Reg. No. : ....

Name : ....

Fifth Semester B.A./B.Sc./B.Com. Degree Examination, December 2022

First Degree Programme under CBCSS

Mathematics

Open Course

MM 1551.3 : BASIC MATHEMATICS

(2018 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

PART – A

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

1. Define improper fractions.

2. Simplify $10 - (1 - 3)^2 2^3$.

3. State the divisibility rule for dividing by 3.

4. Determine the place value of 3 in 547,398.

5. Convert $3\dfrac{3}{21}$, into an improper fraction.

6. Write 123.45 as a fraction.

7. Find $\frac{2}{9} + \frac{7}{5}$.

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

9. Define mode.

10. Define an obtuse triangle.

$(10 \times 1 = 10 \text{ Marks})$

PART – B

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

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

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

13. Convert $\frac{73}{25}$ into a mixed number.

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

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

16. Find the prime factorisation of 320.

17. Find the LCM of 17 and 19.

18. Write two equivalent fractions of 2/7.

19. Find the decimal equivalent of 34/99.

20. Find $2\frac{4}{5} \div 3\frac{2}{7}$.

21. Convert the fraction 3/7 to decimal form and then to percent form.

22. Solve $x^2 - 7x + 12 = 0$.

23. Define logarithm of a number.

24. Evaluate $\sqrt{125} \times \sqrt{20}$.

25. Find the determinant of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$.

26. Find the adjoint of the matrix $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.

(8 × 2 = 16 Marks)

PART – C

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

27. Simplify $\sqrt[3]{\dfrac{32}{9} \div \dfrac{3}{2} \times \dfrac{3}{4}} + \sqrt{\sqrt{\dfrac{128}{27} \div \dfrac{3}{2} + 1} \times \dfrac{3}{5}}$.

28. Describe histograms with an example.

29. Find the weighted arithmetic mean of the first 10 even numbers with the first ten odd numbers as the weights.

30. Find the LCM and GCD of 36 and 60.

31. State the three laws of exponents.

32. State the three laws of logarithms.

33. Find the inverse of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.

34. What percent of 320 is 20? Express as a decimal after rounding.

35. Solve the quadratic equation $2x^2 - 7x + 5 = 0$.

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36. Solve the simultaneous equations $2x + 3y = 12$ and $3x + 2y = 13$.

37. Calculate the total simple interest on a loan of Rs. 10,000 at 5% annual interest after 5 years and 6 months. Also find the total amount to be paid.

38. Construct a histogram for the frequency of prime numbers up to 25, with classes of size 5: The classes are 1-5, 6-10,....,21-25, while the respective frequencies are the number of primes among 1-5, number of primes among 6-10,.., number of primes among 21-25.

$(6 \times 4 = 24 \text{ Marks})$

PART – D

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

39. Define mean, median, mode and weighted mean of a data set, illustrating each with an example. Calculate all of them for the first 10 prime numbers. For calculating the weighted mean, take the whole numbers 1 to 10 as the weights.

40. A bank offers loans under schemes. One, at a compound interest rate of 10% annually; Another, at a simple interest of 15% annually. Which of the two schemes 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?

41. Solve the system of equations by finding the inverse of the matrix:
$$x + 2y + 3z = 6$$
$$2x + 3y + z = 6.$$
$$3x + y + 2z = 6$$

42. Solve the system of equations by Cramer's Rule:
$$x + y + z = 3$$
$$x + 2y + 3z = 6$$
$$2x + y + 4z = 7$$

43. Describe the method to solve a general quadratic equation, stating the role of its discriminant. Solve the quadratic equation $5x^2 + 10x - 15 = 0$.

44. Describe a Geometric Progression with example. Derive the expression for the sum of its first n terms.

$(2 \times 15 = 30 \text{ Marks})$