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PRACTICE PAPER 1 (2023-24)

Algebraic Expressions, Mensuration & Exponents and Powers

(ANSWERS)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**

CLASS : VIII **DURATION : 1½ hr**

General Instructions:

(i). **All** questions are compulsory.

(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.

(iii). **Section A** comprises of **6 MCQs** of **1 mark** each. **Section B** comprises of **1 CCT question** of **4 marks** each which contains **4 MCQs**. **Section C** comprises of 3 questions of **2 marks** each. **Section D** comprises of 4 questions of **3 marks** each and **Section E** comprises of 3 questions of **4 marks** each.

SECTION – A

Questions 1 to 6 carry 1 mark each.

1. The value of $(-2/3)^4$ is equal to:

(a) 16/81 (b) 81/16 (c) -16/81 (d) 81/ −16

Ans: (a) 16/81

Using the laws of indices $(a/b)^m = a^m/b^m$

$(-2/3)^4 = (-2)^4/3^4 = 16/81$

2. The volume of a cube is 64 cm^3. Its surface area is

(a) 16 cm^2 (b) 64 cm^2 (c) 96 cm^2 (d) 128 cm^2

Ans: (c) 96 cm^2

Volume of cube = $a^3 = 64$ [given]

$\Rightarrow a = 4$

Now, surface area of the cube = $6a^2 = 6 \times 4^2 = 96$ cm^2

3. If the radius of a cylinder is tripled, but its curved surface area is unchanged, then its height will be

(a) tripled (b) constant (c) one-sixth (d) one third

Ans: (d) one third

Let "H" be the new height.

When the radius of a cylinder is tripled, then the CSA of a cylinder becomes,

$\Rightarrow$ CSA = 2π (3r) H

$\Rightarrow$ CSA = 6πr. H

Now, compare the CSA of the cylinder to find the height

$\Rightarrow 6\pi rH = 2\pi rh \Rightarrow H = 2\pi rh / 6\pi r \Rightarrow H = (1/3)h$

Hence, the new height of the cylinder is one-third of the original height.

4. Sum of a – b + ab, b + c – bc and c – a – ac is

(a) 2c + ab – ac – bc (b) 2c – ab – ac – bc

(c) 2c + ab + ac + bc (d) 2c – ab + ac + bc

Ans: (a) 2c + ab – ac – bc

(a – b + ab) + (b + c – bc) + (c – a – ac)

= a – b + ab + b + c – bc + c – a – ac

Now, grouping like terms

= (a – a) + (-b + b) + (c + c) + ab – bc – ac = 2c + ab – bc – ac

5. Volume of a rectangular box (cuboid) with length = 2ab, breadth = 3ac and height = 2ac is

(a) $12a^3bc^2$ (b) $12a^3bc$ (c) $12a^2bc$ (d) 2ab +3ac + 2ac

Ans: (a) $12a^3bc^2$

We know that, volume of cuboid = length × breadth × height

Given, length = 2ab, breadth = 3ac, height = 2ac

= 2ab × 3ac × 2ac = (2 × 3 × 2) × ab × ac × ac = $12a^3bc^2$

6. The value of $(7^{-1} - 8^{-1})^{-1} - (3^{-1} - 4^{-1})^{-1}$ is:

(a) 44 (b) 56 (c) 68 (d) 12

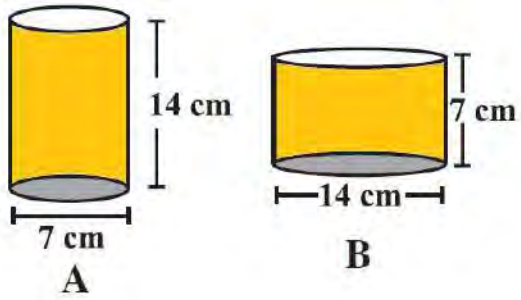
Ans: (a) 44

SECTION – B(CCT Questions)

Questions 7 to 10 carry 1 mark each.

CCT Question

Mohan purchased two cylinders for his Maths Project. He marked first cylinder as 'A' and second one as 'B' with marker pen. He wants to fill sand in two cylinders and also wants to wrap with orange paper around the curved surface of two cylinders as shown in the below figure. Diameter of cylinder A is 7 cm, and the height is 14 cm. Diameter of cylinder B is 14 cm and height is 7 cm.



Answer the following questions based on the above information:

7. Find the area of orange paper in Cylinder A.

(a) 308 cm^2 (b) 539 cm^2 (c) 1078 cm^2 (d) 616 cm^2

Ans: (a) 308 cm^2

CSA of cylinder A = $2\pi rh = 2 \times 22/7 \times 3.5 \times 14 = 308\ cm^2$

8. Find the area of orange paper in Cylinder B.

(a) 308 cm^2 (b) 539 cm^2 (c) 1078 cm^2 (d) 616 cm^2

Ans: (a) 308 cm^2

CSA of cylinder B = $2\pi r_1h_1 = 2 \times 22/7 \times 7 \times 7 = 308\ cm^2$

9. Find the volume of sand in Cylinder A.

(a) 308 cm^3 (b) 539 cm^3 (c) 1078 cm^3 (d) 616 cm^3

Ans: (b) 539 cm^3

Volume of cylinder A = $\pi r^2h = 22/7 \times 3.5 \times 3.5 \times 14 = 539\ cm^3$

10. Find the volume of sand in Cylinder B.

(a) 308 cm^3 (b) 539 cm^3 (c) 1078 cm^3 (d) 616 cm^3

Ans: (c) 1078 cm^3

Volume of cylinder B = $\pi r_1^2h_1 = 22/7 \times 7 \times 7 \times 7 = 1078\ cm^3$

SECTION – C

Questions 11 to 13 carry 2 marks each.

11. Subtract the following polynomials.
3xy + 5yz – 7xz + 1 from -4xy + 2yz – 2xz + 5xyz + 1
Ans:
3xy + 5yz - 7xz + 1 from -4xy + 2yz - 2xz + 5xyz + 1
= -4xy + 2yz - 2xz+5xyz +1-(3xy + 5yz - 7xz+1)
= -4xy + 2yz - 2xz+5xyz +1-3xy-5yz +7xz-1 = 5xz + 5xyz - 7xy-3yz

12. Find the height of the cylinder whose volume if 1.54 m^3 and diameter of the base is 140 cm.
Ans: Volume of cylinder = 1.54 $m^3$and Diameter of cylinder = 140 cm
Radius (r)= d/2 = 140/2 = 70 cm
Volume of cylinder = $\pi r^2 h \Rightarrow 1.54 = (22/7)\times 0.7\times 0.7\times h$
After simplifying, we get the value of h, which is,
$h = (1.54\times 7)/(22\times 0.7\times 0.7) \Rightarrow h = 1$ m

13. Find the value of *m* for which $5^m \div 5^{-3} = 5^5$
Ans: $5^m \div 5^{-3} = 5^5$
$5^{(m-(-3))} = 5^5$ [$\because a^m \div a^n = a^{m-n}$]
$\Rightarrow 5^{m+3} = 5^5$
Comparing exponents on both sides, we get m + 3 = 5
$\Rightarrow$ m = 5 – 3 $\Rightarrow$ m = 2

SECTION – D

Questions 14 to 17 carry 3 marks each.

14. Simplify: (a + b) (c – d) + (a – b) (c + d) + 2 (ac + bd)
Ans: (a + b) (c – d) + (a – b) (c + d) + 2 (ac + bd)
= (a + b) (c – d) + (a – b) (c + d) + 2 (ac + bd)
=(ac – ad + bc – bd) + (ac + ad – bc – bd) + (2ac + 2bd)
= ac – ad + bc – bd + ac + ad – bc – bd + 2ac + 2bd = 4ac

15. Simplify: $\dfrac{3^{-5}\times 10^{-5}\times 125}{5^{-7}\times 6^{-5}}$

Ans:

$$\frac{3^{-5}\times(10)^{-5}\times 125}{5^{-7}\times(6)^{-5}} = \frac{3^{-5}\times(2\times 5)^{-5}\times 125}{5^{-7}\times(2\times 3)^{-5}}$$

$$= \frac{3^{-5}\times 2^{-5}\times 5^{-5}\times 125}{5^{-7}\times 2^{-5}\times 3^{-5}}$$

$$= 3^{-5+5}\times 2^{-5+5}\times 5^{-5+7}\times 125$$

$$= 3^0\times 2^0\times 5^2\times 125 = 1\times 1\times 25\times 125 = 3125$$

16. Simplify the following expressions:
(i) (x + y + z)(x + y – z)
(ii) $x^2(x - 3y^2) - xy(y^2 - 2xy) - x(y^3 - 5x^2)$

Ans: (i) $(x + y + z)(x + y – z)$
$= x^2 + xy – xz + yx + y^2 – yz + zx + zy – z^2$
Add similar terms like xy and yx, xz and zx, and yz and zy. Then simplify and rearrange.
$= x^2 + y^2 – z^2 + 2xy$
(ii) $x^2(x – 3y^2) – xy(y^2 – 2xy) – x(y^3 – 5x^2)$
$= x^3 – 3x^2y^2 – xy^3 + 2x^2y^2 – xy^3 + 5x^3$
Now, add the similar terms and rearrange.
$= x^3 + 5x^3 – 3x^2y^2 + 2x^2y^2 – xy^3 – xy^3 = 6x^3 – x^2y^2 – 2xy^3$

17. Water is pouring into a cuboidal reservoir at the rate of 60 liters per minute. If the volume of reservoir is 108 m^3, find the number of hours it will take to fill the reservoir.
Ans: Given, the volume of the reservoir = 108 m^3
Rate of pouring water into cuboidal reservoir = 60 litres/minute
= 60/1000 m^3 per minute
Since 1 liter = (1/1000)m^3 = (60×60)/1000 m^3 per hour
Therefore, (60×60)/1000 m^3 water filled in reservoir will take = 1 hour
Therefore 1 m^3 water filled in reservoir will take = 1000/(60×60) hours
Hence, 108 m^3 water filled in reservoir will take = (108×1000)/(60×60) hours = 30 hours

SECTION – E

Questions 18 to 20 carry 4 marks each.

18. Simplify $7x^2(3x – 9) + 3$ and find its values for x = 4 and x = 6
Ans: $7x^2(3x – 9) + 3$
Solve for $7x^2(3x – 9)$
$= (7x^2 \times 3x) – (7x^2 \times 9)$ (using distributive law: a(b – c) = ab – ac)
$= 21x^3 – 63x^2$
So, $7x^2(3x – 9) + 3 = 21x^3 – 63x^2 + 3$
Now, for x = 4,
$21x^3 – 63x^2 + 3 = 21 \times 4^3 – 63 \times 4^2 + 3 = 1344 – 1008 + 3 = 336 + 3 = 339$
Now, for x = 6,
$21x^3 – 63x^2 = 21 \times 6^3 – 63 \times 6^2 + 3 = 2268 + 3 = 2271$

19. A road roller takes 750 complete revolutions to move once over to level a road. Find the area of the road if the diameter of a road roller is 84 cm and length 1 m.
Ans: Diameter of road roller, d = 84 cm
Radius of road roller, r = d/2 = 84/2 = 42 cm
Length of road roller, h = 1 m = 100 cm
Formula for Curved surface area of road roller = $2\pi rh$
$= 2\times(22/7)\times42\times100 = 26400$
Curved surface area of the road roller is 26400 cm^2
Again, Area covered by the road roller in 750 revolutions = 26400×750cm^2
= 1,98,00,000cm^2 = 1980 m^2 [∵ 1 m^2= 10,000 cm^2]
Hence the area of the road is 1980 m^2.

20. Express the following numbers in usual form.
(i) 5.325×10^{-6} (ii) 5.45×10^4 (iii) 7×10^{-8} (iv) 3.00201×10^9
Ans: (i) 0.000005325 (ii) 54500 (iii) 0.00000007 (iv) 3002010000