

INTEGRATED⁺ (V₂) ①

Class: VII, MATHEMATICS

2. EXPONENTS AND POWERS

TEACHING TASK (JEE MAINS)

01. $\frac{9 \times 10^5}{3 \times 10^2} = 3 \times 10^3$ Ans: A

02. $(2 \times 10^3) \cdot (3 \times 10^4) = 6 \times 10^7$ Ans: A

03. $0.0052 = \frac{52}{10000} = 52 \times 10^{-4} = 5.2 \times 10^{-3}$ Ans: B

04. $3 \times 10^4 \cdot 2 \times 10^3 = 6 \times 10^7$ Ans: B

05. $0.0067 = \frac{67}{10000} = 67 \times 10^{-4} = 6.7 \times 10^{-3}$ Ans: B

06. $\frac{x^4 \times x^7}{x^3} = x^{4+7-3} = x^8$ Ans: B

07. We know $729 = 3^6$
 $\therefore 3^4 \times 3^2 = 729$: 3^2 , should be multiplied Ans: B

08. $\left(\frac{x^m}{x^n}\right)^p \cdot \left(\frac{x^n}{x^p}\right)^m \cdot \left(\frac{x^p}{x^m}\right)^n$ $= x^0$
 $= 1$
 $= \left(x^{m-n}\right)^p \cdot \left(x^{n-p}\right)^m \cdot \left(x^{p-m}\right)^n$
 $= x^{mp-np+nm-pm+pn-mn}$ Ans: D

09. $\frac{2x-1}{3} = 27 = 3^3 \Rightarrow 2x-1=3 \Rightarrow x=2$ Ans: C

10. $\left[\frac{p^2 \cdot q^{-3}}{r^2} \right]^{-1} \cdot \left(\frac{r^3}{pq} \right)^2 = p^{-4} \cdot q \cdot r^8$
 $= \frac{r^2}{p^2 \cdot q^{-3}} \cdot \frac{r^6}{p \cdot q^2}$ Ans: B, D

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11. A) $0.00056 = \frac{56}{100000} = 56 \times 10^{-5} = 5.6 \times 10^{-4} \checkmark$
 B) $8900 = 89 \times 10^2 = 8.9 \times 10^3 \checkmark$
 C) $12.3 = \frac{123}{10} = 123 \times 10^{-1} = 1.23 \times 10^{-3} \checkmark$
 D) $5 = 5 \times 10^0 \checkmark$ Ans: A, B, C, D

12. $\left(\frac{x^3}{y^2} \right)^{-2} \cdot \left(\frac{y^5}{x^{-1}} \right)^3 = y^4 \cdot x \cdot y^{15} \cdot x^3$
 $= \frac{y^2}{x^3} \cdot \left(\frac{y^5 \cdot x}{1} \right)^3 = x \cdot y^{19} = \frac{y^{19}}{x^3}$ Ans: C, D

13. Statement I: $2^x = 2^4 \Rightarrow x=4$ (False)
Statement II: $2^x = 16 \Rightarrow 2^x = 2^4 \Rightarrow x=4$ (True)
 Ans: C

14. Statement I: Conceptual (True) $\Rightarrow 3x+6 = 4x-3$
Statement II: $\binom{3}{2}^{x+2} = 2^{4x-3} \Rightarrow 3x+6 = 4x-3$
 $\Rightarrow x=9$ (True)
 Ans: A

15. Assertion: $(2^3)^4 = 2^{12}$ (True)

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Reason: $(a^m)^n = a^{mn}$ (True)

Ans: A

16. Assertion: $2^3 \times 2^4 = 2^{3+4} = 2^7$ (True)

Reason: Conceptual (False)

Ans: C

17. $(2a^3b^2)^2 = 2^2 \cdot a^6 \cdot b^4 = 4 \cdot a^6 \cdot b^4$

Ans: C

18. $(3x^2y)^3 = 27x^6y^3$

$\therefore$ The Constant term = 27

Ans: C

19. $\frac{2^{-3} \cdot 3^4}{(2^2)^{-2}} = \frac{2^{-3} \cdot 3^4}{2^{-4}} = 2^{-3+4} \cdot 3^4 = 2 \cdot 3^4$

$= 2 \times 81 = 162$ Ans: B

20. $x^3 \cdot x^{-5} = x^{-2} \Rightarrow x^{-2} = x^{-2} \Rightarrow n = \text{Any real number}$

Ans: D

21. $x^4 \cdot x^5 = x^{4+5} = x^9$, Exponent = 9

Ans: 9

22. $2^x = 8^y \Rightarrow 2^x = 2^{3y} \Rightarrow x = 3y$

$\Rightarrow 3y = 6$

$\Rightarrow y = 2$

Ans: 2

23. a) $2^x = 8 \Rightarrow 2^x = 2^3 \Rightarrow x = 3$ (r)

b) $3^{2x} = 9 \Rightarrow 3^{2x} = 3^2 \Rightarrow 2x = 2 \Rightarrow x = 1$ (v)

c) $5^{x-1} = 25 \Rightarrow 5^{x-1} = 5^2 \Rightarrow x-1 = 2 \Rightarrow x = 3$ (r)

d) $10^{2x} = 10^3 \Rightarrow x = \frac{3}{2}$ (s)

Ans: r, v, r, s



24 a) $4^3 \times 2^2 = (2^2)^3 \cdot 2^2 = 2^{6+2} = 2^8 (P)$ (4)

b) $8^2 \times 2^1 = (2^3)^2 \cdot 2^1 = 2^{6+1} = 2^7 (Q)$

c) $16 \times 2^4 = 2^4 \times 2^4 = 2^{4+4} = 2^8 (P)$

d) $\frac{32}{2^3} = \frac{2^5}{2^3} = 2^2 = 4 (S)$ Ans: P, Q, P, S

LEARNERS TASK (CQs)

01. $7x^2 - 3y + 5 \rightarrow x^3$ Ans: D

02. $x^0 = 1$ for $x \neq 0$ Ans: A

03. $x^{-n} = \frac{1}{x^n}$ Ans: B

04. Conceptual Ans: C

05. $x^n = \frac{1}{x^{-n}}$ Ans: C

06. $x^m = x^n \Rightarrow m = n$ Ans: C

07. $\frac{5^2}{5^6} = \frac{1}{5^4} = \frac{1}{625} = 5^{-4}$ Ans: D

08. $(2^4 \times 3^2)^2 = 2^8 \times 3^4$ Ans: A

09. $\left(\frac{1}{2}\right)^{-3} = 2^3 = 8$ Ans: B

10. $9^{\frac{3}{2}} = (3^2)^{\frac{3}{2}} = 3^{2 \times \frac{3}{2}} = 3^3 = 27$ Ans: B

JEE MAINS LEVEL

01. $45000 = 45 \times 10^3 = 4.5 \times 10^4$ Ans: B

02. $x^3 = 27 \Rightarrow x^3 = 3^3 \Rightarrow x = 3$ Ans: B
03. $10^{2x} = 1000 = 10^3 \Rightarrow 2x = 3 \Rightarrow x = \frac{3}{2}$ Ans: B
04. $x^4 \cdot x^{-7} = x^{4-7} = x^{-3}$ Ans: A
05. $(5^2)^3 = 5^{2 \times 3} = 5^6$ Ans: B
06. $\left(\frac{2}{3}\right)^4 = 3^8$ Ans: B
07. $3^x = 81 \Rightarrow 3^x = 3^4 \Rightarrow x = 4$ Ans: C
08. $\frac{5^4 \times 5^{-2}}{5^3} = 5^{4-2-3} = 5^{-1}$ Ans: A
09. $\left(\frac{1}{2} + \frac{1}{4}\right) - 1 = \left(\frac{1}{2} + \frac{1}{4}\right) - 1 = \frac{3}{4} - 1 = -\frac{1}{4}$ Ans: C
10. $\frac{a}{b} = \frac{2^3 \times 3^2}{2^2 \times 3^3} = \frac{2}{3}$ Ans: A

JEE ADVANCED

11. $5x^2 - 3y + 7 - z^3 \rightarrow 5x^2, -3y, -z^3$
Ans: A, B, D
12. A) $10^0 = 1 \checkmark$ C) $3^{-4} \times 3^4 = 3^0 = 1 \checkmark$
B) $\frac{2^5}{2^5} = 1 \checkmark$ D) $(5^{-1})^{-1} = 5 \times$ Ans: A, B, C
13. Statement I: $-6xy^2 \rightarrow$ Coefficient = -6 (True)
Statement II: $-6xy^2 \rightarrow$ Coefficient = 6 (False)
Ans: C
14. Statement I: Conceptual (True)
Statement II: Conceptual (True)
Ans: A

15 Assertion: $3^x = 27 \Rightarrow 3^x = 3^3 \Rightarrow x = 3$ (False) (E)
Reason: Conceptual (True) Ans: D

16 A: $\left(\frac{1}{5}\right)^{-2} = 5^2 = 25$ (True)
Reason: Conceptual (False) Ans: C

17 $0.00096 = \frac{96}{100000} = 96 \times 10^{-5} = 9.6 \times 10^{-4}$
Ans: D

18 $0.0009 = \frac{9}{1000} = 9 \times 10^{-3}$ Ans: B

19 $4500000 = 45 \times 10^5 = 4.5 \times 10^6$ Ans: A

20 $3.2 \times 10^{-4} = \frac{3.2}{10000} = \frac{32}{100000} = 0.00032$ Ans: B

21. $6x^3y - 4xy^2 + 7 \rightarrow$ three terms Ans: 3

22 $a \times b = 2^3 \times 5^2 \times 2^2 \times 5^3 = 2^5 \times 5^5 = (10)^5$ Ans: 5

23 a) -4 (q)

b) $(2x^2y)^3 = 8x^6y^3 \rightarrow$ Exponent of $x = 6$ (p)

c) $x^m = x^4 \Rightarrow m = 4$ (r)

d) No. of terms = 3 (s)

24 a) $2^x = 32 \Rightarrow 2^x = 2^5 \Rightarrow x = 5$ (p)

b) $3^{x-1} = 3^2 \Rightarrow x-1 = 2 \Rightarrow x = 3$ (q)

c) $5^{2x} = 5^4 \Rightarrow 2x = 4 \Rightarrow x = 2$ (r)

d) $10^{x+1} = 10^3 \Rightarrow x+1 = 3 \Rightarrow x = 2$ (r)

Ans: p, q, r, r

$\Rightarrow$ THE END $\Leftarrow$