# CLASS VIII – MATHEMATICS

## Chapter Test: Power Play

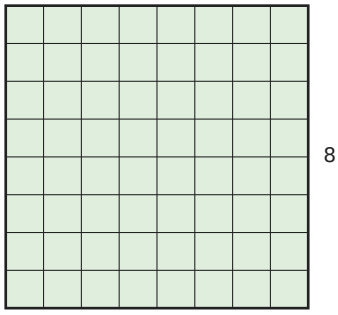
(Ganita Prakash, Grade 8, Part I – Chapter 2)

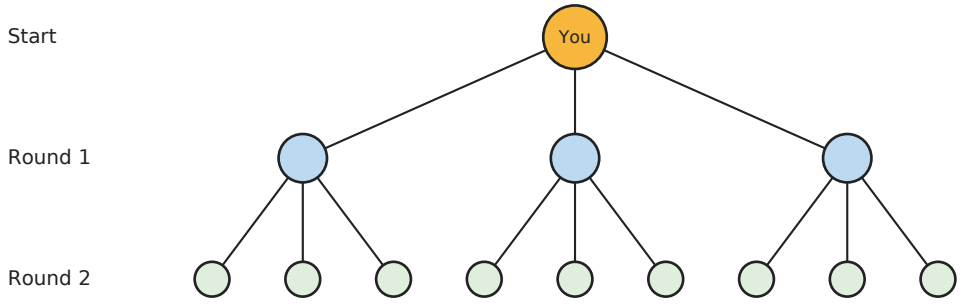
**Time: 1½ Hours** **M. M.: 40**

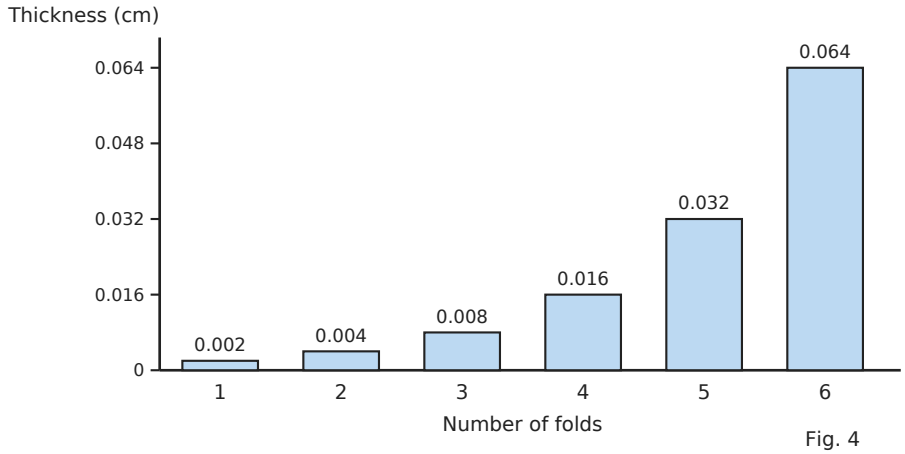
**General Instructions:**

**1.** This paper contains 20 questions. All questions are compulsory.
**2.** This paper is divided into 4 sections: **A, B, C** and **D**.
**3.** In **Section A**, Questions no. 1 to 10 are Multiple Choice Questions carrying 1 mark each.
**4.** In **Section B**, Questions no. 11 to 13 are Very Short Answer type questions carrying 2 marks each.
**5.** In **Section C**, Questions no. 14 to 17 are Short Answer type questions carrying 3 marks each.
**6.** In **Section D**, Questions no. 18 to 20 are Long Answer / Word Problem / Case-based questions carrying 4 marks each.
**7.** There is no overall choice. However, an internal choice has been provided in 1 question of Section B, 2 questions of Section C and 2 questions of Section D.
**8.** Figures are only for reference and are not drawn to scale. Questions 9, 10, 11, 14 and 20 are figure-based.
**9.** Show all the steps of your working. Write answers in exponential form or standard form wherever asked.
**10.** Use of calculator is **not** allowed.

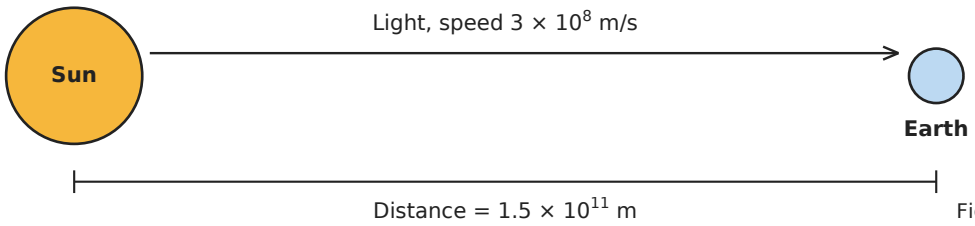
| Q. No. | Section – A | Marks |
|---|---|---|
| **1** | The value of $(-3)^4$ is<br>(A) $-81$ (B) $-12$<br>(C) 81 (D) 12 | **[1]** |
| **2** | The value of $5^{-2}$ is<br>(A) $-25$ (B) $-1/25$<br>(C) 1/10 (D) 1/25 | **[1]** |
| **3** | $2^7 \times 2^{-3}$ is equal to<br>(A) $2^4$ (B) $2^{10}$<br>(C) $2^{-21}$ (D) $2^{-4}$ | **[1]** |
| **4** | $(7^3)^2$ is equal to<br>(A) $7^5$ (B) $7^9$<br>(C) $7^6$ (D) $7^8$ | **[1]** |
| **5** | The number 45,00,000 written in standard form is<br>(A) $4.5 \times 10^5$ (B) $4.5 \times 10^6$<br>(C) $45 \times 10^5$ (D) $4.5 \times 10^7$ | **[1]** |
| **6** | The number 0.00032 written in standard form is<br>(A) $3.2 \times 10^{-3}$ (B) $3.2 \times 10^4$<br>(C) $3.2 \times 10^{-4}$ (D) $32 \times 10^{-5}$ | **[1]** |
| **7** | The value of $2^0 + 3^0 + 5^0$ is<br>(A) 3 (B) 0<br>(C) 1 (D) 10 | **[1]** |
| **8** | If $3^x = 1/81$, then the value of x is<br>(A) 4 (B) $-4$<br>(C) 1/4 (D) $-3$ | **[1]** |

| Q. No. | Section – A | Marks |
|---|---|---|
| **9** | Look at the power line of 3 shown in Fig. 1. Using it, the value of 81 × (1/27) is<br><br><br>Fig. 1: Power line of 3<br>(A) 1/3 (B) 9<br>(C) 3 (D) 27 | **[1]** |
| **10** | A square sheet is divided into equal small squares as shown in Fig. 2. The total number of small squares, written as a power of 2, is<br><br><br>Fig. 2<br>(A) $2^4$ (B) $2^8$<br>(C) $2^{16}$ (D) $2^6$ | **[1]** |

| Q. No. | Section – B | Marks |
|---|---|---|
| **11** | Fig. 3 shows how a message spreads. You send it to 3 friends (Round 1). Each of them sends it to 3 *new* people (Round 2), and the pattern continues in the same way.<br><br><br>Fig. 3<br>(i) How many people receive the message for the first time in Round 4? Write the answer in exponential form and as a number. [1]<br>(ii) In which round will 2187 people receive the message for the first time? Show your working. [1] | **[2]** |
| **12** | (A) Express 1176 as a product of powers of its prime factors.<br>**OR**<br>(B) Express 2160 as a product of powers of its prime factors. | **[2]** |
| **13** | The diameter of a certain virus is 0.00000012 m. Express this number in standard form. | **[2]** |

| Q. No. | Section – C | Marks |
|---|---|---|
| **14** | A sheet of paper is 0.001 cm thick. It is folded again and again, and its thickness after each fold is shown in the bar graph (Fig. 4).<br><br><br>Fig. 4<br>(i) How many times as thick is the paper after 6 folds compared with after 3 folds? Write the answer as a power of 2. [1]<br>(ii) Write the thickness after 12 folds using powers of 2, and find its value in cm. [2] | **[3]** |
| **15** | (A) Show that $(2^6 \times 3^6) \div 6^4 = 36$.<br>**OR**<br>(B) Evaluate: $(-2)^3 \times (-5)^3 \times 10^{-1}$, and write the answer as a power of 10. | **[3]** |
| **16** | Arrange the following numbers in ascending order (smallest to largest): $2^8$, $8^2$, $3^5$, $5^3$. Show your working. | **[3]** |
| **17** | (A) Find the sum $4.5 \times 10^5 + 3.2 \times 10^4$ and write the answer in standard form.<br>**OR**<br>(B) Find the difference $6.3 \times 10^6 - 8 \times 10^5$ and write the answer in standard form. | **[3]** |

| Q. No. | Section – D | Marks |
|---|---|---|
| **18** | (A) A colony starts with 5 bacteria. The number of bacteria doubles every hour.<br>(i) Write, in exponential form, the number of bacteria after 6 hours and find its value. [2]<br>(ii) After how many hours will the colony first have more than 1000 bacteria? Show your working. [2]<br>**OR**<br>(B) In a magical pond, one lotus is placed on Day 0. The number of lotuses triples every day.<br>(i) Write, in exponential form, the number of lotuses on Day 5 and find its value. [2]<br>(ii) On which day will the pond first have more than 1000 lotuses? Show your working. [2] | **[4]** |

| Q. No. | Section – D | Marks |
|---|---|---|
| **19** | (A) A school gives each student an ID code made of 3 capital letters (A to Z) followed by 4 digits (0 to 9). Letters and digits can repeat.<br>(i) Write the number of possible ID codes in exponential form. [1]<br>(ii) Find the number of possible ID codes as a number. [2]<br>(iii) Write your answer to (ii) in standard form. [1]<br>**OR**<br>(B) A digital locker uses a 4-character passcode. Each character can be any capital letter (A to Z) or any digit (0 to 9).<br>(i) Write the number of possible passcodes in exponential form. [1]<br>(ii) Find the number of possible passcodes as a number. [2]<br>(iii) Write your answer to (ii) in standard form, correct to 3 significant digits. [1] | **[4]** |
| **20** | **Case Study:** Light travels at a speed of $3 \times 10^8$ metres per second. The distance between the Sun and the Earth is $1.5 \times 10^{11}$ metres, as shown in Fig. 5.<br><br>Fig. 5<br>(i) How long does light from the Sun take to reach the Earth? Give the answer in seconds, in standard form. [2]<br>(ii) How far does light travel in 1 hour (3600 seconds)? Give the answer in metres, in standard form. [2] | **[4]** |

**— End of Question Paper —**