



Attempt questions first; check the separate key afterward. Show all working. Draw accurate figures where required.

A. Very short answers - 1 mark each

1. Evaluate 2^6 .
2. Evaluate 5^0 .
3. Write $1/81$ as a power of 3.
4. Evaluate 2^{-3} .
5. Simplify $3^4 \times 3^2$.
6. Simplify $7^8 \div 7^5$.
7. Evaluate $(2^3)^2$.
8. Evaluate $(3 \times 4)^2$ in two ways.

B. Short answers / practice - 2 marks each

9. Express 0.000045 in standard form.
10. Express 72000000 in standard form.
11. Compare 2^5 and 5^2 .
12. Compare 3^4 and 4^3 .
13. Simplify $2^5 \times 2^{-2}$.
14. Simplify $10^{-3} \div 10^{-5}$.
15. Find n if $2^n = 128$.
16. Find n if $5^n = 1/625$.
17. Evaluate $(-2)^4$ and -2^4 .
18. Explain why these two expressions differ.
19. A population doubles each hour from 100. Find it after 5 hours.
20. Find the multiplier after 10 hours.

C. Application / reasoning - 3 marks each

21. Calculate $(6 \times 10^5)(3 \times 10^{-2})$.

22. Calculate $(8 \times 10^7)/(2 \times 10^3)$.
23. Evaluate $(2/3)^{-2}$.
24. Simplify $(4^2 \times 4^{-5})/4^{-1}$.
25. Explain why $a^0 = 1$ for nonzero a.
26. Why is division by zero excluded from exponent laws?
27. Simplify $5^3 \times 5^{-4} \times 5^2$.
28. Find n if $2^n \times 2^3 = 1024$.
29. Express 0.00000072 in standard form.
30. Evaluate $(-3)^3 + (-3)^2$.
31. A culture triples daily from 20 cells. Find its size after four days in this model.
32. A sheet is 0.1 mm thick and doubles in thickness on each ideal fold. Find thickness after 8 folds.
33. How many ideal folds first make it thicker than 1 m?
34. A square has side 2^5 cm. Express its area as a power of 2.
35. A cube has edge 3^2 cm. Express its volume as a power of 3.

ANSWER KEY - Numerical / closed questions

- 1) 64. 2) 1. 3) 3^{-4} . 4) $1/8$. 5) 729. 6) 343. 7) 64. 8) 144. 9) 4.5×10^{-5} . 10) 7.2×10^7 . 11) $2^5 > 5^2$. 12) $3^4 > 4^3$. 13) 8. 14) 100. 15) 7. 16) -4. 17) 16; -16. 18) 3200. 19) 1024. 20) 1.8×10^4 . 21) 4×10^4 . 22) $9/4$. 23) $1/16$. 24) 5. 25) 7. 26) 7.2×10^{-7} . 27) -18. 28) 1620 cells. 29) 25.6 mm. 30) 14. 31) 2^{10} cm^2 . 32) 3^6 cm^3 .