

# Assignment-1

EE24BTECH11020 - Ellanti Rohith

- 1) If, for positive integer  $n$ , the quadratic equation,  $x(x+1)+(x+1)(x+2)+\dots+(x+n-1)(x+n) = 10n$  has two consecutive integral solutions, then  $n$  is equal to: [JEE M 2017]
  - a) 11
  - b) 12
  - c) 9
  - d) 10
- 2) For any three positive real number  $a, b$  and  $c$   $9(25a^2 + b^2) + 25(c^2 - 3ac) = 15b(3a + c)$ . Then: [JEE M 2017]
  - a)  $a, b$  and  $c$  are in A.P
  - b)  $b, c$  and  $a$  are in G.P
  - c)  $b, c$  and  $a$  are in A.P
  - d)  $a, b$  and  $c$  are in G.P
- 3) Let  $a, b, c \in \mathbb{R}$ . If  $f(x) = ax^2 + bx + c$  is such that  $a+b+c=3$  and  $f(x+y)=f(x)+f(y) \forall x, y \in \mathbb{R}$ , then  $\sum_{n=1}^{10} f(n)$  is equal to [2017]
  - (a) 255
  - (b) 330
  - (c) 165
  - (d) 190
- 4) Let  $a_1, a_2, a_3, \dots, a_{49}$  be an A.P such that  $\sum_{k=0}^{12} a_{4k+1} = 416$  and  $a_9 + a_{43} = 66$ . If  $a_1^2 + a_2^2 + \dots + a_{17}^2 = 140m$ , then  $m$  is equal to: [JEE M 2018]
  - a) 68
  - b) 34
  - c) 33
  - d) 66
- 5) Let  $A$  be the sum of the first 20 terms and  $B$  be the sum of the first 40 terms of the series  $1^2 + 2 \cdot 2^2 + 3^2 + 2 \cdot 4^2 + 5^2 + 2 \cdot 6^2 + \dots$  If  $B-2A=100\lambda$ , then  $\lambda$  can be [JEE M 2018]
  - a) 248
  - b) 464
  - c) 496
  - d) 232
- 6) If  $a, b$  and  $c$  be three distinct real numbers in GP. and  $a + b + c = xb$ , then  $x$  cannot be: [JEE M 2019]
  - a) -2
  - b) 4
  - c) -3
  - d) 2
- 7) Let  $a_1, a_2, \dots, a_{30}$  be an A.P,  $S = \sum_{i=1}^{30} a_i$  and  $T = \sum_{i=2}^{15} a_{(2i-1)}$ . If  $a_5 = 27$  and  $S-2T=75$ , then  $a_{10}$  is equal to [JEE M 2019]
  - a) 52
  - b) 57
  - c) 47
  - d) 42
- 8) Three circles of radii  $a, b, c$  ( $a < b < c$ ) touch each other externally. If they have  $x$ -axis as a common tangent, then: [JEE M 2019]
  - a)  $\frac{1}{\sqrt{a}} = \frac{1}{\sqrt{b}} + \frac{1}{\sqrt{c}}$
  - b)  $\frac{1}{\sqrt{b}} = \frac{1}{\sqrt{c}} + \frac{1}{\sqrt{a}}$
  - c)  $a, b$  and  $c$  are in A.P
  - d)  $\sqrt{a} = \sqrt{b} + \sqrt{c}$
- 9) Let the sum of the first  $n$  terms of a non-constant A.P.,  $a_1, a_2, a_3, \dots$  be  $50n + \frac{n(n-7)}{2}A$  where  $A$  is a constant. If  $d$  is the common difference of this A.P, then ordered pair  $(d, a_{50})$  is equal to [JEE M 2019]
  - a)  $(50, 50+46A)$
  - b)  $(50, 50+45A)$
  - c)  $(A, 50+45A)$
  - d)  $(A, 50+46A)$