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PRACTICE PAPER 1 (2023-24)

Mensuration, Exponents & Powers, Direct and Inverse Proportion

(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. A person has money to buy 25 cycles worth Rs 500 each. How many cycles he will be able to buy if each cycle is costing Rs 125 more?

(a) 20 (b) 30 (c) 25 (d) 30

Ans: (a) 20

Let x be the number of cycles bought if each cycle costs Rs 125 more.

Cost of a cycle (in Rs): 500 625

Number of cycles: 25 x

It is in inverse variation. Therefore, we get:$500 \times 25 = 625 \times x$

$\Rightarrow x = 500 \times 256 / 25 = 20$

$\therefore$ The required number of cycles is 20.

2. 100 persons had food provision for 24 days. If 20 persons left the place, the provision will last for

(a) 30 days (b) 96/5 days (c) 120 days (d) 40 days

Ans: (a) 30 days

100 persons have food provision for = 24 days

1 person will have food provision for = 24×100 = 2500 days

If 20 persons left the place, then the total left = 100-20 = 80 persons

Hence, 80 persons have food provision for = 2400/80 = 30 days

3. For a non-zero rational number a, $a^7 \div a^{12}$ is equal to

(a) a^5 (b) a^{-19} (c) a^{-5} (d) a^{19}

Ans: (c) a^{-5}

4. Cube of $-1/2$ is

(a) 1/8 (b) 1/16 (c) $-1/8$ (d) $-1/16$

Ans: (c) $-1/8$

5. The dimensions of a godown are 40 m, 25 m and 10 m. If it is filled with cuboidal boxes, each of dimensions 2 m × 1.25 m × 1 m, then the number of boxes will be

(a) 1800 (b) 2000 (c) 4000 (d) 8000

Ans: (c) 4000

Given that, the dimensions of the godown are 40 m, 25 m and 10 m

Volume = 40 m × 25 m × 10 m = 10000 m^3

Given that the volume of each cuboidal box is 2 m × 1.25 m × 1 m = 2.5 m^3

Hence, the total number of boxes to be filled in the godown = 10000/2.5 = 4000

6. A cube of side 4 cm is cut into 1 cm cubes. What is the ratio of the surface areas of the original cubes and cut-out cubes?
(a) 1 : 2 (b) 1 : 3 (c) 1 : 4 (d) 1 : 6
Ans: (c) 1: 4
Given: The cube side is 4cm
The side of cube 4cm is cut into small cubes, in which each of 1 cm
Therefore, the total number of cubes = 4 x 16 = 64 cubes
Thus, the number of cut-out cubes = 64/1
Now, the surface area of the cut-out cubes = c x 1 cm^2
The surface area of the original cube = 6 x 4^2
Hence, the required ratio obtained = 6 x 4^2 / = 64 x 6 = 1: 4

SECTION – B(CCT Questions)

Questions 7 to 10 carry 1 mark each.

CCT Question

Shanti Sweets and Snacks Stall was placing an order for making cardboard boxes for packing their sweets. Two sizes of boxes were required. The bigger of dimensions 25 cm × 20 cm × 5 cm and the smaller of dimensions 15 cm × 12 cm × 5 cm. For all the overlaps, 5% of the total surface area is required extra. The cost of the cardboard is Rs 4 for 1000 cm^2.

Based on the above situation, answer the following questions:

7. Find the total surface area of bigger box
(a) 630 cm^2 (b) 1480 cm^2 (c) 1460 cm^2 (d) 1450 cm^2
Ans: (d) 1450 cm^2
Total surface area of bigger box = 2(lb+lh+bh)
= [2(25×20+25×5+20×5)] = [2(500+125+100)] = 1450 cm^2

8. Find the total surface area of smaller box
(a) 630 cm^2 (b) 1480 cm^2 (c) 1460 cm^2 (d) 1450 cm^2
Ans: (a) 630 cm^2
Total surface area of the smaller box = [2(15×12+15×5+12×5)] cm^2
= [2(180+75+60)] cm^2 = (2×315) cm^2 = 630 cm^2

9. Find the total cardboard sheet required for both 250 boxes considering all overlaps.
(a) 546000 cm^2 (b) 165375 cm^2 (c) 546200 cm^2 (d) 165475 cm^2
Ans: (a) 546000 cm^2

Extra area required for overlapping bigger box = 1450×5/100 cm^2 = 72.5 cm^2
Extra area required for overlapping smaller box = 630×5/100 cm^2 = 31.5 cm^2
While considering all overlaps, the total surface area of the bigger box.
= (1450+72.5) cm^2 = 1522.5 cm^2
Area of cardboard sheet required for 250 such bigger boxes
= (1522.5×250) cm^2 = 380625 cm^2
The total surface area of 1 smaller box while considering all overlaps
= (630+31.5) cm^2 = 661.5 cm^2
Area of cardboard sheet required for 250 smaller boxes = (250×661.5) cm^2 = 165375 cm^2
Now, total cardboard sheet required = (380625+165375) cm^2 = 546000 cm^2

10. Find the cost of cardboard required for supplying 250 boxes of each kind
(a) Rs. 2584 (b) Rs. 2168 (c) Rs. 2192 (d) none of these
Ans: (d) none of these
Cost of 1000 cm^2 cardboard sheet = Rs. 4
Therefore, the cost of 546000 cm^2 cardboard sheet =Rs. (546000×4)/1000 = Rs. 2184
Therefore, the cost of cardboard required for supplying 250 boxes of each kind will be Rs. 2,184.

SECTION – C

Questions 11 to 13 carry 2 marks each.

11. The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. Calculate the ratio of their curved surface areas.
Ans: Let the radii of two cylinders be 2r and 3r, respectively, and their heights be 5h and 3h, respectively.
Let S_1 and S_2 be the curved surface areas of the two cylinder.
S_1 = Curved surface area of the cylinder of height 5h and radius 2r
S_2 = Curved surface area of the cylinder of height 3h and radius 3r
$\therefore S_1 : S_2 = 2\times\pi\times r\times h : 2\times\pi\times r\times h = \dfrac{2\times\pi\times 2r\times 5h}{2\times\pi\times 3r\times 3h} = 10:9$

12. The curved surface area of a cylinder is 1320 cm^2 and its base has diameter 21 cm. Find the height of the cylinder.
Ans: Let h be the height of the cylinder.
Given, Curved surface area, S = 1320 cm^2
Diameter, d = 21 cm $\Rightarrow$ Radius, r = 10.5
$\therefore S = 2\pi rh \Rightarrow 1320 = 2\pi \times 10.5 \times h \Rightarrow h = \dfrac{1320}{2\pi\times 10.5}$
$\Rightarrow h = 20$ cm

13. Express each of the following rational numbers with a positive exponent:
(i) $\left\{\left(\dfrac{3}{2}\right)^4\right\}^{-2}$ (ii) $4^3\times 4^{-9}$
Ans: (i) $(i)\left\{\left(\dfrac{3}{2}\right)^4\right\}^{-2} = \left(\dfrac{3}{2}\right)^{4\times -2} = \left(\dfrac{3}{2}\right)^{-8} = \left(\dfrac{2}{3}\right)^8$
$(ii) 4^3\times 4^{-9} = 4^{(3-9)} = 4^{-6} = \left(\dfrac{1}{4}\right)^6$

SECTION – D

Questions 14 to 17 carry 3 marks each.

14. The sum of the radius of the base and height of a solid cylinder is 37 m. If the total surface area of the solid cylinder is 1628 m^2, find the circumference of its base.

Ans: Let r and h be the radius and height of the solid cylinder.

Given, r + h = 37 m

Total surface area, S = 2πr(r + h)

⇒ 1628 = 2π × r × 37

$\Rightarrow r = = \frac{1628}{2\pi \times 37} = = \frac{1628 \times 7}{2 \times 22 \times 37} = 7$ m

Circumference of its base = 2πr = $2 \times \frac{22}{7} \times 7 = 44$ m

15. Simplify: $\left\{\left(\frac{2}{3}\right)^2\right\}^3 \times \left(\frac{1}{3}\right)^{-4} \times 3^{-1} \times 6^{-1}$

Ans:

$$\left(\left(\frac{2}{3}\right)^2\right)^3 \times \left(\frac{1}{3}\right)^{-4} \times 3^{-1} \times 6^{-1} = \left(\frac{2^2}{3^2}\right)^3 \times \frac{1}{(1/3)^4} \times \frac{1}{3} \times \frac{1}{6}$$

---> $((a/b)^n = a^n/(b^n))$ and $(a^{-n} = 1/(a^n))$

$$= \left(\frac{4}{9}\right)^3 \times \frac{1}{(1/81)} \times \frac{1}{3} \times \frac{1}{6} = \frac{4^3}{9^3} \times 81 \times \frac{1}{18}$$ ---> $((a/b)^n = a^n/(b^n))$

$$= \frac{64}{729} \times 81 \times \frac{1}{18} = \frac{64}{9} \times \frac{1}{18} = 64 \times \frac{1}{162} = \frac{64}{162} = \frac{32}{81}$$

16. If *a* and *b* vary inversely to each other, then find the values of *p, q, r*

a	6	8	*q*	25
b	18	*p*	39	*r*

Ans: Given that *a* and *b* vary inversely to each other.

⇒ ab = k (constant)

a	6	8	*q*	25
b	18	*p*	39	*r*

If *a* = 6 and *b* = 18, then

When *a* = 8, $b = p \Rightarrow k = ab = 6 \times 18 = 108$

When *a* = *q*, *b* = 39

$\therefore k = ab \Rightarrow 108 = 8 \times p \Rightarrow p = \frac{27}{2}$

When *a* = 25, *b* = *r*

$\therefore k = ab \Rightarrow 108 = 25 \times r \Rightarrow r = \frac{108}{25}$

17. A car can finish a certain journey in 10 hours at the speed of 48 km/hr. By how much should its speed be increased so that it may take only 8 hours to cover the same distance?

Ans: Let the increased speed be x km/h.

Time (in h): 10 8

Speed (km/h): 48 x+48

Since speed and time taken are in inverse variation, we get: 10 × 48 = 8(x + 48)

⇒ 480 = 8x + 384 ⇒ 8x = 480 − 384 ⇒ 8x = 96 ⇒ x = 12

Thus, the speed should be increased by 12km/h.

SECTION – E

Questions 18 to 20 carry 4 marks each.

18. (a) In a hostel of 50 girls, there are food provisions for 40 days. If 30 more girls join the hostel, how long will these provisions last?
(b) If 12 pumps can empty a reservoir in 20 hours, then find the time required by 45 such pumps to empty the same reservoir.
Ans: (a) Let x be the number of days with food provisions for 80 (i.e., 50+30) girls.
Number of girls: 50 80
Number of days: 40 x
Since the number of girls and the number of days with food provisions are in inverse variation, we have: $50 \times 40 = 80x \Rightarrow x = \frac{50 \times 40}{80} = \frac{2000}{80} = 25$
Thus, the required number of days is 25.
(b) Time taken by 12 pumps to empty a reservoir = 20 hr
Time taken by 1 pump to empty the reservoir = 20 × 12 = 240 hr
Hence, time taken by 45 pumps to empty the reservoir = 240/45 = (240×60)/45
= 14400/45 = 320 min = 5×69 + 20 min = 5 hours 20 min

19. How many planks each of which is 3 m long, 15 cm broad and 5 cm thick can be prepared from a wooden block 6 m long, 75 cm broad and 45 cm thick?
Ans: Length of the wooden block = 6 m = 6 ×100 cm = 600 cm (∵ 1 m= 100 cm)
Breadth of the block = 75 cm
Height of the block = 45 cm
Volume of block = length × breadth × height = 600 × 75 × 45 = 2025000 cm^3
Again, it is given that the length of a plank = 3 m = 3 ×100 cm = 300 cm (∵ 1 m= 100 cm)
Breadth = 15 cm, Height = 5 cm
Volume of the plank = length × breadth × height = 300 × 15 × 5 = 22500 cm^3
∴ The number of such planks = volume of the wooden block / voume of a plank
= 2025000 cm^3 / 22500 cm^3 = 90

20. Write the following numbers in the usual form:
(i) 4.83×10^7 (ii) 3.02×10^{-6} (iii) 4.5×10^4 (iv) 3×10^{-8}
Ans: (i) 4.83 x 10^7 = 4,83,00,000
(ii) 3.02 x 10^{-6} = 0.00000302
(iii) 4.5 x 10^4 = 45,000
(iv) 3 x 10^{-8} = 0.00000003