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Reg. No. : .....

Name : .....

Fifth Semester B.A./B.Sc./B.Com. Degree Examination, December 2023

First Degree Programme under CBCSS

Mathematics

Open Course

MM 1551.3 : BASIC MATHEMATICS

(2018 Admission Onwards)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. Define mixed numbers.

2. Simplify $40(3-1)^2-5^2$.

3. State the divisibility rule for dividing by 5.

4. Determine the place value of 4 in 547, 098, 632.

5. Convert 33/21 into a mixed number.

6. Write 7/9 as a decimal.

7. Find $\frac{3}{7}+\frac{4}{5}$.

P.T.O.

8. Find the mean of the first 10 whole numbers.

9. Define median.

10. Define a scalene triangle.

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks.

11. Find $\frac{2}{9} \times \frac{7}{3} - \frac{5}{4}$.

12. Convert $22\frac{32}{25}$ into an improper fraction.

13. Find the median of the first 10 prime numbers.

14. Simplify $17 + 3\left(7 - \sqrt{9}\right)^2$.

15. Find the prime factorisation of 250.

16. Write two equivalent fractions of 7/9.

17. Find the decimal equivalent of 17/99.

18. Find $3\frac{2}{3} \div 4\frac{1}{5}$.

19. Convert the fraction 3/5 to decimal form and then to percent form.

20. Solve $x^2 - 5x + 6 = 0$.

21. Define n^{th} root of a number.

22. State any two laws of exponents.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. **Each** question carries **4** marks.

23. Simplify $\sqrt[3]{\frac{32}{25} \div \frac{5}{2} \times \frac{5}{4}} + \sqrt{\sqrt{\frac{125}{27} \div \frac{3}{5}} - 1} \times \frac{3}{4}$.

24. Define pictographs and histograms.

25. Find the weighted arithmetic mean of the first 10 prime numbers with the whole numbers 1 to 10 as the weights.

26. Find the lcm and gcd of 32 and 50.

27. State the three laws of logarithms.

28. The formula below gives a root of the cubic equation $x^3 = 3px + 2q$. Use it to write an expression for the root of $x^3 = 24x + 72$.

$$x = \sqrt[3]{q + \sqrt{q^2 - p^3}} + \sqrt[3]{q - \sqrt{q^2 - p^3}}$$

29. The *golden proportion* is one for which the ratio of the shorter to the longer segment is equal to the ratio of the longer to whole segment, i.e., $\frac{x}{1-x} = \frac{1-x}{1}$.

Find the value of the golden proportion by solving the resulting quadratic equation.

30. Calculate the total simple interest on a loan of Rs. 3500 at 6% annual interest after 3 years and 4 months. Also find the total amount to be paid.

31. Construct a histogram for the frequency of prime numbers up to 50, with classes of size 10: The classes are 1-10, 11-20, ..., 41-50, while the respective frequencies are the number of primes among 1-10, number of primes among 11-20,..., number of primes among 41-50.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks.

32. Define a geometric series and derive the expression for the sum of its first n terms.

33. Briefly explain with examples bar graphs, line graphs and circle graphs.

34. Bank A offers loans at a compound interest rate of 5% annually while another bank B offers loans at a simple interest of 10% annually Which of the two banks is beneficial if you need to take a loan of Rs. 1,00,000 for 3 years? Does the answer change depending on the loan amount or the loan period?

35. Solve the system of equations using matrices:

$$x + y + z = 3$$
$$x + 2y + 3z = 6$$
$$2x + y + 4z = 7$$

(2 × 15 = 30 Marks)
