Arithmetic Series MCQs - Exercises 6.4 and 6.5 (Class 11 Mathematics)

Prepared for Entry Test Preparation

Multiple Choice Questions

1. The sum of all multiples of 5 between 6 and 99 is:

    (a) 950

    (b) 960

    (c) 970

    (d) 980

2. The sum of the series $-5 - 3 - 1 + 1 + \ldots + a_{15}$ is:

    (a) 135

    (b) 145

    (c) 155

    (d) 165

3. The sum of the series $\frac{2}{\sqrt{3}} + \frac{5}{\sqrt{3}} + \frac{8}{\sqrt{3}} + \ldots + a_{12}$ is:

    (a) $\frac{234}{\sqrt{3}}$

    (b) $\frac{244}{\sqrt{3}}$

    (c) $\frac{254}{\sqrt{3}}$

    (d) $\frac{264}{\sqrt{3}}$

4. The sum of the series $1.2 + 1.5 + 1.8 + \ldots + a_{10}$ is:

    (a) 27

    (b) 28.5

    (c) 30

    (d) 31.5

5. The sum of $(x - 2a) + (x + a) + (x + 4a) + \ldots$ for 8 terms is:

    (a) $8x + 28a$

    (b) $8x + 24a$

    (c) $8x + 20a$

    (d) $8x + 16a$

6. How many terms of the series $-9 - 7 - 5 - \ldots$ sum to 65?

    (a) 10

    (b) 11

    (c) 12

    (d) 13

7. The sum of the series $2 + 4 - 5 + 7 + 9 - 11 + \ldots$ to 15 terms is:

    (a) 70

    (b) 80

    (c) 90

    (d) 100

8. The sum of 12 terms of the series with $a_r = 2r + 3$ is:

    (a) 180

    (b) 192

    (c) 204

    (d) 216

9. If $S_n = n(3n + 1)$, the first term of the series is:

    (a) 3

    (b) 4

    (c) 5

    (d) 6

10. If the ratio of sums of n terms of two A.P.s is $2n + 1 : n + 2$, the ratio of their 6th terms is:

    (a) $\frac{21}{13}$

    (b) $\frac{23}{14}$

    (c) $\frac{25}{15}$

    (d) $\frac{27}{16}$

11. If $S_3 = 30$, $S_5 = 80$ in an A.P., then S_8 is:

    (a) 208

    (b) 216

    (c) 224

    (d) 232

12. Three numbers in A.P. with sum 18 and product 192 are:

    (a) $2, 6, 10$

(b) $3, 6, 9$

(c) $4, 6, 8$

(d) $5, 6, 7$

13. Four numbers in A.P. with sum 28 and sum of squares 216 are:

(a) $4, 6, 8, 10$

(b) $5, 6, 7, 8$

(c) $3, 5, 7, 9$

(d) $2, 4, 6, 8$

14. A man deposits Rs. 5, Rs. 10, Rs. 15, ...for 10 months. The total deposit is:

(a) Rs. 250

(b) Rs. 275

(c) Rs. 300

(d) Rs. 325

15. A clock strikes 1, 2, 3, ...times each hour over 24 hours. Total strikes are:

(a) 156

(b) 168

(c) 180

(d) 192

16. A man repays Rs. 1200 with 12 installments decreasing by Rs. 5. The first installment is:

(a) Rs. 145

(b) Rs. 150

(c) Rs. 155

(d) Rs. 160

17. An object falls 5m, 15m, 25m, ... Distance in the 6th second is:

(a) 55

(b) 60

(c) 65

(d) 70

18. An investor earns Rs. 5000 in 2000 and Rs. 9000 in 2004. Total earnings over 5 years are:

(a) Rs. 32500

(b) Rs. 35000

(c) Rs. 37500

(d) Rs. 40000

19. Sum of interior angles of a 12-sided polygon is:

(a) 10π

(b) 11π

(c) 12π

(d) 13π

20. Prize money of Rs. 50000 is distributed among 6 teams with equal increments. If the last team gets Rs. 5000, the first team gets:

(a) Rs. 10000

(b) Rs. 11000

(c) Rs. 12000

(d) Rs. 13000

Solutions and Explanations

1. **Answer: b** 960 *Explanation*: Sequence: $10, 15, \ldots, 95$. $a_1 = 10$, $d = 5$, $95 = 10 + (n-1)\cdot 5 \implies n = 18$. $S_{18} = \frac{18}{2}(10 + 95) = 960$. (Ex. 6.4, Q1).

2. **Answer: a** 135 *Explanation*: Sequence: $-5, -3, \ldots, a_{15}$. $a_1 = -5$, $d = 2$, $n = 15$. $S_{15} = \frac{15}{2}[2(-5) + 14 \cdot 2] = 135$. (Ex. 6.4, Q2(i)).

3. **Answer: a** $\frac{234}{\sqrt{3}}$ *Explanation*: Sequence: $\frac{2}{\sqrt{3}}, \frac{5}{\sqrt{3}}, \ldots, a_{12}$. $a_1 = \frac{2}{\sqrt{3}}$, $d = \frac{3}{\sqrt{3}}$, $n = 12$. $S_{12} = \frac{12}{2}\left[2 \cdot \frac{2}{\sqrt{3}} + 11 \cdot \frac{3}{\sqrt{3}}\right] = \frac{234}{\sqrt{3}}$. (Ex. 6.4, Q2(ii)).

4. **Answer: b** 28.5 *Explanation*: Sequence: $1.2, 1.5, \ldots, a_{10}$. $a_1 = 1.2$, $d = 0.3$, $n = 10$. $S_{10} = \frac{10}{2}[2 \cdot 1.2 + 9 \cdot 0.3] = 28.5$. (Ex. 6.4, Q2(iii)).

5. **Answer: a** $8x + 28a$ *Explanation*: Sequence: $x - 2a, x + a, \ldots$. $a_1 = x - 2a$, $d = 3a$, $n = 8$. $S_8 = \frac{8}{2}[2(x - 2a) + 7 \cdot 3a] = 8x + 28a$. (Ex. 6.4, Q2(v)).

6. **Answer: d** 13 *Explanation*: Sequence: $-9, -7, \ldots$. $a_1 = -9$, $d = 2$, $S_n = 65$. $\frac{n}{2}[2(-9) + (n-1) \cdot 2] = 65 \implies n^2 - 10n - 65 = 0 \implies n = 13$. (Ex. 6.4, Q3(i)).

7. **Answer: b** 80 *Explanation*: Group: $(2 + 4 - 5) + (7 + 9 - 11) + \ldots = 1 + 5 + \ldots$. $a_1 = 1$, $d = 4$, $n = 5$. $S_5 = \frac{5}{2}[2 \cdot 1 + 4 \cdot 4] = 45$. (Ex. 6.4, Q4(i)).

8. **Answer: c** 204 *Explanation*: $a_r = 2r + 3$. Series: $5, 7, \ldots$. $a_1 = 5$, $d = 2$, $n = 12$. $S_{12} = \frac{12}{2}[2 \cdot 5 + 11 \cdot 2] = 204$. (Ex. 6.4, Q5).

9. **Answer: b** 4 *Explanation*: $S_n = n(3n + 1)$. $S_1 = 4 \implies a_1 = 4$. (Ex. 6.4, Q6).

10. **Answer: a** $\frac{21}{13}$ *Explanation*: Ratio: $\frac{2n+1}{n+2}$. For 6th term, $n = 2 \cdot 6 - 1 = 11$. Ratio: $\frac{2 \cdot 11 + 1}{11 + 2} = \frac{23}{13}$. (Ex. 6.4, Q7).

11. **Answer: c** 224 *Explanation*: $S_3 = \frac{3}{2}[2a + 2d] = 30$, $S_5 = \frac{5}{2}[2a + 4d] = 80$. Solve: $a = 4$, $d = 6$. $S_8 = \frac{8}{2}[2 \cdot 4 + 7 \cdot 6] = 224$. (Ex. 6.4, Q8).

12. **Answer: c** $4, 6, 8$ *Explanation*: Numbers: $a - d, a, a + d$. $3a = 18 \implies a = 6$. $a(a^2 - d^2) = 192 \implies d = \pm 2$. Numbers: $4, 6, 8$. (Ex. 6.4, Q14).

13. **Answer: a** $4, 6, 8, 10$ *Explanation*: Numbers: $a - 3d, a - d, a + d, a + 3d$. $4a = 28 \implies a = 7$. $4a^2 + 20d^2 = 216 \implies d = \pm 1$. Numbers: $4, 6, 8, 10$. (Ex. 6.4, Q15).

14. **Answer: b** Rs. 275 *Explanation*: Sequence: $5, 10, \ldots$. $a_1 = 5$, $d = 5$, $n = 10$. $S_{10} = \frac{10}{2}[2 \cdot 5 + 9 \cdot 5] = 275$. (Ex. 6.5, Q1).

15. **Answer: a** 156 *Explanation*: Sequence: $1, 2, \ldots, 12$. $a_1 = 1$, $d = 1$, $n = 12$. $S_{12} = \frac{12}{2}[1 + 12] = 78$. Over 24 hours: $78 \cdot 2 = 156$. (Ex. 6.5, Q4).

16. **Answer: c** Rs. 155 *Explanation*: $S_{12} = 1200$, $d = -5$, $n = 12$. $\frac{12}{2}[2a_1 + 11(-5)] = 1200 \implies a_1 = 155$. (Ex. 6.5, Q3).

17. **Answer: a** 55 *Explanation*: Sequence: $5, 15, \ldots$. $a_1 = 5$, $d = 10$. $a_6 = 5 + 5 \cdot 10 = 55$. (Ex. 6.5, Q6(i)).

18. **Answer: a** Rs. 32500 *Explanation*: $a_1 = 5000$, $a_5 = 9000$. $5000 + 4d = 9000 \implies d = 1000$. $S_5 = \frac{5}{2}[2 \cdot 5000 + 4 \cdot 1000] = 32500$. (Ex. 6.5, Q7).

19. **Answer: a** 10π *Explanation*: Sequence: $\pi, 2\pi, \ldots$. $a_1 = \pi$, $d = \pi$, $n = 10$. $a_{10} = \pi + 9 \cdot \pi = 10\pi$. (Ex. 6.5, Q8).

20. **Answer: c** Rs. 12000 *Explanation*: $a_6 = 5000$, $S_6 = 50000$. $\frac{6}{2}[a_1 + 5000] = 50000 \implies a_1 = 12000$. (Ex. 6.5, Q9).