**JNV**

**MODEL QUESTIONS**

**MATHEMATICS: 5 ARITHMETIC PROGRESSION**

**Class : X**

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| 1 | Find: (i) The 8th term of 117, 104, 91, 78, ... (ii) The 10th term of 10.0, 10.5, 11.0, 11.5, ... | 1 |
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|  | ANS:     (i) a = 117, d = 104 – 117 = – 13 a8 = a + 7d = 117 + 7 × (– 13) = 26 (ii) a = 10, d = 10.5 – 10 = 0.5 a10 = a + 9d = 10 + 9 × 0.5 = 14.5 |  |
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| 2 | The nth term of an AP is 7 – 4n. Find its common difference. | 1 |
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|  | ANS:     an = 7 – 4n C:\fake\image1.pnga1 = 7 – 4 × 1 = 3 a2 = 7 – 4 × 2 = –1 and a3 = 7 – 4 × 3 = –5 C:\fake\image2.png  Common difference = a2 – a1 = –1 – 3 = –4. |  |
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| 3 | For what value of p, are 2p + 1, 13, 5p – 3 three consecutive terms of an AP? | 1 |
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|  | ANS:     If terms are in AP, then 13 – (2p + 1) = (5p – 3) – 13 C:\fake\image3.png 13 – 2p – 1 = 5p – 3 – 13 C:\fake\image4.png28 = 7p C:\fake\image5.pngp = 4 |  |
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| 4 | If the sum of first m terms of an AP is 2m2 + 3m, then what is its second term? | 1 |
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|  | ANS:     Sm = 2m2 + 3m C:\fake\image6.png  S1 = 2 × 12 + 3 × 1 = 5 = a1 and S2 = 2 × 22 + 3 × 2 = 14 ...(i) C:\fake\image7.pnga1 + a2 = 14 C:\fake\image8.png5 + a2 = 14 C:\fake\image9.pnga2 = 9 |  |
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| 5 | Find the sum of the first 1000 positive integers. | 1 |
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|  | ANS:     Sn = C:\fake\image10.png[a + l] C:\fake\image11.pngS1000 = C:\fake\image12.png[1 + 1000] = 500500 |  |
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| 6 | If sum of first n terms of an AP is 2n2 + 5n. Then find S20. | 1 |
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|  | ANS:     Sn = 2n2 + 5n S20 = 2(20)2 + 5 × 20 = 2 × 400 + 100 = 900 |  |
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| 7 | Determine the 25th term of an AP whose 9th term is – 6 and common difference is 5/4. | 2 |
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|  | ANS:     Let Ist term = a Common difference, d = C:\fake\image13.png(Given) Also, a9 = – 6 C:\fake\image14.pnga + 8d = – 6 C:\fake\image15.pnga + 8 × C:\fake\image16.png= – 6 C:\fake\image17.pnga = – 16 Now a25 = a + 24d = – 16 + 24 × C:\fake\image18.png= 14 |  |
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| 8 | If the pth, qth, rth terms of an AP be x, y, z respectively, show that x(q – r) + y(r – p) + z(p – q) = 0. | 3 |
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|  | ANS:     Let a be the first term and d be the common difference of the AP. tp = x C:\fake\image19.pnga + (p – 1) d = x ...(i) tq = y C:\fake\image20.pnga + (q – 1) d = y ...(ii) tr = z C:\fake\image21.pnga + (r – 1) d = z ...(iii) Substituting the values of x, y and z from (i), (ii) and (iii), we get x(q – r) + y(r – p) + z(p – q) = [a + (p – 1)d] (q – r) + [a + (q – 1)d] (r – p) + [a + (r – 1)d] (p – q) = a[(q – r) + (r – p) + (p – q)] + d [(p – 1) (q – r) + (q – 1)(r – p) + (r – 1) (p – q)] = a(0) + d [p(q – r) + q (r – p) + r (p – q) – (q – r + r – p + p – q)] = d(0 – 0) = 0. |  |
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| 9 | If the pth terms of an AP is C:\fake\image22.pngand the qth term is C:\fake\image23.pngshow that the sum of pq terms is C:\fake\image24.png(pq + 1). | 4 |
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|  | ANS:     Tp = a + (p – 1)d C:\fake\image25.pngC:\fake\image26.png= a + (p – 1)d ...(i) Tq = a + (q – 1)d C:\fake\image27.pngC:\fake\image28.png= a + (q – 1)d ...(ii) Subtracting (ii) from (i), we get C:\fake\image29.png= (p – q)d C:\fake\image30.pngd = C:\fake\image31.png Putting d = C:\fake\image32.pngin (i), we have C:\fake\image33.png= a + C:\fake\image34.pngC:\fake\image35.pnga = C:\fake\image36.png C:\fake\image37.png  Spq = C:\fake\image38.png[2a + (pq – 1)d] or, Spq = C:\fake\image39.png= C:\fake\image40.png(pq + 1) |  |
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