THE O.P. GUPTA
ADVANCED MATH CLASSES
Mathematics (Standard & Basic)
Topic - Arithmetic Progression

RTS-05

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RANKERS
TEST SERIES FOR X

Max. Marks - 40
Time - 90 Minutes

SECTION A

*Followings multiple choice questions are of **1 Mark** each (Q01-10).*
Select the correct option in each one of them.

Q01. In an A.P., if $d = -4$, $n = 7$, $a_n = 4$, then a is
(A) 6 (B) 7 (C) 20 (D) 28

Q02. The common difference of the A.P. $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}$, is
(A) 1 (B) $\frac{1}{p}$ (C) -1 (D) $\frac{-1}{p}$

Q03. The sum of first 16 terms of the A.P. $10, 6, 2, \ldots$ is denoted by S. Then $(-S) =$
(A) -320 (B) -352 (C) 320 (D) -400

Q04. Which of the following is **not** an A.P.?
(A) $-1.2, 0.8, 2.8, \ldots$ (B) $3, 3+\sqrt{2}, 3+2\sqrt{2}, \ldots$
(C) $\frac{4}{3}, \frac{7}{3}, \frac{9}{3}, \ldots$ (D) $-\frac{1}{5}, -\frac{2}{5}, -\frac{3}{5}, \ldots$

Q05. The value of x for which $2x$, $(x+10)$ and $(3x+2)$ are the three consecutive terms of an A.P., is
(A) 6 (B) -6 (C) 18 (D) -18

Q06. The sum of first five positive integers divisible by 6, is
(A) 180 (B) 90 (C) 45 (D) 30

Q07. The n^{th} term of the A.P. : $a, 3a, 5a, \ldots$ is
(A) na (B) $(2n-1)a$ (C) $(2n+1)a$ (D) $(2n)a$

Q08. If the sum of first n terms of an A.P. is $Pn + Qn^2$; where P and Q are real constants, then the common difference of A.P. will be
(A) $P+Q$ (B) $P-Q$ (C) $2P$ (D) $2Q$

*Followings are **Assertion-Reason based questions** (Q09 & 10).*
In the following questions, a statement of Assertion (**A**) is followed by a statement of Reason (**R**).
Choose the correct answer out of the following choices.
(A) Both **A** and **R** are true and **R** is the correct explanation of **A**.
(B) Both **A** and **R** are true and **R** is not the correct explanation of **A**.
(C) **A** is true but **R** is false.
(D) **A** is false but **R** is true.

Q09. **Assertion (A) :** The sum of first 'n' natural numbers is $\frac{n(n+1)}{2}$.
Reason (R) : The sum of first 'n' odd natural number is $n(n-1)$.

Q10. **Assertion (A) :** a, b, c are in A.P. if and only if $2b = c - a$.
Reason (R) : $-3, -\frac{3}{2}, 0, \frac{3}{2}, \ldots$ is an arithmetic progression.

$[1 \times 10 = 10$

SECTION B

*Followings are of **2 Marks** each (Q11-12).*

Q11. (a) The sum of first n terms of three arithmetic progressions are X, Y, S respectively. The first term of each A.P. is 1 and their common differences are 1, 2 and 3 respectively. Prove that $X + S = 2Y$.

OR

(b) If S_n denotes the sum of first n terms of an arithmetic progression, prove that $S_{12} = 3(S_8 - S_4)$.

Q12. Find the 8^{th} term from the end in the A.P. : 7, 10, 13, ..., 184.

$[2\times 2=4$

SECTION C

*Followings are of **3 Marks** each (Q13-16).*

Q13. The 8^{th} term of an A.P. is half its 2^{nd} term and the 11^{th} term exceeds one third of its 4^{th} term by 1. Find its 15^{th} term.

Q14. The sum of three numbers in A.P. is 12 and the sum of their cubes is 288. Find the numbers.

Q15. (a) In an A.P., if p^{th} term is q and the q^{th} term is p, then find its $(p+q)^{th}$ term.

OR

(b) If a, b and c are the p^{th}, q^{th} and r^{th} terms of an A.P., prove that $a[q-r]+b[r-p]+c[p-q]=0$.

Q16. Which term of the A.P. : 65, 61, 57, 53, ... is its first negative term?

$[3\times 4=12$

SECTION D

*Followings are of **5 Marks** each (Q17-18).*

Q17. (a) If the first, second and the last terms of an A.P. are a, b and c respectively, then show that the sum of its first 'n' terms is given by $\frac{[a+c][b+c-2a]}{2[b-a]}$.

OR

(b) If the sum of first 'p' terms of an arithmetic progression is equal to the sum of first 'q' terms, then find the sum of first (p+q) terms.

Q18. The sum of the third and the seventh terms of an A.P. is 6 and their product is 8. Find the sum of first sixteen terms of the A.P.

$[5\times 2=10$

SECTION E

*Following is a case-study based question of **4 Marks** (Q19); having three sub-parts (i), (ii) and (iii).*

Q19. Meta Platforms gave away a total of ₹124000 in January on promotions.
If the company increases the amount given away each day by ₹100, then

(i) how much amount they gave away on the first day?

(ii) how much amount have they given away on the 15^{th} day?

(iii) (a) how much amount have they given away in the first 15 days?

OR

(b) what is the difference in the amount spent in the first 15 days and in the next 16 days?

$[1+1+2=4$

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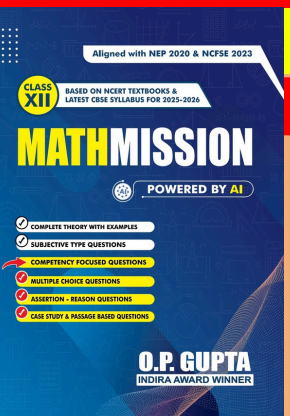

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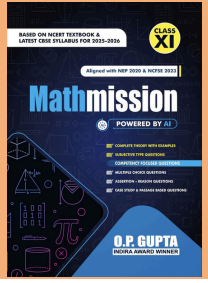

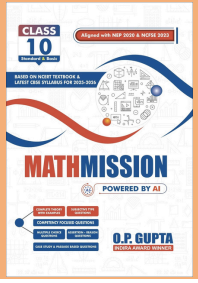

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