S=1+\frac{1}{(1+3)}(1+2)^2+\frac{1}{(1+3+5)}(1+2+3)^2+\frac{1}{(1+3+5+7)}(1+2+3+4)^2+\ldots\ldots$, if the sum of the first 10 terms is K, then $\frac{4K}{101}$ is equal to

Q24

Let the sum $\sum_{n=1}^{9}\frac{1}{n(n+1)(n+2)}$, written in the rational form be $\frac{p}{q}$ (where p and q are co-prime), then the value of $\left[\frac{q-p}{10}\right]$ is, (where [.] is the greatest integer function)

Q25

If $S_n=\left(1^2-1+1\right)\left(1!\right)+\left(2^2-2+1\right)\left(2!\right)+\ldots+\left(n^2-n+1\right)(n!)$, then S_{50} is:

(1) $52!$

(2) $1+49\times 51!$

(3) $52!-1$

(4) $50\times 51!-1$

Q26

Let $a_1, a_2, \ldots\ldots, a_n$ be real numbers such that

$\sqrt{a_1}+\sqrt{a_2-1}+\sqrt{a_3-2}+\ldots+\sqrt{a_n-(n-1)}=\frac{1}{2}\left(a_1+a_2+\ldots+a_n\right)-\frac{n(n-3)}{4}$. Compute the value of $\sum_{i=1}^{100} a_i$.

(1) 1010

(2) 505

(3) 2525

(4) 5050

Q27

Let $a_1, a_2, a_3, \ldots\ldots\ldots\ldots, a_{11}$ be real numbers satisfying $a_1 = 15$, $27 - 2a_2 > 0$ and $a_k = 2a_{k-1} - a_{k-2}$ $\forall$ $k = 3, 4, \ldots\ldots, 11$. If $\frac{a_1^2 + a_2^2 + \ldots + a_{11}^2}{11} = 90$, then the value of $\frac{a_1 + a_2 + \ldots + a_{11}}{11}$ is equal to

Q28

$\frac{1.2}{1!} + \frac{2.3}{2!} + \frac{3.4}{3!} + \frac{4.5}{4!} + \ldots\infty =$

(1) $2e$

(2) $3e$

(3) $3e - 1$

(4) e

Q29

The minimum value of sum of real numbers a^{-6}, $2a^{-4}$, $2a^{-3}$, 1 and $2a^{10}$ with $a > 0$ is equal to

(1) 1

(2) 2

(3) 4

(4) 8

Q30

If $a + b + c = 3$ (where $a, b, c > 0$), then the greatest value of $a^2 b^3 c^2$ is

(1) $\frac{3^{10}2^4}{7^7}$

(2) $\frac{3^9 2^4}{7^7}$

(3) $\frac{3^8 2^4}{7^7}$

(4) $\frac{3^9 2^3}{7^6}$

Answer Key

Q1 (3)	**Q2** (1)	**Q3** (2)	**Q4** (4)
Q5 (1)	**Q6** (1)	**Q7** (4)	**Q8** (1)
Q9 (8)	**Q10** (3)	**Q11** (2)	**Q12** (1)
Q13 (4)	**Q14** (4)	**Q15** (3)	**Q16** (1)
Q17 (1)	**Q18** (3.25)	**Q19** (3)	**Q20** (2)
Q21 (1)	**Q22** (3250)	**Q23** (5)	**Q24** (8)
Q25 (2)	**Q26** (4)	**Q27** (0)	**Q28** (2)
Q29 (4)	**Q30** (1)		