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FOR KARNATAKA CLASS 12 PREPARATION

Karnataka 2nd PUC Model Question Paper 2027 for Basic Mathematics (Paper 5)

EXAM	YEAR	TYPE	SUBJECT
Karnataka Class 12	2027	Sample Paper	Maths

GOVERNMENT OF KARNATAKA
KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD
6TH CROSS, MALLESHWARAM, BENGALURU – 560 003
II PUC MODEL QUESTION PAPER – 5 (2026-2027)

SUBJECT: BASIC MATHEMATICS **MAXIMUM MARKS: 80**

TIME: 03 HOURS **NUMBER OF QUESTIONS: 42**

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,
III Part - D carries 20 marks and Part - E carries 10 marks.
IV Write the question number properly as indicated in the question paper.

PART-A

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

1. If A is a square matrix of order n then the value of $|adjA|$ is

a) $|A|$ b) $|A|^{n-1}$ c) $|A|^{n+1}$ d) $|A|^n$

2. The number of ways in which a committee of 5 can be chosen from 10 students is

a) 252 b) 30,240 c) 50 d) 10^5

3. If A and B are independent events then $P(B|A)$ is

a) $\frac{P(A \cap B)}{P(A)}$ b) $P(A)$ c) $\frac{P(A \cap B)}{P(B)}$ d) $P(B)$

4. The contra-positive of the implication "$\sim p \rightarrow \sim q$" is

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

5. The sub-triplicate ratio of 1 : 64 is

a) 8 : 1 b) 1 : 8 c) 1 : 4 d) 4 : 1

6. If $\sin A = \frac{\sqrt{3}}{2}$ then $\sin 2A$ is

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

7. If the equation of the parabola is $x^2 = 12y$ then the equation of latus rectum is

a) $x = 3$ b) $x = -3$ c) $y = 3$ d) $y = -3$

8. If $y = x^2 - 3x + 10$ then $\frac{dy}{dx}$ is

a) $2x + 3$ b) $\frac{x^3}{3} - 3\frac{x^2}{2} + 10x$ c) $2x - 3$ d) $\frac{x^3}{3} - 3\frac{x^2}{2}$

9. Evaluate: $\int \frac{8}{\text{cosec}x} dx$

a) $8\sin x + C$ b) $-8\sin x + C$ c) $-8\cos x + C$ d) $8\cos x + C$

10. Evaluate: $\int (3x + 5)^2 \, dx$

a) $\frac{(3x+5)^2}{3} + C$ b) $\frac{3x+5}{3} + C$ c) $3x + 5 + C$ d) $\frac{(3x+5)^3}{9} + C$

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

11.

A		B	
a)	If $\begin{vmatrix} 2x+1 & 3 \\ 2 & 4 \end{vmatrix} = 0$ then the value of x is	i)	$\frac{\sqrt{3}+1}{2\sqrt{2}}$
b)	The value of ${}^{7}P_{3}$ is	ii)	2
c)	If 32 : x = 75 : 50 then the value of x is	iii)	210
d)	The value of sin75° is	iv)	35
e)	The value of $\lim_{x \to 1} \frac{x^2-1}{x-1}$ is	v)	$\frac{64}{3}$
		vi)	$\frac{1}{4}$

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

$\left(\frac{8}{3}, \quad 96, \quad \frac{1}{2}, \quad 12, \quad 8, \quad 2520\right)$

12. If $\begin{bmatrix} 2a-1 & 5 \\ -5 & 0 \end{bmatrix}$ is a skew symmetric matrix then the value of 'a' is _____

13. The number of ways 8 different precious stones be set to form a necklace is _____

14. The mean proportional of 6 and 24 is _____

15. If the length of the latus rectum of the parabola $x^2 = 2ky$ is 16 then the value of k is _____

16. $\int_0^2 x^2\,dx$ =_____

PART-B

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

17. If $\begin{bmatrix} x^2 & 3 \\ 1 & 2 \end{bmatrix} + \begin{bmatrix} 5x & 1 \\ 4 & 3 \end{bmatrix} = \begin{bmatrix} 6 & 4 \\ 5 & 5 \end{bmatrix}$ then find x.

18. A person has 9 friends. In how many ways can he invite one or more of them to a dinner?

19. A box contains 5 defective and 15 non defective bulbs. Two bulbs are chosen at random. Find the probability that both the bulbs are non-defective.

20. If a : b = 2 : 3 and b : c = 6 : 13 find a : b : c.

21. A banker pays ₹2380 on a bill of ₹2500, 73 days before the legal due date. Find the rate of discount charged by the banker.

22. Find the equation of the parabola whose focus is $(0, 3)$ and directrix is $y = -3$.

23. If $y = \sqrt{\log x + \sqrt{\log x + \sqrt{\log x + \cdots \infty}}}$ then prove that $(2y-1)\frac{dy}{dx} = \frac{1}{x}$

24. The total cost of a commodity is given by $C(x) = x^2 - 7x + 2$ where 'x' is the number of units and the price/unit is ₹5.00. Find the profit function.

25. Find the area enclosed by the curve $x = 2y^2$, y-axis and the abscissae $y = 2$ and $y = 4$.

PART-C

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

26. Solve using Cramer's rule: $5x + 7y = 3$, $7x + 5y = 9$

27. Find the number of permutations of the letters of the word ENGINEERING. In how many of these a)begin with E and end with E b) all the vowels are together.

28. 5 men each working 9 hours a day can finish a work in 30 days. How many men are required to finish eight times the work in 25 days, each working 8 hours a day?

29. Banker's gain on a bill due 6 months at 4% p.a.is ₹20.Find the true discount, banker's discount and bill amount.

30. Raksha sells her 9600, 4% stock at a premium of 6. How much 3.5% stock at 4 discount can she buy from the sale proceeds of the former stock. What is the change in her income?

31. A shopkeeper announces a discount of 10% on a TV set. The marked price of TV is ₹22,000. How much will a customer have to pay for buying the TV set if the rate of sales tax is 8%.

32. The side of an equilateral triangle is increasing at the rate $\sqrt{3}$cm/s. Find the rate at which its area is increasing when its side is 200cms.

33. .Evaluate: $\int \frac{5x}{(x-3)(x+4)} dx$

34. Evaluate: $\int_0^1 (6x + 1)\sqrt{3x^2 + x + 5}\, dx$.

PART-D

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

35. Solve by matrix method: $x - y + 2z = 3$, $2x + z = 1$, $3x + 2y + z = 4$.

36. Resolve into partial fraction: $\frac{2x^2-4x+1}{(x-2)(x-3)^2}$

37. Verify whether the proposition $\sim(p \to q) \vee [(\sim p \wedge q) \leftrightarrow \sim q]$ is a Tautology, contradiction or neither.

38. ABC Company required 1000 hours to produce first 30 engines. If the learning effect is 90%, find the total labour cost at ₹20 per hour to produce total of 120 engines.

39. Maximize: $Z = 400x + 150y$
Subject to the constraints $3x + y \leq 600$, $x \leq 150, y \leq 400$ and $x \geq 0, y \geq 0$.

40. Prove that: $\frac{\sin 2A + \sin 5A - \sin A}{\cos 2A + \cos 5A + \cos A} = \tan 2A$

41. If $y = a\cos(\log x) + b\sin(\log x)$ show that $x^2y_2 + xy_1 + y = 0$

PART-E

VII. Answer the following questions.

42. a) 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 $(0,0),(0,2),(4,0)$ and $(3,-1)$ are concyclic.

b)Two towers of heights 14m and 25m stand on level ground. The angles of elevation of their tops from a point on the line joining their feet are 45^0and60^0respectively. Find the distance between the towers. **(4 marks)**

(OR)

Find the value of $(99)^5$ using Binomial theorem.

PART-F

(Only for visually challenged students)

39. A diet must contain at least 20 units of proteins and 30 units of vitamins. Food A provides 2 units of protein and 3 units of vitamin per kg and Food B provides 4 units of protein and 2 units of vitamin per kg. Food A costs ₹50 per kg and Food B costs ₹75 per kg. Formulate L.P.P. model to minimize the cost.