Please check the examination details below before entering your candidate information

Candidate Name	Class	Section

BLOOM Reasoning & Aptitude Olympiad (BRAO)

Question Paper 2023-24

Class 12

Total Questions **50 + 5** (Tie-Breaking Section)

Total Time Allotted : 60 minutes	**Total Marks** 60

Instructions

1. There are **50 Multiple Choice Questions** in this booklet having 4 options out of which **ONLY ONE** is correct.
2. There are two sections in the Question Paper; Section 1 having 40 Questions carrying 1 Mark each & Section 2 having 10 Higher Difficulty Order Questions carrying 2 Marks each.
3. All questions are compulsory. There is **NO negative** marking for incorrect answers.
4. Total time allotted to complete the paper is 60 minutes.
5. Please fill in your details in the space provided on this page before attempting the paper.

OMR Sheet Instructions

1. Before starting the paper, fill in all the details in the OMR Sheet.
2. Additional 10 minutes will be provided to fill up the OMR sheet, before the start of the exam.
3. Use HB Pencil to darken the circle of the correct Option in OMR sheet. The correct way to darken the circle in OMR sheet is shown below.

   ● ○ ○ ○
4. Use black or blue ball point pen/HB pencil to fill the information in the OMR sheet. Partially filled OMR sheet will not be checked.
5. Return the OMR sheet to the invigilator after the exam.

CODE #1

R12

BLOOM CAP

Founded by | arihant

Bloom Reasoning & Aptitude Olympiad Class 12

Section 1 (1 Mark)

1. 'Cataract' is related to 'eyes' in the same way 'Gout' is related to .....

(a) Joints (b) Heart
(c) Liver (d) Hair

2. Select the group of numbers in the option which share the same relationship as given in the group of numbers in the question.

(12, 144, 1728)
(a) (13, 169, 2028)
(b) (18, 36, 72)
(c) (11, 121, 1331)
(d) (19, 685, 921)

3. The number of rational numbers between $\frac{1}{2}$ and $\frac{1}{4}$ are

(a) Infinite (b) 0
(c) 3 (d) 4

4. The largest value of y for which $5y793y4$ is divisible by 3 is

(a) 9 (b) 7
(c) 4 (d) 3

5. Find the next term in the given series.

G13T, F15U, E17V, ?
(a) D 19 W (b) W21D
(c) C19D (d) D19F

6. Choose the group of letters which will complete the following series.

b_ _ o m _ l _ _ m b l _ o _
(a) l o b b m o b (b) l o b o o o m
(c) l b b m o o n (d) b o o l m b b

7. A 4-digit number $1pq7$ is divisible by 11, what is the value of $p - q$?

(a) –2 (b) –8
(c) –6 (d) –4

8. By what least number 2400 be multiplied so that it becomes a perfect square?

(a) 6 (b) 3
(c) 5 (d) 13

9. Identify the odd group of letters

(a) Sodium
(b) Potassium
(c) Magnesium
(d) Radium

10. Identify the odd pair of numbers.

(a) 19 : 362 (b) 14 : 197
(c) 17 : 290 (d) 11 : 123

11. Two rods of length 1.5 m and 1.2 m are to be cut into two equal pieces without leaving any extra length. The greatest length of the rod pieces of same size which can be cut from these two lengths be

(a) 0.3 m (b) 0.15 m
(c) 0.21 m (d) None of these

12. The ratio of incomes of Raju and Sahaj is 4 : 5 and that of their expenditure is 2 : 3. If each of them saves ₹ 5000, then what is the income (in ₹) of Sahaj?

(a) 18100 (b) 13600
(c) 10000 (d) 12500

13. If in a certain code language 'FREE' is written as 136 and 'MEND' is written as 144, then how will 'CAKE' be written in that code language?

(a) 110 (b) 80
(c) 90 (d) 100

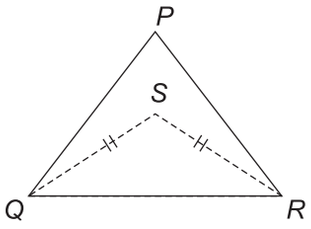
14. If in a certain code language 'GOING' is written as '@ β γ δ @' and 'KITE' is written as 'θ γ Δ *' then how will 'KING' be written in that code language?

(a) θ γ δ @ (b) @ δ γ θ
(c) δ γ β * (d) θ γ Δ @

15. The average height of 25 persons is increased by 3 inches when one of them whose height is 80 inches is replaced by a new person. What is the height of the new person?

(a) 90 inches (b) 158 inches
(c) 200 inches (d) 155 inches

16. In the given figure,



$PQ = PR$ and $QS = SR$, then
$\angle PQR : \angle PRQ$ is equal to

(a) 1 : 1 (b) 2 : 1 (c) 1 : 2 (d) 3 : 1

17. Arrange the following words in a meaningful sequence.

Asia, India, Universe, Earth, Galaxy
(1) (2) (3) (4) (5)
Solar System
(6)

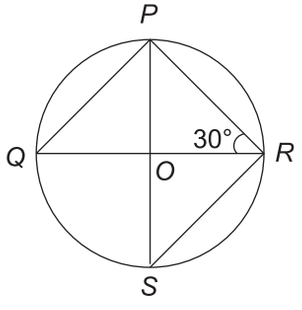
(a) 2,1,4,6,5,3 (b) 1,2,4,5,6,3
(c) 1,4,5,6,3,2 (d) None of these

18. If all the letters of the word

'PREDOMINANT' are arranged in alphabetical order, then how many letters will remain at the same position?

(a) one (b) two
(c) three (d) None of these

19. In the given figure,



QOR is the diameter of the circle with center O. If $\angle QRP = 30°$, then $\angle RSP$ is equal to

(a) 60° (b) 35° (c) 49° (d) 80°

20. A silver wire is bent in the form of an equilateral triangle and has area of $121\sqrt{3}$ cm^2. If the same wire is bent in the form of a circle, then the area (in cm^2) enclosed by the wire is

(a) 345 (b) 346.5
(c) 348 (d) 742

21. In the evening Akshay and Shivam are sitting in a park with their backs facing each other back. If the shadow of Akshay falls to the right of the Shivam, then which side is Akshay facing?

(a) West (b) North
(c) East (d) South

22. Paras runs 2 km East, then 3 km South, then 5.5 km West, then 4 km North and then 3.5 km East. Where is he now with reference to the starting position?

(a) 5 km North (b) 6 km South
(c) 1 km North (d) 7 km South

23. The volume of air in a room is 204 m^3. The height of the room is 4 m. What is the area (in m^2) of the floor?

(a) 51 (b) 53
(c) 55 (d) 40

24. The radius and volumes of a cone and sphere are equal. The ratio of diameter of sphere to the height of cone is

(a) 1 : 2 (b) 2 : 3
(c) 1 : 3 (d) 3 : 2

25. Aman sells two cows for ₹ 1000 each, one at a loss of 15% and another at the profit of 15%. Then, the loss/gain percentage in overall transaction is

(a) 2.25% (loss)
(b) 3% (loss)
(c) 4% (gain)
(d) No profit, no loss

26. The rate of interest at which the simple interest for $12\frac{1}{2}$ yr become 3 / 4 of the sum is

(a) 5% (b) 6% (c) 7% (d) 8%

27. Pointing to Kanan, Aman said, 'His father is the husband of my father's father daughter'. How is Aman's father related to Kanan's mother?

(a) Father (b) Husband
(c) Son (d) Brother

28. The height of Ashish and Baman are equal, Chaman is shorter than Ashish, Daman is shorter than Elesh, but taller than Baman. Who is the tallest of all?

(a) Baman (b) Chaman
(c) Daman (d) Elesh

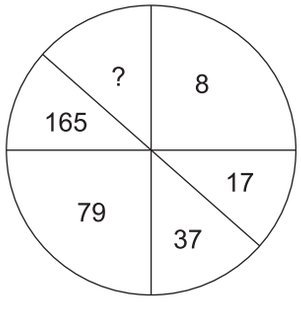
29. The distance between the points P(a, 0) and $Q(0, b)$ is

(a) $\sqrt{a^2+b^2}$ units (b) $\sqrt{2ab}$ units
(c) $\sqrt{b^2-a^2}$ units (d) $\frac{2\sqrt{ab}}{3}$ units

30. If $a = \frac{1}{2+\sqrt{3}}$ and $b = \frac{1}{2-\sqrt{3}}$, then find the value of $\frac{1}{a+1}+\frac{1}{b+1}$

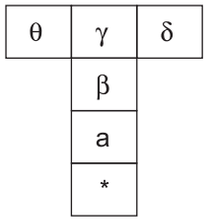
(a) $\sqrt{3}$ (b) 1
(c) $\frac{1}{\sqrt{3}}$ (d) $\frac{1}{2}$

31. Find the missing number in the given figure



(a) 231 (b) 339 (c) 327 (d) 321

32. A cube is made by folding the given sheet of paper. In the cube so formed, what would be the symbol on the opposite side of '*' ?



(a) β (b) γ
(c) *a* (d) θ

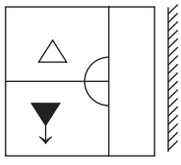
33. In how many different ways the letter of the word 'MISTER' be arranged?

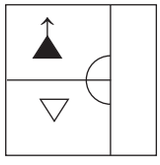
(a) 720 (b) 610
(c) 210 (d) 320

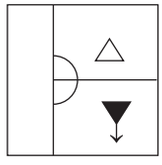
34. Cards numbered from 1 to 20 are properly mixed in a bag. What is the probability of choosing a card which bears the number divisible by 4 ?

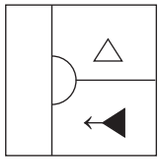
(a) $\frac{1}{4}$ (b) $\frac{2}{7}$
(c) $\frac{1}{20}$ (d) $\frac{1}{10}$

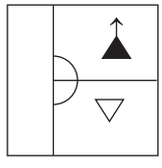
35. Choose the correct mirror image of the following figure



(a) 

(b) 

(c) 

(d) 

36. What will be the value of the following expression if '+' and '×' and 15 and 11 interchange their places

$17 \times 15 + 3 - 11 \div 3$

(a) 45 (b) 49
(c) 52 (d) 62

37. If $\sin A + \cos A = \sqrt{3}\cos(90° - A)$, then what is the value of $\tan A$?

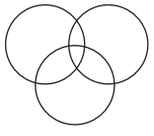
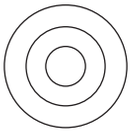
(a) $\sqrt{3} - 1$ (b) $\sqrt{3} + 1$
(c) $\frac{\sqrt{3}+1}{2}$ (d) $\frac{\sqrt{3}-1}{2}$

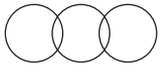
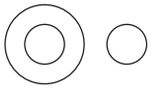
38. The shadow of a tree is 30 m when the sun's altitude is 60°, what is the length of the shadow when sun's altitude is 30°?

(a) $30\sqrt{3}$ m (b) 90 m
(c) $\frac{90}{\sqrt{3}}$ m (d) $90\sqrt{3}$ m

39. Select the venn diagram that will best depict the relationship between

Mathematician, Scientist, Females

(a)  (b) 

(c)  (d) 

40. Read the following statement and choose the conditions that follow.

Statements Some Parrots are Pigeons

All Pigeons are Pears

All Parrots are Cars.

Conclusions

I. All Cars are Pigeons

II. Some Cars are Parrots

III. Some Pears are Pigeons

(a) Only I follows
(b) Only II and III follow
(c) All I, II and III follow
(d) Only I and II follow

Section 2 (2 Marks)

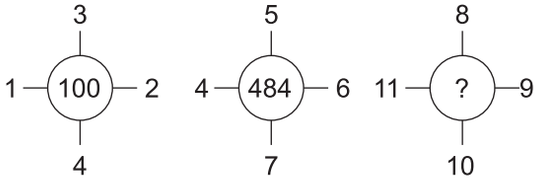
41. If $p^3 + q^3 = 341$ and $pq = 30$, then the value of $p + q$ is

(a) 1 (b) 9 (c) 7 (d) 11

42. At what point does the line $4x - 5y = 10$ cuts the Y-axis?

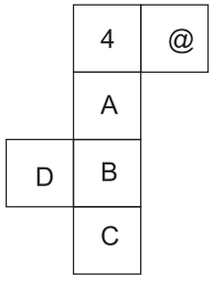
(a) (–5, 0) (b) (0, 5)
(c) (0, 2) (d) (0, – 2)

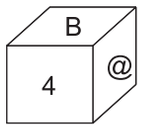
43. Find the missing term in the following figure

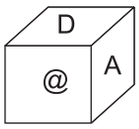


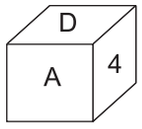
(a) 1444 (b) 4144
(c) 2197 (d) 7129

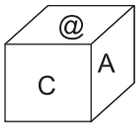
44. Choose the box that is similar to the box formed from the given sheet of paper



(a) 

(b) 

(c) 

(d) 

45. Which of the following options follows from the question

Statement A < B < C = D > E > F > G

Conclusions I. E < C II. F = A

(a) Only I follows

(b) Only II follows

(c) Both I and II follow

(d) None follows

46. P + Q means 'P is the father of Q', 'P ÷ Q' means 'P is the wife of Q'

If X ÷ Y + Z + A, then which of the following statements is not correct?

(a) Z is the father of A

(b) X is maternal grand father of A

(c) Y is paternal grand father of A

(d) Z is the son of X

47. In a row of 37 boys, Alex is 15th from the left end. If he is shifted six places to the right, then what is his position from the right end?

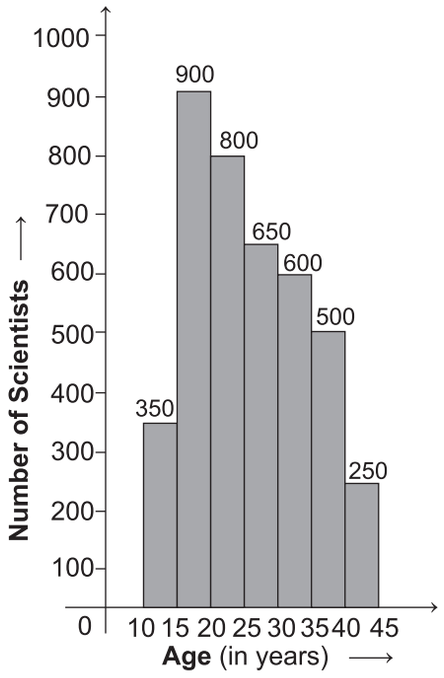
(a) 18th

(b) 21st

(c) 20th

(d) 17th

Directions (Q. Nos. 48-50) *The following histogram of data is related to number of scientists and their age group in a country 'X '*



48. The total number of scientists in the age group 15 – 45 yr is

(a) 3700 (b) 2000 (c) 1900 (d) 1800

49. The percentage of scientists in the age group 30-45 yr is

(a) 33.33% (b) 40.18%

(c) 32.9% (d) 36%

50. The number of scientists in the age group 20-35 yr is

(a) 1100 (b) 2050 (c) 1000 (d) 1050

Tie-Breaking Section

Instructions

1. This section consists of 5 Questions.
2. The score achieved in this section will not be included in the total marks.
3. If overall marks of two or more students are same, winner will be decided based on the score in this section.
4. Participation in this section is optional, and students may choose to attempt it or not.

1. (i) If A * B means, A is to the left of B at 5 m

(ii) If A # B means, A is to the South of B at 3 m

(iii) If A @ B means, A is to the right of B at 2 m

(iv) A %B means A, is to the North of B at 4 m

if P@Q%R#S@T, then in which direction T is with respect to R.

(a) North (b) East

(c) South (d) North-West

Directions (Q. Nos. 2 and 3) *Study the following information and answer the given questions.*

Vimal, Ujjwal, Tarun are seated in a circle facing center. Arun, Baman and Chaman are also seated in the same circle, but two of them are not facing center (opposite to center). Vimal is second to the left of Chaman. Ujjwal is second to the right of Arun. Baman is third to the left of Tarun. Chaman is second to the right of Tarun. Arun is next to Vimal.

2. What is the position of Arun with respect to Baman?

(a) Second to the left

(b) Third to the right

(c) Second to the right

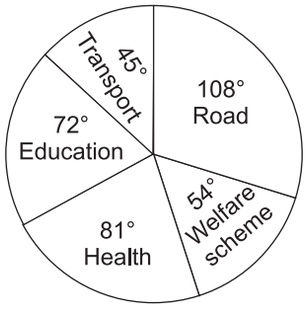
(d) Third to the left

3. Who is sitting third to the right of Chaman?

(a) Vimal (b) Ujjwal

(c) Tarun (d) Arun

Directions (Q. Nos. 4 and 5) *The given pie-chart represents the money alloted by government for different developmental project. Total amount allotted is ₹ 40000 crores*



4. The amount proposed for roads are more than that on education by

(a) 7.5% (b) 50%

(c) 12% (d) 12.5%

5. The amount proposed (in ₹ crores) on transport is less than that on education by

(a) 3000 (b) 3500

(c) 2000 (d) 2500