# UDAAN 2025

## Maths

## Arithmetic Progressions

DHA : 04

**Q1** The first term of an AP is 5, the last term is 45 and the sum of all its terms is 400. Find the number of terms and the common difference of the AP.

(A) n = 12, d = 8/3
(B) n = 16, d = 5/3
(C) n = 14, d = 3/8
(D) n = 16, d = 8/3

**Q2** If the ratio of $11^{\text{th}}$ term of an AP to its $18^{\text{th}}$ term is 2: 3, then find the ratio of the sum of first five terms to the sum of first 10 terms.

(A) $6:17$ (B) $13:15$
(C) $15:13$ (D) $17:6$

**Q3** Find the sum of the first twelve 2-digit numbers which are multiples of 6.

(A) 450 (B) 540
(C) 640 (D) 440

**Q4** Find the sum of the n terms of an AP, if the first and third terms of AP, are 15 and 20 respectively.

(A) $n[30+(n-1)5]$
(B) $\frac{n}{2}\ \left[30+\left(n-1\right)\frac{5}{2}\right]$
(C) $\frac{n}{2}\ \left[15+\left(n-1\right)\frac{5}{2}\right]$
(D) None of these

**Q5** If the ratio of the sum of n terms of two APs is (7n + 1) : (4n + 27), then the ratio of their 11th terms is.

(A) 4 : 3 (B) 3 : 4
(C) 2 : 3 (D) 3 : 2

**Q6** Sum of first n terms of an A.P is $6n^2$+6n. Then find 4th term of series.

(A) 120 (B) 72
(C) 48 (D) 24

**Q7** In an A.P the common difference is 2. Sum of n terms is 49. If 7th term is 13. Find n.

(A) 0 (B) 5
(C) 7 (D) 13

**Q8** How many terms of the sequence 18, 16, 14, ... should be taken so that their sum is zero?

# Answer Key

| | |
|---|---|
| Q1 | (D) |
| Q2 | (A) |
| Q3 | (B) |
| Q4 | (B) |
| Q5 | (A) |
| Q6 | (C) |
| Q7 | (C) |
| Q8 | 19 terms |

# Hints & Solutions

**Q1** **Text Solution:**
Given that, a=5,$a_n$=45 and Sn=400

Sn=n/2 (a+$a_n$)
400=n/2 (5+45)
400=n/2 (50)
n=16

$a_n$=a+(n-1)d
45=5+(16-1)d
40=15d
d=40/15
=8/3

**Video Solution:**

**Q2** **Text Solution:**
Let a and d be the first term and common difference of an AP.
Given that, a11:a18=2:3

⇒ a+10da+17d=23
⇒ 3a+30d=2a+34d
⇒ a=4d ...(i)
**Now,Sum of the first 5 terms** S5 = $\frac{5}{2}[a+4d]$
=5/2$[8d+4d]$
=5/2$[12d]$
=30d

**And, sum of the first 10 terms,** $S_{10}$=10/2[2a+(10–1)d]
=10/2[2(4d)+9d]
=5x 17d
=85d
So, ratio of the sum of the first five terms to the sum of the first 10 terms is,
**S5:S10=30d:85d=6:17**

**Video Solution:**

**Q3** **Text Solution:**
Two digits Multiples of 6 will in the form of 12,18,24....
a=12
d=6
$S_{12} = 12/2\,[2a+(n-1)d]$
$= 6\,[(2\times 12)+(12-1)\times 6]$
$= 6\,[24+(11\times 6)]$
$= 6\,[24+66]$
$= 6\times 90$
$= 540$

**Video Solution:**

**Q4** **Text Solution:**
a=15

$a_3 = 20$
$a + 2d = 20$
$15 + 2d = 20$
$2d = 5$
$d = \frac{5}{2}$
$S_n = n/2\,[2a + (n-1)d]$
$= n/2\left[(2 \times 15 + (n-1)\frac{5}{2}\right]$
$= n/2\left[30 + (n-1)\frac{5}{2}\right]$

**Video Solution:**

**Q5 Text Solution:**

Let the first term and common difference of the two series be a1,d1 and a2,d2 respectively.

We have $\frac{2a_1+(n-1)d_1}{2a_2+(n-1)d_2} = \frac{7n+1}{4n+27}$ .....(i)

Now we have to find the value of $\frac{a_1+10d_1}{a_2+10d_2}$

Hence by putting the value of n=21 in equation (i) we get

$\frac{2a_1+(21-1)d_1}{2a_2+(21-1)d_2} = \frac{(7\times21)+1}{(4\times21)+27}$
$\frac{2a_1+20d_1}{2a_2+20d_2} = \frac{147+1}{84+27}$
$\frac{a_1+10d_1}{a_2+10d_2} = \frac{148}{111}$
$\frac{a_1+10d_1}{a_2+10d_2} = \frac{4}{3}$
$Hence\ the\ ratio\ is\ 4:3$

Thus, the required ratio is 4:3.

**Video Solution:**

**Q6 Text Solution:**

Given the sum of n terms, Sn=$6n^2$+6n
$S_1$=$6(1)^2$+6(1)=3+6=12=a,the first term
$S_2$=$6(2)^2$+6(2)=24+12=36
$S_2$=$a_1 + a_2$
36=12+$a_2$
=36-12
$a_2$=24
common difference, d=a2–a1=24–12=12
nth term of an AP, an=a+(n–1)d
ie, $a_4$=12+(4–1)12=12+(3x12)=48
4th term of the AP is 48

**Video Solution:**

**Q7 Text Solution:**

Sum of n terms is $S_n$ = 49
$Sn$ = 49
7t h term is $a_7$ = 13
$a_7$ = 13
⇒ a + 6 d = 13 ( ∵ a 7 = a + ( 7 – 1 ) d = a + 6 d )
⇒ a + 12 = 13 ( ∵ d = 2 )
⇒ a = 13 – 12 = 1
Now, Sn = 49
⇒ n/ 2 [ 2 a + ( n – 1 ) d ] = 49
⇒ n /2 [ 2 × 1 + ( n – 1 ) 2 ] = 49
⇒ n [ 2 + 2 n – 2 ] = 49 × 2
⇒ $2n^2$ = 49 × 2

$\Rightarrow n^2 = 49$

$\Rightarrow n = 7$

**Video Solution:**

**Q8** **Text Solution:**

Here a=18,d=–2.

Let there are n terms so that the sum is zero.

Now,

Sn=n/2[2a+(n–1)d]

⇒n/2[2×18+(n–1)×–2]=0

$\frac{n}{2}[36 - 2n + 2] = 0$ 3

$\frac{n}{2}[38 - 2n] = 0$

$\frac{n}{2} = 0 \; or \; 38 - 2n = 0$

$n = 0 \; (not \; possible) \; or \; 2n = 38$

$n = 19$

Since, the number of terms cannot be zero, the number of terms (n) is 19

**Video Solution:**