Bhavan's Mathematics Olympiad (BMO) – 2023

Class:-8 **Subject:-** Mathematics
Time:- **Total :- 50 Marks**

Instructions :

- **Question no. 1 to 40 carries on 1 mark**
- **Question no. 41 to 45 carries 2 mark**

1) Find the value of the fraction given by $\frac{10+20+30+\ \ldots\ldots\ldots\ldots\ +400}{30+60+90+\ \ldots\ldots\ldots\ldots .+1200}$

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{5}$

2) Difference of $\frac{3}{5}$ and $\frac{2}{7}$ of a number is 44. The number is

(a) 132 (b) 140 (c) 254 (d) 142

3) If $\boldsymbol{x}$ is a rational number, such that $\boldsymbol{x} \times \boldsymbol{x} = \boldsymbol{x}$, then $\boldsymbol{x}$ is

(a) x (b) x^2 (c) 1 (d) 25

4) What number should be subtracted from $\frac{-5}{4}$ to get additive identity?

(a) $\frac{5}{4}$ (b) $\frac{-5}{4}$ (c) $\frac{6}{7}$ (d) $-\frac{6}{7}$

5) The number which when added to 10 times itself gives 264 is

(a) 14 (b) 34 (c) 240 (d) 24

6) Which of the following is not true?

(a) equilateral triangle is a regular polygon
(b) square is a regular polygon
(c) rectangle is a regular polygon
(d) a regular polygon is both equiangular and equilateral.

7) Simplify: $\frac{\sqrt{1024}-\sqrt{324}}{\sqrt{441}-\sqrt{196}}$

(a) 2 (b) $\sqrt{\frac{2}{5}}$ (c) $\sqrt{\frac{8}{5}}$ (d) $\sqrt{\frac{6}{25}}$

8) The least number must be subtracted from 7250 to get a perfect square is:

(a) 20 (b) 15 (c) 12 (d) 25

9) Which of the following is not a Pythagorean triplet?

(a) (3,4,5) (b) (5,12,13) (c) (7, 24,25) (d) (8, 20, 25)

10) If Y = $\sqrt[3]{2\frac{93}{125}}$, then the value of Y is

(a) $\frac{7}{5}$ (b) $\frac{5}{7}$ (c) $\frac{33}{7}$ (d) $\frac{13}{7}$

11) The least square number which is exactly divisible by 10, 12, 15 and 18 is

(a) 3600 (b) 900 (c) 1600 (d) 2500

12) The sum of the given expressions $-5x^2+3x-8$, $4x+7-2x^2$ and $6-2x+2x^2$ is

(a) $2x^2+3x+4$ (b) x^2+2x+3
(c) $9x^2+6x+4$ (d) $-5x^2+5x+5$

13) If ab = 6 and a+b =5, then the value of a^2+b^2 is

(a)11 (b) 12 (c) 13 (d) 16

14) Cube of a natural number will end with the digit

(a) 0 (b) 1 (c) 3 (d) All of these

15) Profit percent is the profit that would be obtained for

(a) cost price of Rs. 100 (b) selling price of Rs. 100

(c) any cost price (d) any selling price

16) Harry wants to mix the flour of two different rates so that he can sell at the rate he wants. In what proportion he must mixes the flour at Rs. 16.60 per kg with a flour at Rs. 16.45 per kg so that the mixture can be sold at the rate of Rs. 16.54 per kg.

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

17) A man sold 250 chairs and had a gain equal to selling price of 50 chairs. His profit percent is

(a) 5 (b) 10 (c) 25 (d) 50

18) If $(x+2)(x+a) = x^2 + 5x +6$, then a is equal to

(a) 2 (b) 3 (c) 6 (d) 5

19) The area of a trapezium is 24 m^2. If its height is 6m then the sum of its parallel sides is

(a) 4 m (b) 6 m (c) 8 m (d) 10 m

20) If $4^x + 4^x + 4^x = 48$, then x is equal to

(a) 3 (b) 2 (c) 1 (d) 0

21) If two quantities x and y are related to each other in such a way that XY is a constant, then X and Y are said to be in

(a) inverse variation (b) direct variation

(c) variation (d) none of these

22) H.C.F of $2a^2bc$ and ac is

(a) $2a^2b$ (b) 2ab (c) c (d) ac

23) The number 5679010 is divisible by

(a) 5 (b) 3 (c) 11 (d) 4

24) For the following cryptarithms, values of A and B are

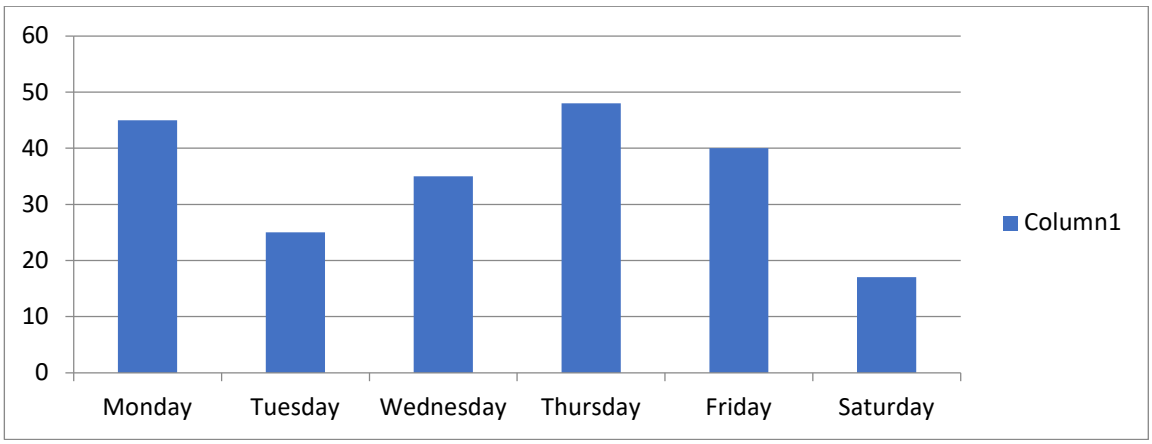
$$\begin{array}{r} 2\,A\,B \\ +\,A\,B\,1 \\ \hline 8\,2\,8 \end{array}$$

(a) A= 5, B=7 (b) A=7, B=5 (c) A=7,B=7 (d) A=5, B= 5

25) If the simple interest on a certain sum of money is one-ninth of the principal and rate of interest is equal to the time for which interest is found. The rate of interest on that sum of money will be

(a) 10% (b) 3.33% (c) 5.5 % (d) 7.25%

Given below a graph representing the number of electric bulbs sold by a shopkeeper during a week of the month:
(Read the graph to answer the question number 26 to 28)



26) On which day of the week sale was minimum?
(a) Monday (b) Saturday
(c) Friday (d) Tuesday

27) What was the total sale during the week?
(a) 200 (b) 210 (c) 521 (d) 230

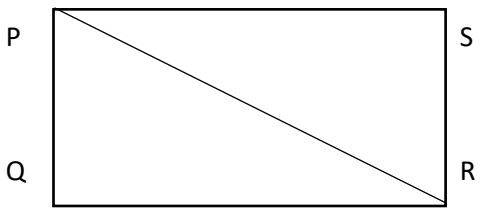
28) What is the ratio of sale of Monday and Friday?
(a) 5:9 (b) 5:8 (c) 9:8 (d) 8:9

29) Find the number of three-digit numbers lying between 100 and 500 that are divisible by both 6 and 9
(a) 25 (b) 22 (c) 28 (d) 30

30) The three numbers a,b,c are such that a:b = 4:5 , b:c=5:6 then the ratio of a:c is
(a) 3:5 (b) 6:1 (c) 8:6 (d) 2:3

31) The unit digit in the product of the numbers given by $19 \times 27 \times 11 \times 45 \times 33 \times 49$ is
(a) 2 (b) 5 (c) 1 (d) 3

32) PQRS is a rectangle such that PS=2PQ, and the diagonal PR is 15m. The perimeter of the rectangle is



(a) $18\sqrt{5}\,m$ (b) $2m$
(c) $4m$ (d) $6\sqrt{3}\,m$

33) The average of the largest and smallest 3-digit numbers formed by 0, 2 and 4 would be
(a) 213 (b) 303 (c) 312 (d) 222

34) A piece of wire when bent to form a circle will have a radius of 84 cm. If the wire is bent to form a square, the length of the side of the square is
(a) 132 cm (b) 225 cm (c) 152 cm (d) 168 cm

35) The ratio of ages of Hina and kanika is 4:3. The sum of their ages is 28 years. The age of Hina is
(a) 15 years (b) 12 years (c) 16 years (d) 18 years

36) Which of the following is true
(a) sum of interior angles of a quadrilateral is 540
(b) sum of interior angles of a pentagon is 720
(c) sum of measures of the exterior angles of any polygon is 360
(d) none of these

37) When we perform an experiment then outcomes are known as equally likely if
(a) there is only one outcome
(b) all outcomes are Same
(c) each outcomes has the same chance of occurrence
(d) none of these

38) The angle of rotational symmetry for the square is
(a) 90 (b) 180 (c) 270 (d) 315

39) complete the series: 3, 15, 90, 630, 5040, ...?
(a) 35280 (b) 40320 (c) 45360 (d) 10080

40) Find odd one out
(a) 4025 (b) 7202 (c) 6023 (d) 5061

ACHIEVER'S SECTION

41) Find the value of $\sqrt[3]{x^{a-b}} \times \sqrt[3]{x^{b-c}} \times \sqrt[3]{x^{c-a}} = ?$
(a) 0 (b) 1 (c) $\sqrt{x}$ (d) $\sqrt{\frac{x}{2}}$

42) A bag contains the coins of different denominations such as 50 paise, 25 paise and 10 paise. If the number of coins is in the ratio 4:6:10 respectively which total amount is Rs. 180. The number of 50 paise coin in the bag is
(a) 90 (b) 160 (c) 240 (d) 400

43) Victor purchased a second-hand motor bike from his close friend Harry for Rs. 4000 on credit. If he pays the interest for the first year at the rate of 5% and for the second year 15%. The cost of bike for victor if he pays the amount after two years.
(a) Rs. 4530 (b) Rs. 4830 (c) Rs. 4930 (d) Rs. 4980

44) If the area of the three adjacent faces of the room is p,q,r respectively, then the volume of air in the room is:
(a) $\sqrt{pqr}$ (b) $2\sqrt{pqr}$ (c) $3\sqrt{pqr}$ (d) $4\sqrt{pqr}$

45) A retail fair price shop uses a weight balance and four weights of 1kg, 2 kg, 4kg and 8kg to measure the weight of articles such as food grains. Find the number of different combinations of weight that shopkeeper can measure with the help of these weights.
(a) 10 (b) 12 (c) 15 (d) 18