

STATE OLYMPIAD MATH TEST-2023



State Olympiad

Foundation

ENGLISH MEDIUM

Question Paper Cum Answer Sheet

CLASS

7

Full Marks

100

Time:-

2 Hrs.

DATE:-...../...../2023

Name of Student:-.....

Class:- Roll No:-.

Name of Centre:-.....

:-INSTRUCTIONS:-

- Read the question paper carefully and answer.
- Give (✓) mark on the correct answer only.
- Use only blue or black ball pen.

Subject	Marks Obtained
Algebra	
Arithmetic	
Geometry	
Reasoning	

Signature of Student

Signature of Examiner

Signature of Invigilator



CLASS – VII
Arithmetic-30

1. Select the correct answer from the choices : -

5x1=5

(i) If 343 is the third proportion of a and b, where $b:a = 7:1$, then find the value of $a + b$?

- (a) 14 (b) 24 (c) 56 (d) 63

(ii) A train 200 m long running at 36 kmph takes 55 seconds to cross a bridge. The length of the bridge is -

- (a) 375 m (b) 300 m (c) 350 m (d) 325 m

(iii) $\sqrt{1\frac{9}{16}} - \sqrt{1\frac{7}{9}} = \underline{\hspace{1cm}} ?$

- (a) $\frac{1}{12}$ (b) $\frac{2}{3}$ (c) $-\frac{2}{3}$ (d) $-\frac{1}{12}$

(iv) For 20 students, the mess bill for 12 days is Rs. 7000/- .In how many days will the mess charges be Rs. 49000/- ?

- (a) 48 (b) 36 (c) 24 (d) 42

(v) If the volume of a cube is 512 cc, then its surface area is

- (a) 384 cm^2 (b) 512 cm^2 (c) 216 cm^2 (d) None of these

2. Answer the following questions:-

5x2=10

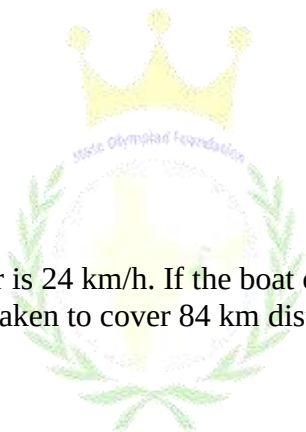
(i) A and B shared money in the ratio $1\frac{2}{3} : 2\frac{1}{3}$, What is the total money if B got Rs 210?

(ii) Area of a parallelogram with side 20 m is 100m^2 . Find its corresponding height?

(iii) A man covers half of his journey at 6 km/h and the remaining half at 3 km/h. What is his average speed?

(iv) How much of a 20% acid solution would a chemist have to mix with one liter of a 40% acid solution to yield a 36% acid solution?

(v) Solution A is 50% acid and solution B is 80% acid. How much of each should be used to make 100 cc of a solution that is 68% acid?



3. Answer the following questions

5x3=15

(i) The speed of a boat in still water is 24 km/h. If the boat covers a distance of 80 km upstream in 4 hours, then find the time taken to cover 84 km distance in downstream.

(ii) In a fraction, the numerator is 5 less than the denominator. If 1 is deducted from both the numerator and the denominator, the fraction becomes $\frac{1}{2}$. Find the fraction.

(iii) The ratio of income and expenditure is 7:5. Income increases by 50% and expenditure decreases by 20%. If the initial expenditure is Rs 15000, find the final savings.

(iv) The income of X is 60 % more than Y's income and the income of Y is 40 % more than Z's income. X's income is how much % more than Z's income?

(v) In a bag, the number of 10 rupees notes, 20 rupees notes, and 50 rupees notes are in the ratio 5:4:3. The total value of the notes in it is 560 rupees. Find the number of 10 rupees notes in it.

Numerical / Algebraic ability-30

1. Select the correct answer from the choices:-

5x1=5

(i) $112 \times 5^4 = ?$

(a) 67000 (b) 70000 (c) 76500 (d) 77000

(ii) What least number must be added to 1056, so that the sum is completely divisible by 23 ?

(a) 2 (b) 3 (c) 18 (d) 21

(iii) Find the missing digit so the number $245*642$ is divisible by 11.

(a) 4 (b) 7 (c) 2 (d) 7

(iv) If $x - \frac{1}{x} = 6$, then find the value of $x^2 + \frac{1}{x^2}$

- (a) 34 (b) 40 (c) 38 (d) None of these

(v) If $2^x = 3^y = 6^z$, then $\frac{1}{x} + \frac{1}{y} - \frac{1}{z} = \underline{\hspace{1cm}}?$

- (a) $\frac{2}{x}$ (b) $\frac{2}{y}$ (c) $\frac{2}{z}$ (d) 0

2. Answer the following questions:-

5x2=10

(i) If $2^{n+2} = 1024$ then find $(n + 8)^{\frac{1}{3}}$

(ii) If seven times a number is added to one-fifth of itself, then five-sixth of the sum is equal to 30. Find the number.



(iii) Write the condition for $(x^2 - 1) \div (x + 1) = x - 1$

(iv) Which is the greatest among: $(2)^{198}$, $(8)^{64}$, $(4)^{100}$, $(16)^{49}$

(v) If $x^2 - px + p^2$ is a perfect square and 'p' is an integer, find the possible values of 'p'.

3. Answer the following questions:-

5x3=15

(i) Find the value: $\left[\left[\frac{x}{y} \right]^{\sqrt{54}-\sqrt{57}} \right]^{\sqrt{57}+\sqrt{54}}$ where $x=2, y=3$



(ii) Factorize: $x^4 + x^2y^2 + y^4$

(iii) The length of the rectangle exceeds its breadth by 3 cm. If the length and breadth are each increased by 2 cm, then the area of new rectangle will be 70 sq. cm more than that of the given rectangle. Find the length and breadth of the given rectangle.

(iv) If $x = \frac{2}{3} + \frac{3}{2}$ and $y = \frac{2}{3} - \frac{3}{2}$ Find the value of $x^4 - y^4$



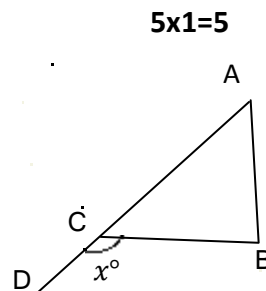
(v) Rabi has a total of Rs 1040 as currency notes in the denomination of 10, 20 and 50. The ratio of the number of ` 10 notes and ` 20 notes are 2:5. If she has a total of 30 notes, how many notes of each denomination she has.

Geometry-20

1. Select the correct answer from the choices:-

(i) In the figure, $\angle ABC = 80^\circ$ and $AC=BC$. Then find x°

- (a) 45° (b) 160° (c) 120° (d) 135°



(ii) The sides of a triangle are 5, 12 & 13 units. The type of triangle is-

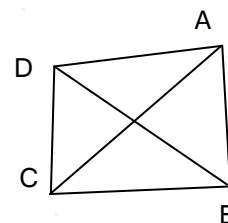
- (a) Obtuse angled (b) Right angle (c) Acute angled (d) can't say

(iii) Two complementary angles are in the ratio 4:5, Find their difference -

- (a) 90° (b) 40° (c) 50° (d) 10°

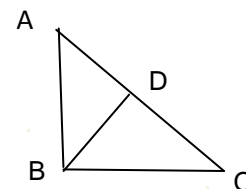
(iv) In the given figure ABCD is a trapezium $AD \parallel BC$
If $\angle ABC = 70^\circ$, $\angle BAC = 50^\circ$, then find $\angle DAC$ -

- (a) 30° (b) 45° (c) 40° (d) 60°



(v) In the figure BD is the altitude drawn to AC . $\triangle ABD \cong \triangle CBD$ if

- (a) $AB=BC$ (b) $AD=CD$
(c) Either (a) or (b) (d) None of these

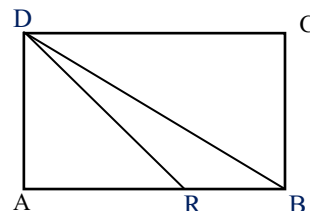


2. Answer the following questions:-

(i) How many excircles can be drawn for a triangle?

(ii) Centroid of a triangle divides its median in the ratio of _____ From the vertex.
(Fill in the gaps)

(iii) In the given figure, ABCD is a rectangle, $\angle DRB = 110^\circ$ Find the $\angle RDA$.



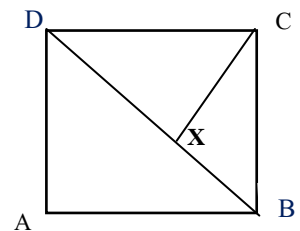
(iv) If a triangle ABC, $AB=BC$ and $\angle B = 60^\circ$, find the angle A.

(v) In an n- sided regular polygon, each exterior angle is 72° . Find the sum of all interior angles of the polygon.

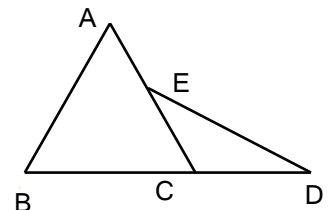
3. Answer the following questions:-

5x2=10

(i) In the figure ABCD is a square of area 96 square cm. If $DX:XB= 3:1$. Find the area of triangle BXC.



(ii) In figure aside, $BC = AC$, $CD = CE$ If $\angle ABC = 50^\circ$, find $\angle CED$



(iii) Construct a triangle ABC whose angles are in the ratio 1:2:3 and the least side is 3 cm.

(iv) Construct a rhombus PQRS with diagonal PR=4 cm and QS = 3 cm



(v) One angle of a parallelogram is thrice its adjacent angle. If any adjacent sides are 3 cm and 4 cm. Draw the parallelogram

Reasoning-20

1. Select the correct answer from the choices:-

5x1=5

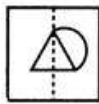
(i) All the faces of a cube are painted with blue colour. If it is cut into 125 small equal cubes how many small cubes will be formed having two face coloured?

- (a) 6 (b) 4 (c) 8 (d) 12

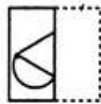
(ii) In a certain code, EAT is written as 318 and CHAIR is written as 24156. What will TEACHER be written as ?

- (a) 8312346 (b) 8321436 (c) 8312436 (d) 8313426

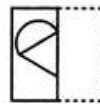
(iii) Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet (x) is folded at the dotted line.



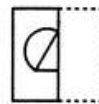
(x)



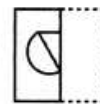
(a)



(b)

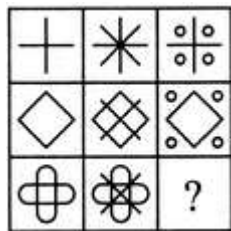


(c)

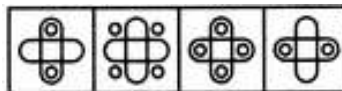


(d)

(iv) From amongst the figures marked (a), (b), (c) and (d), select the figure which satisfies the same conditions of placement of the dots as in figure (X).



(X)



(a)

(b)

(c)

(d)

(v) Find the missing character in place of “?”

3, 6, 18, 36, 108, 216, ?

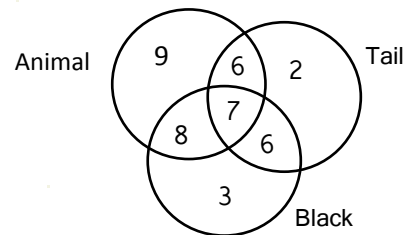
- (a) 502 (b) 458 (c) 648 (d) 442

2. Answer the following questions:

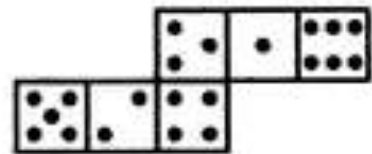
5x1=5

(i) In a class of 45 students, Sohan is placed eighth from the bottom, whereas Mohan is placed tenth from the top. Rohan is placed exactly in between the two. What is Rohan's position from Mohan?

(ii) In the given figure, which number represents black animals which do not have tail?



(iii) How many dots lie opposite to the face having three dots, when the given figure is folded to form a cube?



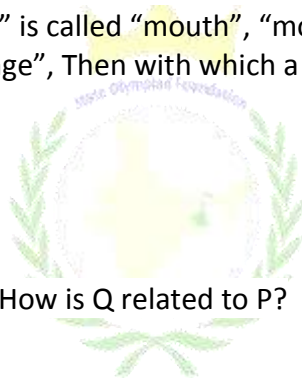
(iv) If DELHI is written as EDMGJ in a certain code. How is NEPAL written in that code?

- (v) Anandi walks 24 m east from point A and reaches point B. From point B she takes left turn and walks 8 m and then she takes right turn and walked 12 m and again she takes right turn and walks 14 m and again takes right turn and reaches point M. If it is given that the starting point is in north from point where she ends her journey, then what is the distance between the points A and M?

3. Answer the following questions:-

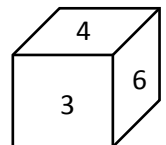
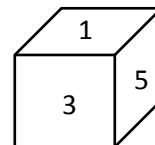
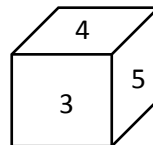
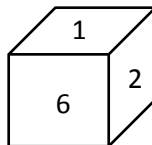
5x2=10

- (i) If “eye” is called “hand”, “hand” is called “mouth”, “mouth” is called “ear”, “ear” is called “nose”, “nose” is called “tonge”, Then with which a person can hear?



- (ii) P's father's Sister's father is Q. How is Q related to P?

- (iii) From the positions of a cube which letter will be on the face opposite to face with '1' and '5'?



(iv) Some boys are sitting in three rows and the distance between each row is 4 m. All of them are facing north such that Damu is in the middle row, Kanu is 6 m to the right of Damu but in the same row. Neer is just behind Kanu while Golu is in the North of Damu. What is the shortest distance between Neer and Golu?

(v) One morning Uday and Vishal were talking to each other face to face at a crossing. If Vishal's shadow was exactly to the left of Uday, which direction was Uday facing?

Rough Work