

MATHEMATICS
WORKSHEET_130626
CHAPTER 02 POWER PLAY (Ganita Prakashan)

SUBJECT: MATHEMATICS
CLASS : VIII

MAX. MARKS : 40
DURATION : 1½ hr

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. If the mass of a dust particle is 7.2×10^{-11} kg, what is this mass in a number form?
(a) 0.000000000072 kg (b) 0.00000000072 kg
(c) 0.0000000072 kg (d) 0.000000072 kg
2. What is the value of $(20)^0 - (20)^0$?
(a) 20 (b) 0 (c) 1 (d) -20
3. The value of $(0.5)^2 \times (0.5)^3$ is:
(a) $(0.5)^6$ (b) $(0.5)^2$ (c) $(0.5)^5$ (d) 0.5
4. If $2^x = 1/64$, what is the value of x?
(a) 6 (b) -6 (c) 8 (d) -8
5. What is the simplified form of $\frac{18^2 \times 3^4}{6^4 \times 9}$?
(a) 9/4 (b) 3 (c) 1/3 (d) 9
6. A video game character's power level, P, is calculated as $P = 2^n$, where n is the number of missions completed. If a player completes 8 missions, what is their power level?
(a) 64 (b) 16 (c) 256 (d) 128
7. The population of a town is growing at a rate of 2×10^3 people per year. If the current population is 10^5 , what will the population be in 2 years?
(a) $10^5 + 4 \times 10^3$ (b) 1.04×10^4 (c) $10^5 + 2 \times 10^3$ (d) 10^8
8. Which of the following is equivalent to $\left(\frac{1}{2}\right)^5$?
(a) 2^{-5} (b) 2^5 (c) $\left(\frac{1}{2}\right)^{-5}$ (d) $\frac{1}{2^{-5}}$

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.

- (c) A is true but R is false.
(d) A is false but R is true.

9. **Assertion (A):** The value of $\left(\frac{2}{3}\right)^{-2}$ is $\frac{9}{4}$.

Reason (R): The reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$.

10. **Assertion (A):** The standard form of 0.0000035 is 3.5×10^{-6} .

Reason (R): A number in standard form must have a coefficient between 1 and 10.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Simplify and express the result as a power of 2: $\frac{2^5 \times 4^2}{8^2}$

12. Find the value of x for which $5^{x+1} \times 5^3 = 5^8$.

13. Simplify: $3^{-2} + 4^{-2}$

14. The population of a city is 1.25×10^7 . If each person consumes 10^3 litres of water per year, what is the total water consumption in a year? Express your answer in standard form.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Simplify: $\frac{12^4 \times 9^3 \times 4}{6^3 \times 8^2 \times 27}$

16. Find the value of x for which $\left(\frac{2}{5}\right)^{x-2} = \frac{125}{8}$

17. By what number should $\left(\frac{4}{5}\right)^{-3}$ be divided so that the quotient is 4^{-2} ?

SECTION – D

Questions 18 carry 5 marks each.

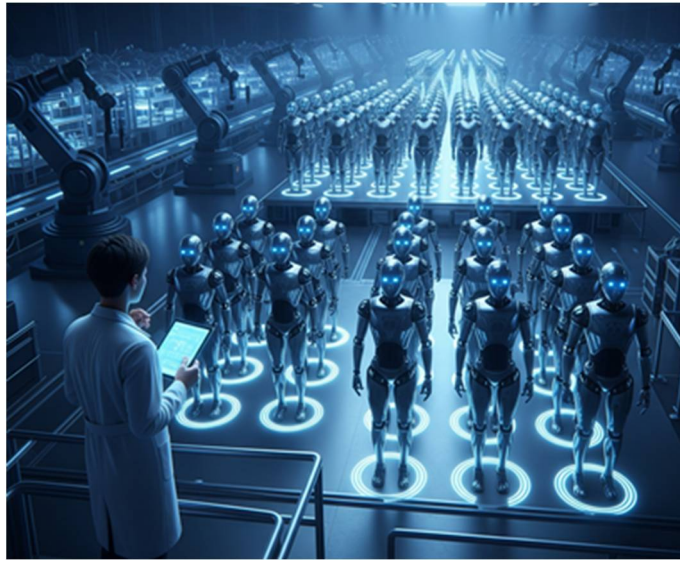
18. Find the value of x such that $\frac{3^{2x} \times 9^{-2x}}{3^{-2}} = 27$.

SECTION – E (Case Study Based Question)

Question 19 to 20 carry 4 mark

19. **Case Study-1: The Robot Army**

A robotics engineer is building an army of robots. The number of robots built each day is a power of 3. On the first day, 3 robots are built. On the second day, 9 robots are built, and on the third day, 27 are built. The factory has a capacity to produce 3^9 robots in a single day.



- (i) Write an expression for the number of robots built on the 5th day. (1)
- (ii) On which day will the number of robots built be 243? (1)
- (iii) If the production rate tripled every 2 days instead of every day, starting with 3 robots, how many robots would be built on the 6th day? (1)
- (iv) What is the ratio of the number of robots built on the 7th day to the number of robots built on the 3rd day? (1)

20. Case Study-2 The Architect's Blueprint:

Two treasure hunters, Ali and Zora, find a map with a riddle. The riddle leads them to a sequence of tunnels. The number of paths from the entrance of each tunnel is determined by a power of 4. From the first tunnel, there are 4 paths. From the second tunnel, there are 16 paths, and so on.



- (i) How many paths are there from the 4th tunnel? (1)
- (ii) If a tunnel has 1024 paths, which tunnel number is it? (1)
- (iii) To find a hidden treasure, they must follow a path that has 4^3 paths from its entrance. If they find it, they gain a treasure of 4^2 gold coins. What is the total number of gold coins they could find from all such paths? (1)
- (iv) The treasure is protected by a lock that requires a 6-digit code. Each digit can be any number from 0 to 9. How many possible combinations are there for the lock? Express your answer in exponential form. (1)