PM SHRI KENDRIYA VIDYALAYA GACHIBOWLI,GPRA CAMPUS,HYD-32
PRACTICE PAPER 2 (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. A cuboid has total surface area of 50 m2 and lateral surface area is 30 m2. Find the area of its base.
(a) 10 m² (b) 20 m² (c) 30 m² (d) 40 m²
Ans: (a) 10 m²
Total sufrace area of the cuboid = 50 m^2
Its lateral surface area = 30 m^2
Now, total surface area of the cuboid = 2 × (surface area of the base) + (surface area of the 4 walls)
⇒ 50 = 2×(surface area of the base) + (30)
⇒ 2 × (surface area of the base) = 50 − 30 = 20
∴ Surface area of the base = 20/2 = 10 m^2

2. If $\left(2^{3x-1}+10\right)\div 7=6$, then the value of x is
(a) 2 (b) 0 (c) 1 (d) -2
Ans: (a) 2
$\frac{\left(2^{3x-1}+10\right)}{7}=6\Rightarrow 2^{3x-1}+10=42\Rightarrow 2^{3x-1}=32=2^5\ \Rightarrow 3x-1=5\Rightarrow 3x=6\Rightarrow x=2$

3. The value of $\left(\frac{1}{2}\right)^{-2}+\left(\frac{2}{3}\right)^{-2}+\left(\frac{3}{4}\right)^{-2}$ is
(a) $\frac{289}{36}$ (b) $\frac{313}{72}$ (c) $\frac{27}{4}$ (d) $\frac{241}{36}$
Ans: (a) $\frac{289}{36}$

4. 13 x 10^{-7} Km is the standard form of which of the following _____ .
(a) 0.000000013 Km (b) 0.0000013 Km
(c) 0.000000000013 Km (d) 0.00000000013 Km
Ans: (b) 0.0000013 Km

5. The height of a cylinder whose radius is 7 cm and the total surface area is 968 cm2 is:
(a) 15 cm (b) 17 cm (c) 19 cm (d) 21 cm
Ans: (a) 15 cm
Total surface area = 2πr (h + r)
⇒ 968 = 2 x 22/7 x 7 (7+h)
⇒ h = 15 cm

6. A rectangular strip 25 cm × 7 cm is rotated about the longer side. Find the total surface area of the solid thus generated.
(a) 1480 cm² (b) 1408 cm² (c) 1840 cm² (d) 1804 cm²

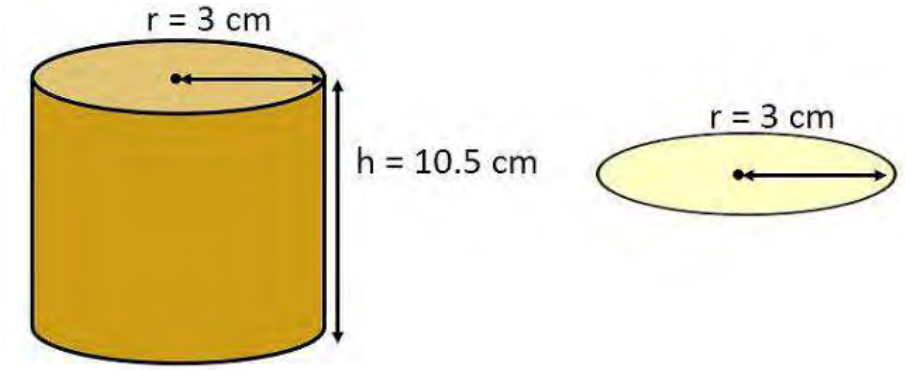
Ans: (b) 1408 cm^2
Dimension of rectangular strip = 25 cm × 7cm
When this strip is rotated about its longer side,
Height of cylinder becomes = 25 cm
Radius = 7 cm
∴ Total surface area of cylinder = 2πr (h+r)
= 2 × 22/7 × 7 (25 + 7) = 2 × 22/7 × 7 × 32 = 1408 cm^2

SECTION – B(CCT Questions)

Questions 7 to 10 carry 1 mark each.

CCT Question

The students of a Vidyalaya were asked to participate in a competition for making and decorating penholders in the shape of a cylinder with a base, using cardboard. Each penholder was to be of radius 3 cm and height 10.5 cm. The Vidyalaya was to supply the competitors with cardboard. There were 35 competitors to participate in this competition. The cost of cardboard is Rs. 20 per 10 square cm.



Based on the above situation, answer the following questions:

7. Find the lateral surface area of a pen holder.
(a) 196 cm^2 (b) 198 cm^2 (c) 96 cm^2 (d) 128 cm^2
Ans: (b) 198 cm^2
CSA of pen holder = 2πrh
= 2×(22/7)×3×10.5 = 198 cm^2

8. Find the total surface area of a penholder.
(a) 196/7 cm^2 (b) 1918/7 cm^2 (c) 196/7 cm^2 (d) 1584/7 cm^2
Ans: (d) 1584/7 cm^2
Surface area of a penholder = CSA of pen holder + area of base of penholder
= 2πrh + πr2
= 2×(22/7)×3×10.5 + (22/7)×32= 1584/7 cm^2

9. Find the Area of cardboard sheet used by 35 competitors.
(a) 1584 cm^2 (b) 7920 cm^2 (c) 1960/7 cm^2 (d) 1584/7 cm^2
Ans: (b) 7920 cm^2
Area of cardboard sheet used by 35 competitors = 35×1584/7 = 7920 cm^2

10. What is the cost of cardboard?
(a) Rs. 1584 (b) Rs. 3168 (c) Rs. 792 (d) Rs. 396
Ans: (a) Rs. 1584
Cost of 10 cm^2 cardboard = Rs. 20
Total cost of cardboard = Rs. 20 x 7920 / 10 = Rs. 1584

SECTION – C

Questions 11 to 13 carry 2 marks each.

11. A cuboidal vessel is 10 cm long and 5 cm wide. How high it must be made to hold 300 cm^3 of a liquid?

Ans: Volume of a liquid in the vessel = 300 cm^3
Length of a cuboidal vessel = 10 cm
Breadth of a cuboidal vessel = 5 cm
Let height of cuboidal vessel be 'h' cm
We know that, l × b × h = 300 cm^3
⇒ h = 300/(l × b) = 300/(10×5) = 6cm

12. The curved surface area of a cylindrical road is 132 cm^2. Find its length if the radius is 0.35 cm.

Ans: Curved surface area of cylindrical road =132 cm^2
Radius of road = 0.35 cm
Let length of road be 'h' cm
By using the formula, Curved surface area of cylindrical road = 2πrh
So, 2πrh = 132 ⇒ 2 × 22/7 × 0.35 × h = 132
⇒ h = 132×7 / 2×22×0.35
= 924 / 15.4 = 60cm
∴ Length of road is 60 cm.

13. Find the value of x for which $\left(\frac{5}{7}\right)^{-3} \times \left(\frac{5}{7}\right)^{-11} = \left(\frac{5}{7}\right)^{7x}$

Ans:

$$\left(\frac{5}{7}\right)^{-3} \times \left(\frac{5}{7}\right)^{-11} = \left(\frac{5}{7}\right)^{7x} \Rightarrow \left(\frac{5}{7}\right)^{-3+(-11)} = \left(\frac{5}{7}\right)^{7x} \Rightarrow \left(\frac{5}{7}\right)^{-14} = \left(\frac{5}{7}\right)^{7x}$$

$$\therefore \quad -14 = 7x \Rightarrow x = -\frac{14}{7} \Rightarrow x = \mathbf{-2.}$$

SECTION – D

Questions 14 to 17 carry 3 marks each.

14. A tea-packet measures 10 cm × 6 cm × 4 cm. How many such tea-packets can be placed in a cardboard box of dimensions 50 cm × 30cm × 0.2 m?

Ans: Dimensions of tea packet = 10 cm × 6 cm × 4cm
Dimension of cardboard box = 50cm × 30cm × 0.2 m
So, Number of tea packets can be put in cardboard box =
Volume of cardboard box / volume of tea packet
= (50 × 30 × 20) / (10 × 6 × 4)
= 125 tea packets

15. The circumference of the base of a cylinder is 88 cm and its height is 15 cm. Find its curved surface area and total surface area.

Ans: Circumference of base of cylinder = 88 cm
Height of cylinder = 15 cm
By using the formula, Circumference of base of cylinder = 2πr
So, 2πr = 88
⇒ 2 × 22/7 × r = 88

$\Rightarrow$ r = 88×7 / 44 = 616/44 = 14cm
Radius of cylinder = 14 cm
$\therefore$ Curved surface area of cylinder = $2\pi rh$
= 2 × 22/7 × 14 × 15 = 1320 cm^2
$\therefore$ Total surface area area of cylinder = $2\pi r\,(h+r)$
= 2 × 22/7 × 14 (15 + 14) = 2 × 22/7 × 14 × 29 = 2552 cm^2

16. By what number should $\left(\frac{5}{4}\right)^{-3}$ be divided so that the quotient may be $\left(\frac{15}{16}\right)^{-2}$?

Ans:
Let the required number be *x*. Then,

$$\left(\frac{5}{4}\right)^{-3} \div x = \left(\frac{15}{16}\right)^{-2} \Rightarrow \left(\frac{4}{5}\right)^{3} \times \frac{1}{x} = \left(\frac{16}{15}\right)^{2} \Rightarrow \left(\frac{4}{5}\right)^{3} = \left(\frac{16}{15}\right)^{2} \times x$$

$$\Rightarrow x = \left(\frac{4}{5}\right)^{3} \div \left(\frac{16}{15}\right)^{2} \Rightarrow x = \frac{64}{125} \div \frac{256}{225} \Rightarrow x = \frac{64}{125} \times \frac{225}{256} = \mathbf{\frac{9}{20}}$$

The required number is $\frac{9}{20}$.

17. In a stack, there are 5 books, each having a thickness of 20 mm and 5 paper sheets, each having a thickness of 0.016 mm. What is the total thickness of the stack?
Ans: Thickness of one book = 20 mm
Thickness of 5 books = 20×5 = 100 mm
Thickness of one paper = 0.016 mm
Thickness of 5 papers = 0.016×5 = 0.08 mm
Total thickness of a stack = 100+0.08 = 100.08 mm
= 1.0008 $\times 10^2$ mm

SECTION – E

Questions 18 to 20 carry 4 marks each.

18. What will happen to the volume of a cuboid if its:
(i) Length is doubled, height is same and breadth is halved?
(ii) Length is doubled, height is doubled and breadth is same?
Ans: Let us consider, Length of a cuboid be 'l'
Breadth of a cuboid be 'b'
Height of a cuboid be 'h'
So, Volume of a cuboid = l × b × h
(i) Length of a cuboid becomes = 2l
Breadth = b/2
Height = h
Volume of cuboid = 2l × b/2 × h = l × b × h (remains same)
(ii) Length of a cuboid becomes = 2l
Breadth = b
Height = 2h
Volume of cuboid = 2l × b × 2h = 4lbh (four times)

19. Simplify: (i) $\left[\left(\frac{2}{5}\right)^{-3}\right]^4$ (ii) $\left[\left(\frac{-6}{11}\right)^{-5}\right]^{-3}$ (iii) $\left(-\frac{2}{3}\right)^{-4} \times \left(\frac{1}{8}\right)^{-4}$ (iv) $\left(\frac{5}{7}\right)^{-1} \times \left(\frac{7}{3}\right)^{-1}$

Ans:

(i) $\left[\left(\frac{2}{5}\right)^{-3}\right]^4 = \left(\frac{2}{5}\right)^{-3\times 4} = \left(\frac{2}{5}\right)^{-12} = \left(\frac{\mathbf{5}}{\mathbf{2}}\right)^{\mathbf{12}}$.

$\because \left[\left(\frac{a}{b}\right)^m\right]^n = \left(\frac{a}{b}\right)^{mn}$ and $\left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m$

(ii) $\left[\left(\frac{-6}{11}\right)^{-5}\right]^{-3} = \left(\frac{-6}{11}\right)^{-5\times -3} = \left(\frac{\mathbf{-6}}{\mathbf{11}}\right)^{\mathbf{15}}$

(iii) $\left(-\frac{2}{3}\right)^{-4} \times \left(\frac{1}{8}\right)^{-4} = \left(-\frac{2}{3}\times\frac{1}{8}\right)^{-4} = \left(-\frac{1}{12}\right)^{-4} = \left(\frac{12}{-1}\right)^4$

$= (-12)^4 = (-1)^4\,(12)^4 = \mathbf{12^4}$.

$\because (-1)^4 = 1$

(iv) $\left(\frac{5}{7}\right)^{-1} \times \left(\frac{7}{3}\right)^{-1} = \left(\frac{5}{7}\times\frac{7}{3}\right)^{-1} = \left(\frac{5}{3}\right)^{-1} = \frac{\mathbf{3}}{\mathbf{5}}$.

20. Express the following numbers in standard form.

(i) 0.0000000000085

(ii) 0.00000000000942

(iii) 6020000000000000

(iv) 0.00000000837

Ans: (i) $0.0000000000085 = 8.5 \times 10^{-12}$

(ii) $0.00000000000942 = 9.42 \times 10^{-12}$

(iii) $6020000000000000 = 6.02 \times 10^{15}$

(iv) $0.00000000837 = 8.37 \times 10^{-9}$