Sample Paper - 5

GENERAL INSTRUCTIONS

All questions are compulsory.
The question paper consist of 30 questions divided into four sections A, B, C and D. Section A comprises of 6 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each, Section C comprises of 10 questions of 3 marks each and Section D comprises of 8 questions of 4 marks each.
There is no overall choice.
Use of calculator is not allowed.

SECTION-A

(1 mark each)

1. Find cube root of 13824.

2. Factorise: $49x^2 - 36y^2$

3. Simplify: $\left(2^5 \div 2^8\right) \times 2^{-7}$.

4. Using contributive law, find the square of 43.

5. Is it possible to have a polyhedron with any given number of faces?

6. Add the following :

(a) $7a^2bc, -3abc^2, 3a^2bc, 2abc^2$

(b) $5x^2 - 3xy + 4y^2 - 9, 7y^2 + 5xy - 2x^2 + 13$

SECTION-B

(2 marks each)

7. Verify the following : $-\frac{5}{8} + \frac{3}{5} = \frac{3}{5} + \frac{-5}{8}$

8. The area of a parallelogram is 60 cm^2 and one of its altitude is 5 cm. Find length of the corresponding side?

9. Factorise the following :

(a) $x^2 + 9x + 20$ (b) $p^2 - 13p - 30$

10. Ramita bought a second hand two-wheeler for Rs. 15,000 and spent Rs. 500 on its repair. She sold it for Rs. 18,600. Find her loss or profit percent.

11. Square of $9x - 7xy$ is :

12. Find the square root of 784 by the long division method.

SECTION-C

(3 marks each)

13. Find five rational number between.

(a) $\frac{2}{3}$ and $\frac{4}{5}$ (b) $\frac{-3}{2}$ and $\frac{5}{3}$

(c) $\frac{1}{4}$ and $\frac{1}{2}$

14. In a fort, 300 men had provisions for 90 days. After 20 days, 50 men left the fort. How long would the food last at the same rate?

15. In a two digit number, digit in units place is twice the digit in tens place. If 27 is added to it, the digits are reversed. Find the number.

16. If $\frac{5m \times 5^3 \times 5^{-2}}{5^{-5}} = 5^{12}$, find m.

17. The length, breadth and height of a cuboidal reservoir is 7 m, 6 m and 15m respectively. 8400L of water is pumped out from the reservoir. Find the fall in the water level in the reservoir.

18. Construct the following quadrilaterals

LI=4 cm
IF=3cm
TL = 2.5 cm
LF = 4.5 cm
IT = 4 cm

19. How many 3 metre cubes can be cut from a cuboid measuring 18 m × 12 m × 9 m ?

20. The area of a rectangular field whose length is twice its breadth is 2450 m2. Find the perimeter of the field.

21. If $x - \frac{1}{x} = 9$, then find the value $x^2 + \frac{1}{x^2}$.

22. Find the amount which Ram will get on Rs. 4096, if he gave it for 18 months at $12\frac{1}{2}$ % per annum, interest being compounded half yearly.

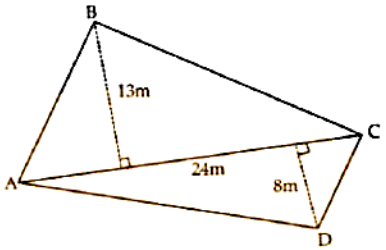
SECTION-D

(4 marks each)

23. Principal = Rs. 1000, rate = 8% per annum. Fill in the following table and find which type of interest (simple or compound) changes in direct proportion with time period.

Time period	1 Year	2 Years	3 Years
Simple Interest (in Rs.)			
Compound Interest (inRs.)			

24. Find the area of quadrilateral ABCD as shown in the figure.



25. Madhulika thought of a number, doubled it and added 20 to it. On dividing the resulting number by 25, she gets 4. What is the number?

26. Complete the following table.

Numbers	Associative for			
	Addition	Subtraction	Multiplication	Division
Rational numbers	...	...	...	No
Integers	...	...	Yes	...
Whole numbers	Yes	...	...	...
Natural numbers	...	No	...	...

27. The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the students were 540, answer the following questions.

(a) In which subject did the student score 105 marks?

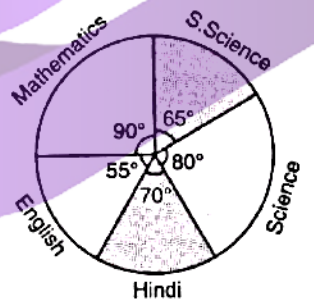
(**Hint**: for 540 marks, the central angle = 360°).

So, for 105 marks what is the central angle?

(b) How many more marks were obtained by the student in Mathematics than in Hindi?

(c) Examine whether the sum of the marks obtained in Social Science and Mathematics is more than that in Science and Hindi.

(**Hint**: Just study the central angles).



28. I borrowed Rs. 12000 from Jamshed at 6% per annum simple interest for 2 years. If I borrowed this sum at 6% per annum compound interest, what extra amount would I have to pay?

29. Factorise and divide:

$55(x^4 - 5x^3 - 24x^2) \div 5x(x-8)$

30. (a) Find $4x \times 5y \times 7z$

(b) First find 4x x 5y and multiply it by 7z; or first find $5y \times 7z$ and multiply it by 4x.

(c) Is the result the same? What do you observe?

(d) Does the order in which you carry out the multiplication matter?

Solutions

Section 'A'

(1 marks each)

1.

2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
1	

½

$\therefore \quad \sqrt[3]{13824} = 2\times2\times2\times3 = 24$ ½

2. $49x^2 - 36y^2 = (7x)^2 - (6y)^2$ ½

$= (7x+6y)(7x-6y)$

[using $a^2 - b^2 = (a+b)\ (a-b)$] ½

3. $\left(2^5 \div 2^8\right)\times 2^{-7} = \left(\frac{2^5}{2^8}\right)\times 2^{-7}$

$(2^{-3})\times 2^{-7} = 2^{-10}$

4. $43 = 40 + 3$

So, $43^2 = (40+3)^2$

$= (40 + 3)\ (40 + 3)$

$= 40(40 + 3) + 3(40 + 3)$

½

$= 40\times40 + 40\times3 + 3\times40 + 3\times3$

$= 1600 + 240 + 9$

$= 1849$

So, $43^2 = 1849$ ½

5. Yes, it is possible when the numbers of faces are greater than or equal to 4.

6. (a) $7a^2bc + (-3\,abc^2 + 3a^2bc + 2abc^2$

$\Rightarrow 7a^2bc - 3abc^2 + 3a^2bc + 2abc^2$

$\Rightarrow 10\ a^2bc - abc^2$ ½

(b) $\left[5x^2 - 3xy + 4y^2 - 9\right] + \left[7y^2 + 5xy - 2x^2 + 13\right]$

$\Rightarrow 5x^2 - 3xy + 4y^2 - 9 + 7y^2 + 5xy - 2x^2 + 13$

$\Rightarrow 3x^2 + 11y^2 + 2xy + 4$ ½

Section 'B'

(2 marks each)

7. Verification : L.H.S. $= -\frac{5}{8} + \frac{3}{5}$

$= \frac{-5\times 5 + 3\times 8}{40}$

$= \frac{-25+24}{40} = \frac{-1}{40}$

R.H.S. $= \frac{3}{5} + \frac{-5}{8}$

$= \frac{3\times 8 + (-5)\times 5}{5}$

$= \frac{24-25}{40} = -\frac{1}{40}$

$\therefore$ L.H.S. = R.H.S. Hence Verified.

8. Area of parallelogram $= 60\ cm^2$

altitude = 5 cm

Area = base × height

$60 = b \times 5$

b = 12 cm

Corresponding side is 12 cm. 2

9. (a) $x^2 + 9x + 20 = x^2 + (5+4)\ x + 20$

$= x^2 + 5x + 4x + 20$ ½

$= x(x+5) + 4(x+5)$

$= (x+5)(x+4)$ ½

(b) $p^2 - 13p - 30 = p^2 - (15-2)\ p - 30$

$= p^2 - 15p + 2p - 30$ ½

$= p(p-15) + 2\ (p-15)$

$= (p-15)(p+2)$ ½

10. Total Cost Price of the two-wheeler (C.P.)

= Rs. 15000 + overhead expenses

= Rs 15000 + Rs. 500

= Rs. 15500

Selling Price (S.P.) = Rs 18600

$\because$ $S.P. > C.P.$ = She got profit

1

$\therefore$ Profit = Rs. 18600 – 15500 = Rs. 3100

Now, Profit percent $= \frac{3100}{15500} \times 100\% = 20\%$

Thus, she eamed a profit of 20%. 1

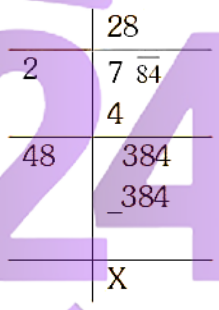
11. $(9x - 7xy)^2$

Using $(a-b)^2 = a^2 + b^2 - 2ab$ 1

$(9x)^2 + (7xy)^2 - 2 \times 9x \times 7xy$

$81x^2 + 49x^2y^2 - 126x^2y$ 1

12. Using division method.



Therefore, $\sqrt{784} = 28$ 2

Section 'C'

(3 marks each)

13. (a) $\frac{2}{3}$ and $\frac{4}{5}$

LCM of 3 and 5 is 15

$\therefore$ $\frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$ and $\frac{4}{5} \times \frac{3}{3} = \frac{12}{15}$

Again, $\frac{10}{15} \times \frac{4}{4} = \frac{40}{60}$ and $\frac{12}{15} \times \frac{4}{4} = \frac{48}{60}$

$\therefore$ Five rational numbers between $\frac{2}{3}$ and $\frac{4}{5}$ are

$\frac{41}{60}, \frac{42}{60}, \frac{43}{60}, \frac{44}{60}, \frac{45}{60}$. 1

(b) $\frac{-3}{2}$ and $\frac{5}{3}$

LCM of 2 and 3 is 6

$\therefore \quad \frac{-3}{2}\times\frac{3}{3}=\frac{-9}{6}$ and $\frac{5}{3}\times\frac{2}{2}=\frac{10}{6}$

$\therefore$ Five rational number between $\frac{-3}{2}$ and $\frac{5}{3}$ are

$\frac{-8}{6},\frac{-7}{6},0,\frac{1}{6},\frac{2}{6}$. 1

(c) $\frac{1}{4}$ and $\frac{1}{2}$ LCM of 4 and 2 is 4

$\frac{1}{4}\times\frac{1}{1}=\frac{1}{4}$ and $\frac{1}{2}\times\frac{2}{2}=\frac{2}{4}$

Again, $\frac{1}{4}\times\frac{8}{8}=\frac{8}{32}$ and $\frac{2}{4}\times\frac{8}{8}=\frac{16}{32}$

$\therefore$ Five rational numbers between $\frac{1}{4}$ and $\frac{1}{2}$ are

$\frac{9}{32},\frac{10}{32},\frac{11}{32},\frac{12}{32},\frac{13}{32}$. 1

14. (a) Since, the remaining days $=(90-20)$ days

$= 70$ days

But remaining number of men $= 300-50$

$= 250$

Let the number of days = x, then

Number of men	300	250
Number of days	70	x

1

Clearly less men will have food for more days.

Then, by inverse variation,

$\frac{300}{250}=\frac{x}{70}$

$x=\frac{70\times300}{250}$

$x=\frac{70\times6}{5}$

$x=14\times6$

$= 84$

Hence, the number of days = 84. 2

15. Let the tens place digit be x then the unit place digit $=2x$

Hence, two digit number $=10x+2x$

$= 12x$ 1

According to condition,

$12x+27=10\times 2x+x$ 1

$12x+27=20x+x$

$21x-12x=27$

$9x=27$

x = 3

Hence, two digit number $=12x=12\times 3$

= 36 1

16. $\frac{5^m\times 5^3\times 5^{-2}}{5^{-5}}=5^{12}$

$5^m\times 5^3-5^{-2}\times 5^5=5^{12}$

$5^m\times 5^{3-2+5}=5^{12}$ 1

$5^m\times 5^6=5^{12}$

$5^{m+6}=5^{12}$ 1

On comparing powers m + 6 = 12

$m=12-6$

m = 6 1

17. Here, l = 7 m, b = 6 m, h = 15 m

Volume of cuboid $= l\times b\times h$

$= 7\times 6\times 15$

$= 630\ m^3$ ½

Since, $1\ m^3 = 1000\ L$

$\therefore$ Capacity of water in reservoir $=630\times 1000$

= 630000 L ½

Since, 8400 L water 5 pumped out

$\therefore$ Water left in reservoir $= 630000-8400$

= 621600 L

$= 621.6\ m^3$ 1

$Water\ level = \frac{Volume}{Base\ Area}$

$=\frac{621.6}{7\times 6}$

= 14.8 m ½

Fall in water level = 15 – 14.8

= 0.2 m or 20 cm ½

18. Steps of construction :

(i) Draw IT = 4 cm

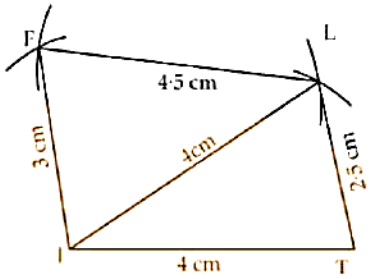
(ii) With I as centre and IF (= 3 cm) as radius, draw an arc.

(iii) With T as centre and TL (=2.5 cm) as radius draw an arc.

(iv) With I as centre and IL (= 4 cm) as radius draw an arc.

(v) With L as centre and LF (= 4.5 cm) as radius draw an arc to intersect the arc.

1



19. $\because$ Volume of cube $= (side)^3$

Given: side of cube = 3m

So, volume of cube $= (3)^3$

$= 27\ m^3$ 1

and Volume of cuboid = length × breadth × height

$=18\times12\times9\ m^3$ 1

$Therefore,\ Number\ of\ cubes = \dfrac{Volume\ (cuboid)}{Volume\ (cube)}$

$=\dfrac{18\times12\times9}{27}=72$ 1

20. Let the breadth of the field be x metres. Then, length of the field be 2x metres.

Therefore, area of the rectangular field

= length × breadth

$= (2x)(x)=(2x^2)\ m^2$ 1

Given that area is $2450\ m^2$.

Therefore, $2x^2 = 2450$

$x^2 = \dfrac{2450}{2}$

$x=\sqrt{1225}$

or x = 35 m 1

Hence, breadth = 35 m and length 35×2

= 70 m

Perimeter to the field $=2(l+b)$

$=2(70+35)\ m$

$=2\times105\ m$

= 210 m 1

21. $x-\dfrac{1}{x}=9$

Use the identity $(a-b)^2=a^2+b^2-2ab$ 1

$\left(x-\dfrac{1}{x}\right)^2=x^2+\dfrac{1}{x^2}-2\times(x)\times\left(\dfrac{1}{2}\right)$

$(9)^2=x^2+\dfrac{1}{x^2}-2$

$81+2=x^2+\frac{1}{x^2}$ 1

$83=x^2+\frac{1}{x^2}$ 1

22. Here, P = Rs. 4096

$R=12\frac{1}{2}\%=\frac{25}{2}\%=\frac{25}{4}$

(Compounded half yearly)

Time (n) = 18 month $=\frac{1}{2}$ years = 3 half years

$A = P\left(1+\frac{R}{100}\right)^n$

1

$=4096\left(1+\frac{25}{4\times100}\right)^3$

$=4096\left(1+\frac{1}{16}\right)^3$ 1

$=4096\times\frac{17}{16}\times\frac{17}{16}\times\frac{17}{16}$

= Rs. 4913 1

Section 'D'

(4 marks each)

23. Principal = Rs. 1000

Rate = 8%

Case I: t = 1 year

Simple Interest = $\frac{p\times r\times t}{100}=\frac{1000\times1\times8}{100}$

= Rs. 80

Compound Interest = $p\left(1+\frac{r}{100}\right)^t-p$

$=1000\left(1+\frac{8}{100}\right)-1000$

$=1000\left(\frac{108}{100}\right)-1000$

$=1080-1000$

= Rs. 80 1

Case II: t = 2 years

Simple Interest $= \frac{p \times r \times t}{100} = \frac{1000 \times 8 \times 2}{100}$

= Rs. 160

Compound Interest $= p\left(1+\frac{r}{100}\right)^t - p$

$=1000\left(1+\frac{8}{100}\right)^2 - 1000$

$=1000\left(\frac{100+8}{100}\right)^2 - 1000$

$=1000\left(\frac{108 \times 108}{100 \times 100}\right) - 1000$

$=\frac{108 \times 108}{10} - 1000$

$=1166.40 - 1000$

= Rs. 166.40 1

Case III: t = 3 years,

Simple interest $= \frac{p \times r \times t}{100} = \frac{1000 \times 8 \times 3}{100}$

=Rs. 240

Compound interest $= p\left(1+\frac{r}{100}\right)^t - p$

$=1000\left(1+\frac{8}{100}\right)^3 - 1000$

$=1000\left(\frac{108}{100}\right)^3 - 1000$

$=\frac{1000}{1000000}(1259712) - 1000$

$=1259.71 - 1000$

= Rs. 259.71 1

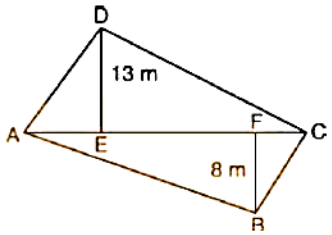
The table is:

Time period	1 year	2 year	3 years
S.I.	80	160	240
C.I.	80	166.40	259.71

24. Quadrilateral is divided into triangle.

Here, $h_1 = 13\ m$, $h_2 = 8\ m$

and AC = 24 m



Area of quadrilateral ABCD

$= \text{Area of } \Delta ADC + \text{Area of } \Delta ABC$

$= \frac{1}{2} \times b \times h_1 + \frac{1}{2} \times b \times h_2$

$= \frac{1}{2} \times 24 \times 13 + \frac{1}{2} \times 24 \times 8$

$= 12 \times 13 + 12 \times 8$

$= 156 + 96$

$= 252\ m^2$

The area of quadrilateral field $= 252\ m^2$. 2

25. Let the number be x

According to condition:

$\frac{2x + 20}{25} = 4$ 1

$2x + 20 = 25 \times 4$ ½

$2x + 20 = 100$

$2x = 100 - 20$ ½

$2x = 80$ ½

$x = \frac{80}{2}$

So, required number is 40. 1½

26.

Numbers	**Associative**			
	Addition	**Subtraction**	**Multiplication**	**Division**
Rational numbers	Yes	No	Yes	No
Integers	Yes	No	Yes	No
Whole numbers	Yes	No	Yes	No
Natural numbers	Yes	No	Yes	No

27.

Subject	**Centre angle**	**Marks obtained**
Hindi	70°	$\frac{70}{360} \times 540 = 105$
English	55°	$\frac{55}{360} \times 540 = 82.5$

Mathematics	90°	$\frac{90}{360}\times 540 = 135$
Social Science	65°	$\frac{65}{360}\times 540 = 97.5$
Science	80°	$\frac{80}{360}\times 540 = 120$

(a) In Hindi student score 105 marks. 2

(b) Marks scored in Mathematics = 135 ½

& Marks scored in Hindi = 105

$\because 135 - 105 = 30$

$\therefore$ 30 more marks were obtained by the students in Mathematics than in Hindi.

½

(c) Yes, Sum of marks obtained in Social Science & Mathematics $= 97.5 + 135 = 232.5$

Sum of marks obtained in Science & Hindi $= 120 + 105 = 225$

Hence, the sum of the marks obtained in Social Science & Mathematics is more than that in Science & Hindi. 1

28. Here, P = 12000, R = 6% p.a.

T = 2 years

$\text{S. I.} = \frac{P \times R \times T}{100}$

$= \frac{12000 \times 6 \times 2}{100} = \text{Rs. } 1440$

Amount (A) = P + S.I. = 12000 + 1440

2

= Rs. 13440

Again in second case,

$A = P\left(1 + \frac{R}{100}\right)^n$

$= 12000\left(1 + \frac{6}{100}\right)^2$

$= 12000\left(\frac{53}{50}\right)^2$

$= 12000 \times \frac{53}{50} \times \frac{53}{50}$

= Rs. 13483.20

I pay extra amount $= A_2 - A_1$

= Rs. 13483.20 – Rs.13440

= Rs. 43.20 2

29. $55\left(x^4 - 5x^3 - 24x^2\right) \div 5x\ (x-8)$

$55\left(x^4 - 5x^3 - 24x^2\right)$

$= 55\left[x^2(x^2 - 5x - 24)\right]$

$= 55[x^2(x^2+3x-8x-24)]$

$= 55\,[x^2(x+3)(x-8)]$

$= 5\times 11x^2(x+3)(x-8)$ 3

Now, Dividing by $5x(x-8)$

$\frac{5\times 11x^2(x+3)(x-8)}{5x(x-8)} = 11x(x+3)$ 1

30. (a) $4x\times 5y\times 7z$

$=(4\times 5\times 7)\times(x\times y\times z)$

$= 140\,xyz$

(b) $4x \times 5y$

$=(4\times 5)\times(x\times y)$

$= 20\,xy$

1

$20xy\times 7z$

$=(20\times 7)\times(xy\times z)$

$= 140xyz$ ...(i)

Now, $5y\times 7z$

$=(5\times 7)\times(y\times z)$

$= 35\,yz$

Secondly, $35yz\times 4x$

$=(35\times 4)\times(yz\times x)$

$= 140\,yzx$ *or* $140\,xyz$ ...(ii)

(c) Yes, the result is same. 1

(d) No, the order in which we carry out the multiplication does not matter. 1