## Questions of 1 mark each

| Q1. | If in a G.P, $a_3 + a_5 = 90$ and if r = 2 then the first term of the G.P. | | | |
|---|---|---|---|---|
| | A)4.5 | B) 5.5 | C) 6 | D) 10 |

| Q2 | In G.P. $2\sqrt{2}$, 4, ..., $128\sqrt{2}$, find the $4^{th}$ term from the end. | | | |
|---|---|---|---|---|
| | A)60 | B) 64 | C) 70 | D) 74 |

| Q3. | Find the value of $5^{1/2} \times 5^{1/4} \times 5^{1/8} \times \cdots$ up to infinity. | | | |
|---|---|---|---|---|
| | A) 0 | B) 50 | C) 5 | D) 1 |

| Q4. | $\alpha$ and $\beta$ are the roots of the equation $x^2 - 3x + a = 0$ and $\gamma$ and $\delta$ are the roots of the equation $x^2 - 12x + b = 0$. If $\alpha, \beta, \gamma$ and $\delta$ form an increasing G.P., then $(a, b) =$ | | | |
|---|---|---|---|---|
| | A) (3, 12) | B) (12, 3) | C) (2, 32) | D) (6, 14) |

**ASSERTION AND REASONING**

**DIRECTION**: A statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

**Q5**

**Assertion (A)** The fourth term of a GP is the square of its second term and the first term is $-3$, then its 7th term is equal to 2187.

**Reason (R)** Sum of first n terms of the GP is always $\frac{a(1-r^n)}{1-r}$

**Q6**

Find the sum of the first 12 terms for the following series $\frac{1}{6} - \frac{1}{2} + 1\frac{1}{2} - 4\frac{1}{2} + \cdots$

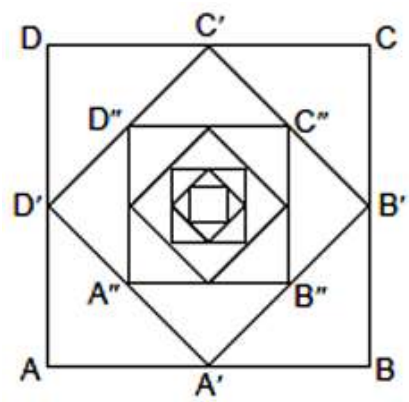| A) $S_{12} = \frac{1-(-3)^{12}}{24}$ | B) $S_{12} = \frac{1+(-3)^{12}}{24}$ | C) $S_{12} = \frac{1-(-3)^{11}}{24}$ | D) $S_{12} = \frac{1-(-2)^{12}}{24}$ |
|---|---|---|---|

| | **Questions of 2 mark each** |
|---|---|
| **Q.7** | If a, b, c are in G.P. then show that $a^2+b^2$, $ab + bc$, $b^2 + c^2$ are also in G.P. |
| **Q8.** | If the product of 3 consecutive terms of G.P. is 27, find the middle term. |
| **Q9.** | Using G.P. prove that $0.03111\ldots\ldots = \dfrac{7}{225}$ |
| **Q10** | The sum of the first three terms of a GP is $\dfrac{12}{13}$ and their product is -1. Find the common ratio |
| **Q11** | The sum of some terms of G.P is 315 whose first term is 5 and the common ratio is 2. Then find the number of terms of the G.P. |
| | **Questions of 3 marks each** |
| **Q12** | If the $p^{(th)}$, $q^{(th)}$ and $r^{(th)}$ term of a G. P. are a, b, c respectively, prove that: $a^{(q-r)} \cdot b^{(r-p)} \cdot c^{(p-q)} = 1$. |
| **Q13** | For each of the following geometric series, find an expression for the nth term. <br> a) $1 + 5 + 25 + 125 + \ldots$ <br> b) $3 - 12 + 48 - 192 + \ldots$ <br> c) $81 + 54 + 36 + 24 + \ldots$ |
| **Q14** | The sum of the first four terms of a geometric series is 130 and its common ratio is $1\frac{1}{2}$. <br><br> (i) Find the first term of the series. <br> (ii) Find the eighth term of the series. |
| **Q.15** | The first three terms of a geometric series are $(k - 8)$, $(k + 4)$ and $(3k + 2)$ respectively, where k is a positive constant. <br> (i) Find the value of k. <br> (ii) Find the sixth term of the series. <br> (iii) Find the sum of 10 terms. |
| | **Case Study Question (4 Marks)** |
| **Q.16** | Geometrical mathematics has helped in art integration in the formation of designs of different patterns. Let us consider a square pattern. The mid points of whose sides are again joined to form another square, the mid points of whose sides are again joined to form another square and the process continues infinity. The pattern looks like. <br> If side of original square is 100 cm. Answer the following: <br><br> (i) What is the side of square A′B′C′D′? <br> (ii) Find the area of square A″B″C″D″. <br> (iii) Find the sum of perimeter of squares if process continuous infinitely |  |
| | **Questions of 5 marks each** |
| **Q17** | Find three numbers in GP whose product is 216 and the sum of their products in pairs is 156. |

| Q18 | (i) If a, b, c is in G.P., then prove that $\frac{1}{a^2-b^2} - \frac{1}{b^2-c^2} = -\frac{1}{b^2}$ <br> (ii) Find the sum of n terms of the series: 0.4+0.44+0.444+……. |
|---|---|
| Q19 | Given: a is A.M. of b and c , c, $G_1$, $G_2$, b are in G.P. Prove that $G_1^3 + G_2^3 = 2abc$ |
| Q20 | Find the sum of first n terms of the series $\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{15}{16} + \cdots$ .... $n$ terms. |

## ANSWER KEY

| Q1 | (A) 4.5 | Q2 | (B) 64 | Q3 | C) 5 | Q4 | C) (2, 32) | Q5 | (D) | Q6 | A) $\frac{1-(-3)^{12}}{24}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Q7 | Take a=a, b=ar, c=ar² <br> then show that terms have a common ratio | | | Q8 | 3 | Q9 | | $0.03\bar{1} = 0.03 + 0.001 + 0.0001 + 0.00001 + \ldots$ <br> Then apply the infinite sum of GP | | | |
| Q10 | $r = \frac{2}{3}\ or\ \frac{3}{2}$ | Q11 | | 6 | | | Q12 | Use the properties of a geometric progression (G.P.) and exponent rules. | | | |
| Q13 | a) $a_n = 5^{n-1}$ <br> b) $a_n = 3(-4)^{n-1}$ <br> c) $a_n = 81(\frac{2}{3})^{n-1}$ | Q14 | | i) a= 16 <br> ii) $a_8 = \frac{2187}{8}$ | | | Q15. | (i) K=16 <br> (ii) $\frac{25000}{32}$ <br> (iii) $S_{10} = \frac{16}{3}\left(\left(\frac{5}{2}\right)^{10} - 1\right)$ | | | |
| Q16 | (i) $50\sqrt{2}$ <br> (ii) 2500 <br> (iii) $400(2 + \sqrt{2})$ | Q17 | | 18, 6, 2 or 2, 6, 18 | | | Q18 | (i) Take a=a, b=ar, c=ar² <br> Then show LHS=RHS <br> (ii) <br> $\frac{4}{81}\left[9n - 1 + \frac{1}{10^n}\right]$ | | | |
| Q19 | $G_1^3 + G_2^3 = c^3r^3 + c^3r^6$ <br> $= c^3r^3(1 + r^3)$ <br> $= c^3(b/c)(1 + b/c)$ <br> $= c^2b(c + b)/c$ <br> $= cb(c + b)$ <br><br> **Substitution & Conclusion:** <br> Substitute $c + b = 2a$ into the result: <br> $G_1^3 + G_2^3 = cb(2a) = 2abc$ (RHS). | | | Q20 | | | $S_n = \left(1 - \frac{1}{2^1}\right) + \left(1 - \frac{1}{2^2}\right) + \left(1 - \frac{1}{2^3}\right) + \left(1 - \frac{1}{2^4}\right) + \ldots$ <br><br> $S_n = n - 1 + \frac{1}{2^n}.$ | | | |

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