Mathematics

1. Find the value of $\left(61^2 - 11^2\right)^{\frac{3}{2}}$

   (A) 50^3 (B) 216000

   (C) 3600   (D) 60

2. If $x = \left(8^{\frac{2}{3}}.32^{-\frac{2}{5}}\right)$ then $x^{-5} = ?$

   (A) $\dfrac{1}{32}$ (B) -1

   (C) 1   (D) -5

3. Find the value of $\left[\left(\dfrac{a}{b}\right)^{\sqrt{99}-\sqrt{97}}\right]^{\sqrt{99}+\sqrt{97}}$

   (A) $\dfrac{b^2}{a^2}$ (B) $\sqrt{\dfrac{a}{b}}$

   (C) $\sqrt{\dfrac{b}{a}}$ (D) $\dfrac{a^2}{b^2}$

4. $\dfrac{\left(\dfrac{1}{x}+y\right)^{a+b}\left(\dfrac{1}{y}-x\right)^{-(p+q)}}{\left(\dfrac{1}{x}-y\right)^{-(p+q)}\left(x+\dfrac{1}{y}\right)^{a+b}} = ?$

   (A) $\left(\dfrac{x}{y}\right)^{(a+b)+(p+q)}$ (B) $\left(\dfrac{y}{x}\right)^{(a+b)+(p+q)}$

   (C) $\left(\dfrac{y}{x}\right)^{(a+b)-(p+q)}$ (D) $\left(\dfrac{x}{y}\right)^{(a+b)-(p+q)}$

5. $7^{5x-8} \times 5^{x+2} = 30625$ then x = ?

   (A) 4   (B) 3

   (C) 2   (D) 1

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6. $11^x = 3^y = 99^z$ then $\dfrac{1}{x} + \dfrac{1}{y} + \dfrac{1}{z} = ?$

(A) $\dfrac{2}{z} - \dfrac{1}{y}$ (B) $\dfrac{2}{z} + \dfrac{1}{y}$

(C) $-\dfrac{1}{y}$ (D) 0

7. If $5^{a-3} = 625$ then $5^{a+3} = ?$
(A) 5^{12} (B) 5^9
(C) 5^{10} (D) 5^{15}

8. Value of $(0.00243)^{\frac{3}{5}} + (0.0256)^{\frac{3}{4}}$
(A) 0.083   (B) 0.073
(C) 0.091   (D) 0.081

9. If $\left(\sqrt{3}\right)^{x+y} = 9$ and $\left(\sqrt{2}\right)^{x-y} = 32$ then $2x + y$ is
(A) 1   (B) 0
(C) 17   (D) 11

10. $2^{x+y} = 128$ and $4^{x-y} = 16$ then $\dfrac{x}{y}$ is

(A) $\dfrac{2}{3}$ (B) $\dfrac{5}{9}$

(C) $\dfrac{9}{5}$ (D) $\dfrac{3}{5}$

11. If $a^2 + \dfrac{1}{a^2} = 27$ then $a - \dfrac{1}{a} =$
(A) ± 5 (B) ± 6
(C) ± 7 (D) ± 8

12. The expression $\left(x^2 + 4\right)\left(x^2 - 4\right)\left(x^4 + 16\right)$ is
(A) $x^8 - 128$ (B) $x^4 - 16^2$
(C) $x^6 - 256$ (D) $x^8 - 256$

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13. One of the factor of $4a^2 + b^2 - 4ab + 2b - 4a + 1$ is
    (A) $(a - b)$
    (B) $(a + b - 2)$
    (C) $(a - b + 2)$
    (D) $(2a - b - 1)$

14. $\left(\dfrac{x}{3} - \dfrac{y}{2}\right)^2 =$
    (A) $\dfrac{x^2}{9} + \dfrac{y^2}{4}$
    (B) $\dfrac{x^2}{9} - \dfrac{y^2}{4}$
    (C) $\dfrac{x^2}{9} + \dfrac{y^2}{4} - \dfrac{xy}{3}$
    (D) $\dfrac{x^2}{9} + \dfrac{y^2}{4} + \dfrac{xy}{9}$

15. $\left(\dfrac{2a}{5} + \dfrac{3q}{5}\right)^3 - \left(\dfrac{2a}{5} - \dfrac{3q}{5}\right)^3$ is
    (A) $\dfrac{1}{125}\left(54q^3 - 72a^2q\right)$
    (B) $\dfrac{1}{125}\left(54q^3 + 72a^2q\right)$
    (C) $\dfrac{1}{125}\left(16q^3 + 108aq^2\right)$
    (D) $\dfrac{1}{125}\left(16a^3 - 108aq^2\right)$

16. Factorisation of $-r^2 + p^2 + q^2 - 2pq$ is
    (A) $(p - q - r)(p - q + r)$
    (B) $(p + q + r)(p - q - r)$
    (C) $(p - q)(q - r)$
    (D) $(p - q)(q - r)$

17. $\left(a + \dfrac{1}{a} + 2\right)^2 = 4$ then $a^2 + \dfrac{1}{a^2} = ?$
    (A) 12
    (B) 13
    (C) 14
    (D) – 14

18. Expansion of $(x - y)^3 + (y - z)^3 + (z - x)^3$ is
    (A) $2x^3 + 2y^3 + 2z^3$
    (B) $(x - y)(y - z)(z - x)$
    (C) 0
    (D) $3(x - y)(y - z)(z - x)$

19. If x + y = 2 and xy=1 then $x^4 + y^4 = ?$
    (A) 6
    (B) 4
    (C) 8
    (D) 2

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20. Factorisation of $y^2 + (x - 1)y - x$ is

(A) $(y + x - 1)(x + 1)$ (B) $(y + 1)(x - 1)$

(C) $(y - 1)(y + x)$ (D) $(x - 1)(x + y)$

21. If $x + y + z = 5$ and $xy + yz + zx = 7$ then $x^3 + y^3 + z^3 - 3xyz = ?$

(A) 20   (B) 21

(C) 12   (D) 22

22. If $ab + bc + ca = 4$ and $abc = 2$ then value of $\dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c} =$

(A) 2   (B) 1

(C) 0   (D) – 1

23. If $\dfrac{Px}{b - c} = \dfrac{Qy}{c - a} = \dfrac{Rz}{a - b}$ then value of $Pax + Qby + Rcz = ?$

(A) $P + Q + R$ (B) $x + y + z$

(C) $a + b + c$ (D) 0

24. If $P = \dfrac{8ab}{a + b}$ then value of $\dfrac{P + 4a}{P - 4a} + \dfrac{P + 4b}{P - 4b} = ?$

(A) 4   (B) 2

(C) 1   (D) 3

25. If SP = 750, discount = 25%, then MP = ?

(A) Rs. 800   (B) Rs. 900

(C) Rs. 1000   (D) Rs. 1100

26. The single discount that is equivalent to two successive discount of 12% and 20% is

(A) $29\dfrac{2}{5}\%$ (B) $70\dfrac{2}{5}\%$

(C) $29\dfrac{3}{5}\%$ (D) $70\dfrac{3}{5}\%$

Space for rough work

27   The SP of an article is $\frac{11}{6}$ times that of its CP. The gain% is

(A) 85%   (B) 72%

(C) $83\frac{1}{3}$%   (D) 76%

28.   A sold an article for Rs. 420 at a gain of 5% and B sold an article for Rs. 477 at a gain of 6% who got more profit and by how much?
(A) A, Rs. 10   (B) B, Rs. 7
(C) A, Rs. 8   (D) B, Rs. 10

29.   A certain sum triples in 4 years at C.I. being compounded annually, In how many years would it become 27 times itself.
(A) 9   (B) 10
(C) 12   (D) 16

30.   A sum of Rs.5120 amounts to Rs.7290 is 3 years at CI. Find the rate of interest per annum.

(A) $33\frac{1}{3}$%   (B) $12\frac{1}{2}$%

(C) $8\frac{1}{3}$%   (D) $17\frac{1}{2}$%

31.   The ages of A and B are in the ratio 3:8 6 years hence their ages will be in the ratio 4:9. The present age of A is
(A) 18 years   (B) 15 years
(C) 12 years   (D) 21 years

32.   Shayam deposited in a bank Rs 7500 for 6 months at the rate of 8% interest compounded quarterly. Find the amount he received after 6 months.
(A) 7803   (B) 8803
(C) 6083   (D) 5083

33.   The price of sugar falls by 12%. By how much percent must a family increase its consumption so as not to decrease the expenditure on it?
(A) 12.84%   (B) 14%
(C) 13.64%   (D) 13%

Space for rough work

34. A man deposited Rs. 3000 at 10% CI for 1 year 122 days in a leap year. Amount he receives at the end is

(A) Rs. 3000   (B) Rs. 3500

(C) Rs. 3410   (D) Rs. 4000

35. If $11^x = 3^y = 33^z$ then $\dfrac{1}{x} + \dfrac{1}{y} + \dfrac{1}{z} = ?$

(A) ∞ (B) $\dfrac{2}{z}$

(C) $\dfrac{-1}{y}$ (D) 0

36. $\sqrt{2 + \sqrt{2 + \sqrt{2} \ldots\ldots\ldots\infty}} = ?$

(A) 1.42   (B) 4

(C) 2   (D) 2.414

37. If P = 99 then value of $P(P^2 + 3P + 3)$ is

(A) 999   (B) 9999

(C) 9999   (D) 999999

38. If $1.5x = 0.04y$ then $\dfrac{y - x}{y + x} = ?$

(A) $\dfrac{730}{77}$ (B) $\dfrac{73}{77}$

(C) $\dfrac{73}{770}$ (D) $\dfrac{703}{77}$

39. $\dfrac{1}{5} : \dfrac{1}{x} = \dfrac{1}{x} : \dfrac{1}{1.25}$ then x = ?

(A) 1.5   (B) 2

(C) 2.5   (D) 3

Space for rough work

40. If $x^2 + 4y^2 = 4xy$ then x:y is

(A) 2 : 1   (B) 1 : 2
(C) 1 : 4   (D) 1 : 1

41. 30% of A = 0.25 of $B = \dfrac{1}{5}$ of C then $A:B:C = ?$

(A) 15:12:10   (B) 12:15:10
(C) 10:12:15   (D) 10:15:12

42. At a certain rate of interest compounded annually a sum amounts to 8820 in 2 years and 9261 in 3 years. The sum is
(A) Rs. 8400   (B) Rs. 8250
(C) Rs. 8000   (D) Rs. 8650

43. On a certain sum the difference between SI and CI at 10% P.A is Rs. 20. The sum is
(A) Rs. 4000   (B) Rs. 2000
(C) Rs. 1500   (D) Date insufficient

44. If $a^3 + b^3 - 1 + 3ab = 0$ then value of $(a+b)$ is

(A) 1   (B) – 1
(C) 2   (D) 0

45. By what should we divide $16^{\frac{7}{8}}$ to obtain $2^{\frac{13}{4}}$?

(A) $2^{\frac{1}{4}}$ (B) $2^{\frac{1}{3}}$
(C) $2^{\frac{1}{2}}$ (D) None

Space for rough work