

BHAVAN'S MATHEMATICS OLYMPIAD (BMO) – 2023

Question Paper & Complete Solutions

Class: 5

Subject: Mathematics

Time Allowed: 1 Hour

Total Marks: 50

General Section (Questions 1 to 40 — 1 Mark Each)

Q1. 4 times of a quarter litre =

1 Mark

- a) 2 litre b) 1 litre c) 500 ml d) None of these

Answer: b) 1 litre — Quarter litre = 250 ml = $\frac{1}{4}$ litre. Thus, $4 \times (\frac{1}{4} \text{ litre}) = 1 \text{ litre}$.

Q2. 3 tenths 2 hundredths is written as

1 Mark

- a) 0.23 b) 0.032 c) 0.302 d) 0.32

Answer: d) 0.32 — 3 tenths = 0.3, 2 hundredths = 0.02. Sum = $0.3 + 0.02 = 0.32$.

Q3. If your school is celebrating its silver jubilee, how many years has it completed?

1 Mark

- a) 50 years b) 10 years c) 25 years d) 100 years

Answer: c) 25 years — A silver jubilee marks a 25th anniversary (50 years = Golden jubilee, 100 years = Centenary).

Q4. Which of the following numbers are divisible by 6?

1 Mark

- a) 256 b) 228 c) 777 d) 639

Answer: b) 228 — A number is divisible by 6 if it is even and sum of digits is divisible by 3. 228 is even and $2+2+8=12$ (divisible by 3).

Q5. The numbers having more than 2 factors are called

1 Mark

- a) Prime numbers b) Coprime number c) composite number d) Twin primes

Answer: c) composite number — Composite numbers have more than two factors (1, itself, and others). Prime numbers have exactly 2 factors.

Q6. The HCF of two coprime numbers is

1 Mark

- a) 1 b) 20 c) infinity d) none of these

Answer: a) 1 — Coprime numbers are numbers that have no common factors other than 1. Thus their Highest Common Factor (HCF) is 1.

Q7. Multiplicand $\times$ _____ = product

1 Mark

- a) addend b) sum c) multiplier d) none of these

Answer: c) multiplier — In multiplication: Multiplicand $\times$ Multiplier = Product.

Q8. In a division sum, the number leftover is called the

1 Mark

- a) quotient b) remainder c) dividend d) divisor

Answer: b) remainder — The amount left over after division is called the remainder.

Q9. It is easy to compare decimals, if they are expressed as

1 Mark

- a) unlike decimals b) like decimals c) equivalent decimals d) none of these

Answer: b) like decimals — Converting decimals to like decimals (same number of decimal places) makes direct comparison straightforward.

Q10. There are 40 kites tied to 10 posts, how many kites are tied to 20 posts?

1 Mark

- a) 60 b) 300 c) 200 d) 80

Answer: d) 80 — $\text{Kites per post} = 40 \div 10 = 4$. For 20 posts $= 20 \times 4 = 80$ kites.

Q11. I am a solid shape with one curved surface with no vertex or edge and I can only roll. Who am I?

1 Mark

- a) Square b) Sphere c) A line segment d) A point

Answer: b) Sphere — A sphere has 1 continuous curved surface, 0 edges, and 0 vertices.

Q12. A polygon having 5 sides is called a

1 Mark

- a) square b) rectangle c) hexagon d) pentagon

Answer: d) pentagon — A 5-sided polygon is a pentagon (Hexagon = 6 sides, Square/Rectangle = 4 sides).

Q13. The value of $5 \times 100000 + 8 \times 1000 + 5 \times 100 + 7 \times 1$

1 Mark

- a) 508057 b) 058057 c) 508507 d) 5000857

Answer: c) 508507 — $500000 + 8000 + 500 + 7 = 508,507$.

Q14. In the international place value chart 1 crore is equal to

1 Mark

- a) 1 million b) 10 million c) 100 million d) 100 thousand

Answer: b) 10 million — 1 Crore = 1,00,00,000 = 10,000,000 = 10 million.

Q15. Write the Hindu-Arabic number of MCMV

1 Mark

- a) 905 b) 1995 c) 1905 d) 295

Answer: c) 1905 — $M (1000) + CM (900) + V (5) = 1905$.

Q16. Which Roman symbol can be subtracted from L & C only?

1 Mark

- a) I b) V c) X d) none of these

Answer: c) X — According to Roman numeral rules, 'X' (10) can be subtracted from 'L' (50) and 'C' (100) to form XL (40) and XC (90).

Q17. The remainder is always _____ than the divisor.

1 Mark

- a) greater b) less c) equal d) none of these

Answer: b) less — In integer division, remainder must always be strictly less than the divisor.

Q18. Solve: $98 - [5 + 3 \times (25 - 2 \times 10)]$

1 Mark

- a) 73 b) 70 c) 75 d) 78

Answer: d) 78 — Using BODMAS: Inner bracket $= (25 - 20) = 5$. Then $3 \times 5 = 15$. Next $[5 + 15] = 20$. Finally $98 - 20 = 78$.

Q19. Write the type of angle formed by capital letter L?

1 Mark

- a) Square b) Obtuse angle c) Straight line d) Right angle

Answer: d) Right angle — The perpendicular vertical and horizontal lines of letter 'L' form a 90° right angle.

Q20. 32, 40, 48, 56 and 64 are all multiples of which number?

1 Mark

- a) 7 b) 3 c) 12 d) 8

Answer: d) 8 — $8 \times 4 = 32$, $8 \times 5 = 40$, $8 \times 6 = 48$, $8 \times 7 = 56$, $8 \times 8 = 64$. All are multiples of 8.

Q21. The difference of a given number and 1 is the _____ of the number.

1 Mark

- a) Predecessor b) 0 c) Successor d) equal

Answer: a) Predecessor — Subtracting 1 from a number gives its predecessor (number - 1).

Q22. Two prime numbers whose difference is _____ are called twin prime numbers.

1 Mark

- a) 3 b) 4 c) 5 d) 2

Answer: d) 2 — Twin primes are pairs of prime numbers that differ by 2 (e.g., (3,5), (5,7), (11,13)).

Q23. The predecessor of the smallest 8-digit number is

1 Mark

- a) 99,99,999 b) 10,00,00,000 c) 1,00,00,000 d) 9,99,999

Answer: a) 99,99,999 — Smallest 8-digit number = 1,00,00,000. Predecessor = 1,00,00,000 - 1 = 99,99,999 (largest 7-digit number).

Q24. Solve and write the answer in Roman numeral: 4335 - 4331 = _____

1 Mark

- a) IV b) 4 c) 41 d) VI

Answer: a) IV — 4335 - 4331 = 4. In Roman numerals, 4 is represented as 'IV'.

Q25. Which is the smallest 4-digit number divisible by both 2 & 3?

1 Mark

- a) 1006 b) 9998 c) 1002 d) 9996

Answer: c) 1002 — Smallest 4-digit number is 1000. Divisibility by 2 & 3 means divisible by LCM(2,3) = 6. $1002 \div 6 = 167$ (exact).

Q26. Of the following numbers which is closest to 11.98?

1 Mark

- a) 12.9 b) 12.00 c) 11.00 d) 10.00

Answer: b) 12.00 — $|11.98 - 12.00| = 0.02$, which is the smallest difference among all options.

Q27. If $4/5 = x/40$, then the value of x is

1 Mark

- a) 32 b) 20 c) 16 d) 8

Answer: a) 32 — Cross multiplying: $x = (4 \times 40) / 5 = 160 / 5 = 32$.

Q28. Sum of second multiple of 2 and third multiple of 5 is

1 Mark

- a) 19 b) 13 c) 18 d) 17

Answer: a) 19 — Second multiple of 2 = $2 \times 2 = 4$. Third multiple of 5 = $5 \times 3 = 15$. Sum = $4 + 15 = 19$.

Q29. One hundred million divided by ten thousand equals

1 Mark

- a) 1,00,000 b) 10 c) 1 d) 10,000

Answer: d) 10,000 — $100,000,000 \div 10,000 = 10,000$.

Q30. How many three-fifths are there in 18?

1 Mark

- a) 25 b) 30 c) 5 d) 64

Answer: b) 30 — Number of $(3/5)$ in 18 = $18 \div (3/5) = 18 \times (5/3) = 6 \times 5 = 30$.

Q31. The only number which is the reciprocal of itself is

1 Mark

- a) 2 b) 5 c) 1 d) 0

Answer: c) 1 — Reciprocal of 1 is $1/1 = 1$.

Q32. What percent is 500g of 2 kg?

1 Mark

- a) 50% b) 25% c) 100% d) 5%

Answer: b) 25% — $2 \text{ kg} = 2000 \text{ g}$. $\text{Percentage} = (500 / 2000) \times 100\% = 1/4 \times 100\% = 25\%$.

Q33. 0.5 l is equal to

1 Mark

- a) 5ml b) 50ml c) 500ml d) none of these

Answer: c) 500ml — $1 \text{ litre} = 1000 \text{ ml}$. Therefore, $0.5 \text{ l} = 0.5 \times 1000 = 500 \text{ ml}$.

Q34. 2 tenths 8 hundredths is written as

1 Mark

- a) 0.028 b) 0.208 c) 0.28 d) 0.82

Answer: c) 0.28 — $2/10 + 8/100 = 0.2 + 0.08 = 0.28$.

Q35. 10 tens = _____

1 Mark

- a) 20 b) 100 c) 300 d) 30

Answer: b) 100 — $10 \text{ tens} = 10 \times 10 = 100$.

Q36. The average of first five prime numbers

1 Mark

- a) 5.5 b) 5.6 c) 5.7 d) 5.8

Answer: b) 5.6 — First 5 prime numbers: 2, 3, 5, 7, 11. $\text{Sum} = 28$. $\text{Average} = 28 \div 5 = 5.6$.

Q37. The ratio of 15 months to 1.5 years is

1 Mark

- a) 6:1 b) 10:1 c) 5:6 d) 1:10

Answer: c) 5:6 — $1.5 \text{ years} = 1.5 \times 12 = 18 \text{ months}$. $\text{Ratio} = 15 : 18 = 5 : 6$.

Q38. Profit % and Loss % are always calculated on

1 Mark

- a) Selling price b) cost price c) a & b d) none of these

Answer: b) cost price — Unless explicitly stated otherwise, profit % and loss % are always calculated relative to Cost Price (CP).

Q39. A man deposited Rs 8000 at the rate of 5% per annum. Find the interest he will get after 4 years.

1 Mark

- a) Rs 10,000 b) Rs 100 c) Rs 1600 d) none of these

Answer: c) Rs 1600 — $\text{Simple Interest (SI)} = (P \times R \times T) / 100 = (8000 \times 5 \times 4) / 100 = \text{Rs } 1600$.

Q40. If the diameter of a circle is of length 9 cm, then the length of its radius will be?

1 Mark

- a) 18 cm b) 4.5 cm c) 9cm d) none of these

Answer: b) 4.5 cm — $\text{Radius} = \text{Diameter} / 2 = 9 \text{ cm} / 2 = 4.5 \text{ cm}$.

Achiever's Section (Questions 41 to 45 — 2 Marks Each)

Q41. Find the value of P and Q respectively: $PPP \times 5 = 2QQP$

2 Marks

- a) 5, 7 b) 7, 5 c) 4, 5 d) 5, 4

Answer: a) 5, 7 — If $P = 5$: $555 \times 5 = 2775$. Comparing with $2QQP$ gives $Q = 7$ and $P = 5$. So $P = 5$, $Q = 7$.

Q42. Rohit's age is 15 years and his sister's age is 3 years less than his age. Find the ratio of sister's age to Rohit's age.

2 Marks

- a) 4:5 b) 5:4 c) 6:3 d) 1:5

Answer: a) 4:5 — $\text{Sister's age} = 15 - 3 = 12 \text{ years}$. $\text{Ratio (Sister : Rohit)} = 12 : 15 = 4 : 5$.

Q43. What is the next number in the pattern below? 150, 300, 600, 1200, _____

2 Marks

a) 2000

b) 1800

c) 2400

d) 3000

Answer: c) 2400 — Pattern doubles each term: $150 \times 2 = 300$; $300 \times 2 = 600$; $600 \times 2 = 1200$; $1200 \times 2 = 2400$.

Q44. The average of 3 dozen and 4 dozen is

2 Marks

a) 42

b) 30

c) 34

d) 46

Answer: a) 42 — 3 dozen = 36, 4 dozen = 48. Average = $(36 + 48) / 2 = 84 / 2 = 42$.

Q45. Find the average of first 10 odd numbers

2 Marks

a) 10

b) 19

c) 3

d) 5

Answer: a) 10 — First 10 odd numbers are 1, 3, 5, ..., 19. Sum = $10^2 = 100$. Average = $100 / 10 = 10$.