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PRACTICE PAPER 1 (2023-24)
MENSURATION & EXPONENTS AND POWERS (ANSWERS)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**
CLASS : VIII **DURATION : 1½ hr**

SECTION – A
Questions 1 to 6 carry 1 mark each.

1. 700000000 is equal to:
(a) 7×10^8 (b) 7×10^7 (c) 7×10^6 (d) 7×10^9
Ans: (a) 7×10^8

2. What is the value of $(2^2 + 3^2 + 4^2)^0$?
(a) 9 (a) 0 (c) 1 (d) 14
Ans: (c) 1
The value of $(2^2 + 3^2 + 4^2)^0$ is 1.
By exponent law, any value raised to the power 0 is equal to 1.

3. The multiplicative inverse of 7^{-2} is:
(a) 7^2 (b) 7 (c) $1/7^2$ (d) 1/7
Ans: (a) 7^2
The multiplicative inverse of any value is the one which when multiplied by the original value gives a value equal to 1.
$7^{-2} = 1/7^2$
Hence, $7^2 \times 1/7^2 = 1$

4. A soft drink is available in a tin can with a rectangular base of length 5 cm, breadth 4 cm and height 15 cm. Find the capacity of the tin.
(a) 200 cm^3 (b) 300 cm^3 (c) 400 cm^3 (d) 150 cm^3
Ans: (b) 300 cm^3
Length of tin can, l = 5 cm
Breadth of tin can, b = 4 cm
Height of tin can, h = 15 cm
∴ Volume of soft drink in tin can = $l \times b \times h = 5 \times 4 \times 15 = 300$ cm^3

5. A glass in the form of a right circular cylinder is half full of water. Its base radius is 3 cm and height is 8 cm. The volume of water is
(a) 18π cm^3 (b) 36π cm^3 (c) 9π cm^3 (d) 36 cm^3
Ans: (b) 36 cm^3
Volume = $\frac{1}{2}$ π × 3 × 3 × 8 = 36π cm^3.

6. The height of a cylinder whose radius is 7 cm and the total surface area is 968 cm^2 is :
(a) 15 cm (b) 17 cm (c) 19 cm (d) 21 cm
Ans: (a) 15 cm
Total surface area = 2πr (h + r)
$\Rightarrow 968 = 2 \times \frac{22}{7} \times 7\ (7 + h)$
$\Rightarrow 968 = 44\ (7 + h) \Rightarrow 22 = 7 + h \Rightarrow h = 15$ cm

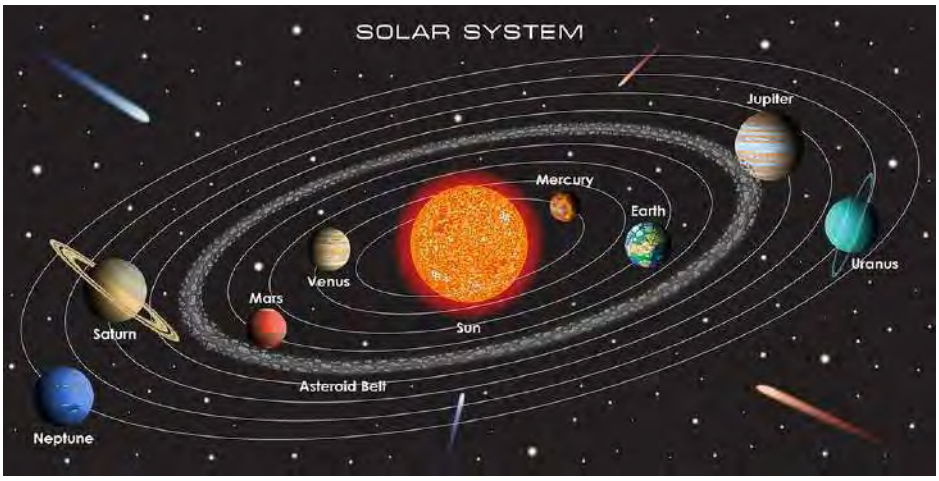
SECTION – B(CCT Questions)

Questions 7 to 10 carry 1 mark each.

CCT Question

Our solar system consists of our star, the Sun, and everything bound to it by gravity – the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune; dwarf planets such as Pluto; dozens of moons; and millions of asteroids, comets, and meteoroids. Beyond our own solar system, we have discovered thousands of planetary systems orbiting other stars in the Milky Way. The distance of all the planets from the Sun in kilometers (km) is given in below table:

Planet	Distance from Sun (km)
Mercury	57,900,000
Venus	108,200,000
Earth	149,600,000
Mars	227,900,000
Jupiter	778,600,000
Saturn	1,433,500,000
Uranus	2,872,500,000
Neptune	4,495,100,000



Based on the above situation, answer the following questions:

7. Write the distance of Mercury from the Sun in standard form.
(a) 5.79×10^6 (b) 5.79×10^7 (c) 5.79×10^8 (d) 5.79×10^9
Ans: Distance of Mercury from the Sun = 57,900,000 = 5.79×10^7
Correct option is (b)

8. Write the sum of the distances of Mercury and Venus from the Sun in standard form.
(a) 1.661×10^6 (b) 1.661×10^7 (c) 1.661×10^8 (d) 1.661×10^9
Ans: Sum of the Distances of Mercury and Venus from the Sun = 57,900,000 + 108,200,000 = 166,100,000 = 1.661×10^8
Correct option is (c)

9. Write the difference of the distances of Earth and Venus from the Sun in standard form.
(a) 4.14×10^7 (b) 4.14×10^6 (c) 4.14×10^8 (d) 4.14×10^9
Ans: Difference of the Distances of Earth and Venus from the Sun
= 149,600,000 – 108,200,000

= 41,400,000 = 4.14 x 10^7
Correct option is (a)

10. Find the mean distance of Earth and Venus from the Sun in standard form.
(a) 1.289 x 10^6 (b) 1.289 x 10^7 (c) 1.289 x 10^9 (d) 1.289 x 10^8
Ans: Sum of the Distances of Earth and Venus from the Sun = 149,600,000 + 108,200,000 = 257,800,000
Mean distance = 257,800,000 / 2 = 128,900,000 = 1.289 x 10^8
Correct option is (d)

SECTION – C

Questions 11 to 13 carry 2 marks each.

11. Find the value of x for which $2^x \div 2^{-4} = 4^5$
Ans: Given, $2^x \div 2^{-4} = 4^5$
Now, $2^x \div 2^{-4} = (2^2)^5$
$\Rightarrow 2^{x-(-4)} = 2^{10}$
Thus, $2^{x+4} = 2^{10}$
$\Rightarrow x + 4 = 10 \Rightarrow x = 6$

12. The total surface area of a cube is 1176 cm2. Find its volume.
Ans: Suppose that the side of cube is *x* cm.
Total surface area of cube = 1176 sq cm
$\Rightarrow 1176 = 6x^2 \Rightarrow x^2 = \frac{1176}{6} = 196 \Rightarrow x = \sqrt{196} = 14$
i.e., the side of the cube is 14 cm.
∴ Volume of the cube = $x^3 = 14^3\, cm^3 = 2744\, cm^3$

13. A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litres of water can it hold?
Ans: Volume of water in the tank = Length × Breadth × Height
= 6 × 5 × 4.5 = 135 m^3
∴ Volume of water in litres = 135 × 1000 = 135000 L (1 m^3 = 1000 L)
Thus, the water tank can hold 135000 L of water.

SECTION – D

Questions 14 to 17 carry 3 marks each.

14. Simplify: $(a)\left[\left(\frac{1}{2}\right)^2 - \left(\frac{1}{4}\right)^3\right] \times 2^3$ $(b)\ (3^2 - 2^2) \div \left(\frac{1}{5}\right)^2$

Ans:

(a) $\left[\left(\frac{1}{2}\times\frac{1}{2}\right) - \left(\frac{1}{4}\times\frac{1}{4}\times\frac{1}{4}\right)\right] \times (2\times 2\times 2) = \left[\frac{1}{4} - \frac{1}{64}\right] \times 8 = \left(\frac{16-1}{64}\right) \times 8 = \frac{15}{64} \times 8 = \mathbf{\frac{15}{8}}.$

(b) $(3^2 - 2^2) \div \left(\frac{1}{5}\right)^2 = (9-4) \div \left(\frac{1}{5\times 5}\right) = 5 \div \frac{1}{25} = 5 \times 25 = \mathbf{125.}$

15. Find the value of $a^6 - (b+1)^3$ when $a = \frac{1}{2}, b = \frac{-3}{4}$.

Ans:

$$a^6-(b+1)^3=\left(\frac{1}{2}\right)^6-\left(\frac{-3}{4}+1\right)^3=\frac{1}{2\times2\times2\times2\times2\times2}-\left(\frac{-3}{4}+\frac{1}{1}\right)^3$$

$$=\frac{1}{64}-\left(\frac{-3\times1+1\times4}{4}\right)^3=\frac{1}{64}-\left(\frac{-3+4}{4}\right)^3=\frac{1}{64}-\left(\frac{1}{4}\right)^3$$

$$=\frac{1}{64}-\frac{1\times1\times1}{4\times4\times4}=\frac{1}{64}-\frac{1}{64}=\frac{1-1}{64}=\frac{0}{64}=\mathbf{0.}$$

16. The volume of a cuboid is 1536 m^3. Its length is 16 m, and its breadth and height are in the ratio 3 : 2. Find the breadth and height of the cuboid.

Ans: Length of the cuboid = 16 m

Suppose that the breadth and height of the cuboid are $3x$ m and $2x$ m, respectively.

Given that volume of a cuboid = 1536 m^3

$\Rightarrow 1536=16\times3x\times2x$

$\Rightarrow 1536=16\times6x^2\Rightarrow x^2=\frac{1536}{96}=16\Rightarrow x=\sqrt{16}=4$

$\therefore$ The breadth and height of the cuboid are 12 m and 8 m, respectively.

17. The ratio of the radii of two right circular cylinders is 1 : 2 and the ratio of their heights is 4 : 1. Find the ratio of their volumes.

Ans: Let the radii of the cylinders be r and 2r and their heights be 4h and h respectively.

Also let the volume of the cylinders be V_1 and V_2 respectively.

Volume of 1st cylinder, $V_1=\pi\times(r)^2\times4h$

$\Rightarrow V_1=4\pi r^2h$. ----(1)

Volume of 2nd cylinder, $V_2=\pi\times(2r)^2\times h$

$\Rightarrow V_2=4\pi r^2h$. ----(2)

Now, we will divide eq.1 by eq.2, to get the ratio of their volumes :-

$\Rightarrow V_1/V_2=4\pi r^2h/4\pi r^2h$

$\Rightarrow V_1/V_2=1/1$

$\Rightarrow V_1:V_2=1:1$

Thus, ratio of their volumes is 1 : 1 .

SECTION – E

Questions 18 to 20 carry 4 marks each.

18. Simplify: $(i)\frac{25\times t^{-4}}{5^{-3}\times10\times t^{-8}}$ $(ii)\frac{3^{-5}\times10^{-5}\times125}{5^{-7}\times6^{-5}}$

Ans:

(i) $\frac{25\times t^{-4}}{5^{-3}\times10\times t^{-8}}=\frac{25\times t^{-4}\times5^3\times t^8}{10}$

$=\frac{25\times5\times5\times5\times t^{-4+8}}{10}=\frac{625t^4}{2}$

(ii) $\frac{3^{-5}\times(10)^{-5}\times125}{5^{-7}\times(6)^{-5}}=\frac{3^{-5}\times(2\times5)^{-5}\times125}{5^{-7}\times(2\times3)^{-5}}$

$=\frac{3^{-5}\times2^{-5}\times5^{-5}\times125}{5^{-7}\times2^{-5}\times3^{-5}}=3^{-5+5}\times2^{-5+5}\times5^{-5+7}\times125$

$=3^0\times2^0\times5^2\times125=1\times1\times25\times125=3125$

19. The capacity of a cuboidal tank is 50000 litres of water. Find the breadth of the tank if its length and depth are respectively 10 m and 2.5 m.

Ans: Capacity of the tank = 50000 L = $\frac{50000}{1000}$ = 50 m^3 (1000 L = 1 m^3)

Length of the tank = 10 m
Height (or depth) of the tank = 2.5 m
Now, Volume of the cuboidal tank = Length × Breadth × Height

∴ Breadth of the tank = $\frac{Volume\ of\ the\ tank}{Length \times Height} = \frac{50}{10 \times 2.5} = \frac{50}{25}$ = 2 m

Thus, the breadth of the tank is 2 m.

20. The lateral surface area of a cylinder is 94.2 cm^2 and its height is 5 cm. Find (i) the radius of its base and (ii) its volume. (Take $\pi = 3.14$.)

Ans: Height of the cylinder, h = 5 cm
Lateral (or curved) surface area of cylinder = 94.2 cm^2
(i) Let the radius of the cylinder be r cm.

$\therefore 2\pi rh = 94.2\,cm^2$

$\Rightarrow 2 \times 3.14 \times r \times 5 = 94.2$

$\Rightarrow r = \frac{94.2}{2 \times 3.14 \times 5} = 3\,cm$

Thus, the radius of the cylinder is 3 cm.
(ii) Volume of the cylinder = $\pi r^2 h = 3.14 \times 3^2 \times 5 = 141.3\ cm^3$
Thus, the volume of the cylinder is 141.3 cm^3.