Q1. _____ is a the least natural number.

    a) 0
    b) **1
    c) 2
    d) undefined

Q2. If S is a non-empty subset of $\mathbb{N}$, then $\exists\ b\ \in S$ such that $b \leq x, \forall\ x \in S$, is known as_____

    a) Principle of finite induction

    b) **Well Ordering principle

    c) Binomial theorem

    d) Euclid Lemma

Q3. If $a < b$ and $c < d$ then

    a) $a + b < c + d$

    b) $a + d < b + c$

    c) ** $a + c < b + d$

    d) $a + c = b + d$

Q4. $1^2 + 2^2 + 3^2 + \cdots + n^2 =$ _____

    a) $\dfrac{n\,(n+1)(n+2)}{3}$

    b) $\dfrac{(n+1)(2n+1)}{6}$

    c) $\dfrac{n^2(n+1)^2}{4}$

    d) ** $\dfrac{n\,(n+1)(2n+1)}{6}$

Q5. For $n \geq 1, (a + b)^n =$ _____

    a) ${}^nC_0 a^n b^n + {}^nC_1 a^{n-1} b^{n-1} + {}^nC_2 a^{n-2} b^{n-2} \dots + {}^nC_n$

    b) ${}^nC_1 a^{n-1} b + {}^nC_3 a^{n-3} b^3 + {}^nC_5 a^{n-5} b^5 \dots + {}^nC_n b^n$

    c) ** ${}^nC_0 a^n + {}^nC_1 a^{n-1} b + {}^nC_2 a^{n-2} b^2 \dots + {}^nC_n b^n$

d) $^nC_n a^n + {}^{n-1}C_{n-1}a^{n-1}b + {}^{n-2}C_{n-2}a^{n-2}b^2 \ldots + {}^0C_0 b^n$

Q6. $(a + b)^4 = $ _____

   a) $a^4 + b^4$

   b) $a^4 - 4a^3 b + 6a^2 b^2 - 4ab^3 + b^4$

   c) **$a^4 + 4a^3 b + 6a^2 b^2 + 4ab^3 + b^4$

   d) $a^4 - 4a^3 b - 6a^2 b^2 - 4ab^3 - b^4$

Q7. $\left(2t - \frac{3}{t}\right)^4 = $ _____

   a) **$16t^4 - 96t^2 + 216t^{-2} - 81t^{-4}$

   b) $16t^4 - 96t^3 + 216t^2 - 81t$

   c) $16t^4 + 96t^2 + 216t^{-2} + 81t^{-4}$

   d) $16t^{-4} - 96t^{-2} + 216t^2 - 81t^4$

Q8. If a , b are integers, $a \neq 0$ and ' a divides b' then

   a) **there exist an integer c such that $b = ac$

   b) there exist an integer c such that $c = ab$

   c) there exist an integer c such that $a = bc$

   d) for every integer c such that $b = ac$

Q9. If $a \mid b$ and $a|c$ then for some $m, n \in \mathbb{Z}$

   a) $b \mid ma + nc$

   b) $c \mid mb + na$

   c) ** $a \mid mb + nc$

   d) $mb + nc \mid a$

Q10. If $a \mid b$ and $a|c$ then then following is not true?

   a) $a \mid b + c$

   b) $a \mid b - c$

   c) $a \mid mb + nc$, for any $m, n \in \mathbb{Z}$

   d) ** $mb + nc \mid a$, for any $m, n \in \mathbb{Z}$

Q11. The quotient and remainder when 111 is divided by 12 are

    a) 9,0

    b) 9,1

    c) 9,2

    d) **9,3

Q12. The following is an example of identity function

    a) $f(x) = 0$

    b) $f(x) = 1$

    c) ** $f(x) = x$

    d) $f(x) = -x$

Q13. Let $f(x) = x^2$ be a function and A = {-2,-1,0,1,2} then

    a) $f(A) = \{-2, -1, 0, 1, 2\}$

    b) $f(A) = \{0, 1, 2\}$

    c) ** $f(A) = \{0, 1, 4\}$

    d) $f(A) = \{0\}$

Q14. The smallest integer n for which $\emptyset(n) = 10$ is

    a) 9

    b) 10

    c) **11

    d) 1

Q15. The Last digit of 3^{400} is

    a) 0

    b) **1

    c) 3

    d) 9

Note: Option marked with asterisk (**) is correct option.