BASIC MATHEMATICS(75) BLUE PRINT MODEL PAPER-1 2024-2025

CHAPTERS	Hours	Marks	REMEMBER				UNDERSTAND				HOTS				
			VSA(1)	SA(2)	SA(3)	LA(5)	VSA(1)	SA(2)	SA(3)	LA(5)	VSA(1)	SA(2)	SA(3)	LA(4)	LA(6)
1.Matrices and Determinants	13	13	1		1			1		1	2				
2.Permutations and combinations	8	8	1		1		1	1			1				
3. Probability	5	3	1					1							
4.Binomial Theorem	6	4												1	
5.Partial Fractions	4	5				1									
6. Mathematical Logic	6	6	1			1									
7. Ratios and Proportions	10	8	2		1		1					1			
8. Bill Discounting	6	5		1					1						
9. Stocks and shares	4	3			1										
10. Learning Curve	4	5				1									
11. Linear Programming Problems	6	5								1					
12. Sales Tax and Value Added Tax	4	3							1						
13.Heights and Distances	4	4												1	
14. Compound, Multiple, Sub-multiple angles & Transformation Formulae	8	7	1				1			1					
15. Circles	6	6													1
16. Parabola	4	4	1				1	1							
17. Limits and Continuity of a function	8	7	1												1
18. Differential Calculus	10	8	1	1		1									
19. Application of Derivatives	8	5			1			1							
20. Indefinite Integrals	8	5	1						1		1				
21. Definite Integrals and its application to Areas	8	6						1			1		1		
TOTAL	140	120	11	4	15	20	4	12	9	15	5	2	3	8	12

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Question Type	No. Of Questions	Marks
VAS(1)	20/20	20/20
SA(2)	06/09	12/18
SA(3)	06/09	18/27
LA(4)	01/02	04/08
LA(5)	04/07	20/35
LA(6)	01/02	06/12
Total	38/49	80/120

Note: ** 6 marks question from circles on concyclic and Theorem 1 from limits.*

** 4 marks question from Binomial Theorem and Heights and distances.*

** Proof and problems on properties of determinants are excluded.*

GOVERNMENT OF KARNATAKA
KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD
II PUC MODEL QUESTION PAPER-1 (2024-2025)
BASIC MATHEMATICS (75)

TIME: 3 Hours **Max. Marks: 80**

Instructions:

i. The question paper has 5 Parts A, B, C, D and E. Answer all the Parts.
ii. Part - A carries 20 marks, Part - B carries 12 marks, Part - C carries 18 marks, Part - D carries 20 marks and Part - E carries 10 marks.
iii. Write the question number properly as indicated in the question paper.

PART-A

I. Answer ALL the multiple-choice questions: $\mathbf{10 \times 1 = 10}$

1. If $\begin{vmatrix} 3 & x \\ 4 & 5 \end{vmatrix} = -2$ then the value of x is

a) $\frac{17}{4}$ b) $-\frac{17}{4}$ c) $\frac{15}{4}$ d) $\frac{13}{4}$

2. If ${}^{n}C_8 = {}^{n}C_{12}$ then the value of n is

a) 8 b) 12 c) 20 d) *10*

3. If $P(A') = 0.65$, then $P(A)$ *is*

a) 1 b) 0 c) 0.35 d) *0.65*

4. **Negate:** $\sim p \rightarrow q$

a) $p \rightarrow \sim q$ b) $\sim p \wedge \sim q$ c) $\sim p \wedge q$ d) $p \wedge q$

5. The mean proportion of 9 *and* 16 is

a) 144 b) 25 c) 12.5 d) *12*

6. The value of $3 \sin 10^0 - 4 \sin^3 10^0$ is

a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{2}}$ c) $\frac{\sqrt{3}}{2}$ d) *0*

7. If the focus of the parabola is $(0, -6)$ *then equation of directrix* is

a) $x = 6$ b) $x = -6$ c) $y = 6$ d) $y = -6$

8. If $y = \log e^e$ *then* $\frac{dy}{dx}$ *is*

a) -1 b) 0 c) e d) $\frac{1}{e}$

9. Evaluate: $\int \frac{1}{5e^{-x}} dx$

a) $e^x + C$ b) $\frac{e^x}{5} + C$ c) $5e^x + C$ d) $\frac{1}{5e^x}$ +C

10. Evaluate: $\int_0^1 x^2 dx$

a) 1 b) 0 c) $\frac{1}{2}$ d) $\frac{1}{3}$

II. Match the following: $\mathbf{5 \times 1 = 5}$

11.

	A		**B**
a)	If A = $\begin{bmatrix} 1 & -1 \\ 2 & 4 \end{bmatrix}$ then the value of $\lvert A \rvert$ is	i)	$\frac{\sqrt{3}+1}{2\sqrt{2}}$
b)	The value of ${}^8P_3$ is	ii)	6
c)	The value of x in $5:15 = 3:x$	iii)	336
d)	$\sin 15^\circ$ is	iv)	9
e)	The value of $\lim_{x \to 1} \frac{x^3+4}{1+x}$ is	v)	$\frac{\sqrt{3}-1}{2\sqrt{2}}$
		vi)	$\frac{5}{2}$

III. Fill in the blanks by choosing appropriate answer from given options: $\mathbf{5 \times 1 = 5}$

$$\left(\log x + c, \quad 0, \quad 9, \quad 2, \quad 24, \quad -\frac{1}{x^2} + c\right)$$

12. A square matrix A is a singular matrix if $|A| =$ _____

13. The number of ways 5 people can be seated around a table is _____.

14. The third proportional of 4 and 6 is _____

15. If the length of the latus rectum of the parabola $x^2 = 4ky$ *is* 8, then the value of k is ___

16. $\int \frac{1}{x} dx =$ _____

PART-B

IV. Answer any SIX questions. $\mathbf{6 \times 2 = 12}$

17. If $A = \begin{bmatrix} 2 & 3 & 1 \\ 1 & -2 & 0 \end{bmatrix}$ *and* $B = \begin{bmatrix} 1 & -2 & 4 \\ 1 & 3 & 2 \end{bmatrix}$ $find\ 2A - 3B$

18. Find the number of parallelograms that can be formed from a set of 6 parallel lines intersecting another set 4 of parallel lines.

19. If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(A \cup B) = \frac{7}{12}$, $find\ P(B|A)$

20. What must be added to the terms of the ratio $2:3$ so that it becomes $5:6$

21. BD and BG on a certain bill due after sometime are ₹1250 and ₹50 respectively. Find the face value of the bill.

22. Find the equation of the parabola whose vertex is $(0,0)$ $and\ directrix\ is\ y = 2$

23. If $y = x^{\sin x}$, $find\ \frac{dy}{dx}$

24. The total revenue function is given by $R = 400x - 2x^2$ and the total cost function given by
$C = 2x^2 + 40x + 4000$ find the marginal revenue and marginal cost function

25. Find the area enclosed by the curve $y = x^2 + 2x$ between the ordinates $x = 0\ and\ x = 2$

PART-C

V. Answer any SIX questions. $\mathbf{6 \times 3 = 18}$

26. If $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ then show that: $A^2 - 4A + 3I = 0$

27. Find the number of permutations of the letters of the word '**MISSISSIPPI**'. How many of these
a) all 4S's are together
b) Begin with MISS

28. Monthly incomes of A and B are in the ratio $2:3$ and their monthly expenditures are in the ratio $3:5$. If each saves ₹100 per month, find the monthly incomes of A and B

29. A bill for ₹3500 due for 3 months was drawn on 27 March 2012 and discounted on 18 April 2012, at the rate of 7% p.a. Find the Bankers Discount and discounted value of the bill.

30. Which is the better investment: 7.5% stock at 125 or 5% stock at 75

31. Bharath bought a shirt for ₹336 including 12% sales tax and a neck tie for ₹110 including 10% sales tax. Find the printed price of shirt and neck tie together.

32. A circular patch of oil spreads on water, the area growing at the rate of $16cm^2/min$. How fast are the radius and the circumference increasing when the diameter is 12cms?

33. Evaluate: $\int \frac{1}{x(x+2)}\,dx$

34. Evaluate: $\int_0^1 \frac{2x+5}{x^2+5x+3}\,dx$

PART-D

VI. Answer any FOUR questions. $\mathbf{4 \times 5 = 20}$

35. Solve by matrix method: $x + y + z = 5,\quad 2x + y - z = 2\ ,\quad 2x - y + z = 2$

36. Resolve into partial fraction: $\frac{2x^2+10x-3}{(x+1)(x-3)(x+3)}$

37. Verify whether the proposition $(\sim p \wedge q) \wedge \sim r$ is a Tautology, contradiction or neither.

38. An engineering company has 80% learning effect and spends 1000 hours to produce 1 lot of the product. Estimate the labour cost of producing 8 lots of the product if the labour cost is ₹100 per hour.

39. Maximize: $Z = 5x + 3y$

$subject\ to\ the\ constraints\ 3x + 5y \leq 15,\ \ 5x + 2y \leq 10,\ \ x \geq 0,\ \ y \geq 0$

40. Prove that: $\cos 10^0 \cos 30^0 \cos 50^0 \cos 70^0 = \frac{3}{16}$

41. If $y = \left(x + \sqrt{1 + x^2}\right)^m$ $Prove\ that: (1 + x^2)y_2 + xy_1 - m^2 y = 0$

PART-E

VII. Answer the following questions.

42. P.T: $\lim_{x \to a} \left(\frac{x^n - a^n}{x - a}\right) = na^{n-1}$, for all rational values of n **(6 marks)**

(OR)

Show that the points $(0, 0), (1, 1), (5, -5)$ and $(6, -4)$ $are\ concyclic$

43. The angle of elevation of an object from a point 100m above a lake is 30^0 and angle of depression of its image in the lake is 45^0. Find the height of the object above the lake.

(OR)

Find the value of $(0.99)^5$ using Binomial theorem, upto 4 decimal places. **(4 marks)**