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FOR KARNATAKA CLASS 12 PREPARATION

Karnataka 2nd PUC Model Question Paper 2027 for Basic Mathematics (Paper 4)

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 – 4 (2026 -27)

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, 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: $10 \times 1 = 10$

1. If $\begin{bmatrix}2 & x & 2\end{bmatrix}\begin{bmatrix}1\\4\\2\end{bmatrix}=\begin{bmatrix}3\end{bmatrix}$ then x is

(A) $\frac{1}{4}$ (B) $-\frac{3}{4}$ (C) $\frac{3}{4}$ (D) $-\frac{1}{4}$

2. The number of ways 9 flowers of different colours can be strung together to form a garland is

(A) 9! (B) 10! (C) $\frac{9!}{2}$ (D) $\frac{8!}{2}$

3. Two coins are tossed simultaneously. The probability of getting exactly two heads is

(A) 1 (B) $\frac{1}{2}$ (C) $\frac{1}{4}$ (D) $\frac{3}{4}$

4. The converse of $\sim p \rightarrow \sim q$ is

(A) $\sim p \rightarrow q$ (B) $p \rightarrow q$ (C) $q \rightarrow p$ (D) $\sim q \rightarrow \sim p$

5. The fourth proportional of 6, 12 and 15 is

(A) 32 (B) 4 (C) 30 (D) 2

6. The value of $\sin 80^\circ \cos 10^\circ + \cos 80^\circ \sin 10^\circ$ is

(A) -1 (B) 1 (C) 0 (D) Not defined

7. The equation of the parabola whose focus $(3,0)$ is

(A) $x^2 = 12y$ (B) $x^2 = -12y$ (C) $y^2 = 12x$ (D) $y^2 = -12x$

8. If $x - y = 0$ then $\frac{dy}{dx}$ is

(A) x (B) $\frac{1}{2}$ (C) 0 (D) 1

9. The value of $\int x^5 dx$ is

(A) $5x^4 + c$ (B) $\frac{x^5}{5} + c$ (C) $\frac{x^4}{4} + c$ (D) $\frac{x^6}{6} + c$

10. The value of $\int e^{3-4x} dx$ is

(A) $3e^{3-4x} + c$ (B) $-4e^{3-4x} + c$ (C) $\frac{e^{3-4x}}{4} + c$ (D) $\frac{e^{3-4x}}{-4} + c$

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

11.

A	B
a) If $\begin{vmatrix} x & 3 \\ 12 & x \end{vmatrix} = 0$ then the value of x is	i) 252
b) The numbers ways a committee of 5 can be chosen from 10 students is	ii) 6
c) The third proportional of 4 and 6 is	iii) ± 6
d) The value of $\tan(45 + A).\tan(45 - A)$ is	iv) 2
e) The value of $\lim_{x \to 0} \frac{\sin 4x}{\sin 2x}$ is	v) 1
	vi) 9

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

(7, 1, 2, 60, 20, 3)

12. If the matrix $\begin{bmatrix} 2a-4 & 5 \\ -5 & 0 \end{bmatrix}$ is skew-symmetric then the value of 'a' is ____.

13. The numbers of 3-digit numbers that can be formed using the digits 1, 2, 5, 6, 8 is____.

14. The antecedent of 7 : 2 is ____.

15. If the length of the latus rectum $y^2 = 4kx$ is 12, then the value of k is____.

16. The value of $\int_0^{\frac{\pi}{2}} \cos x \, dx$ is____.

PART-B

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

17. If $A = \begin{bmatrix} 2 & -x \\ x & -7 \end{bmatrix}$. Find $A + A'$.

18. In how many ways can 6 people can be chosen out of 10 people if one particular person is always included?

19. If A and B are mutually exclusive events with $P(A) = \frac{2}{5}, P(A) = \frac{1}{7}$. Find $P(A \cup B)$.

20. A ratio in the lowest terms is $3:8$. If the difference between the quantities is 25. Find the quantities.

21. Find the true discount on Rs. 1380, due 1½ years after, at 10% p.a.

22. Find the equation of the parabola given that its focus is (-4 ,0) and directrix is x = 4.

23. If $y = \sqrt{\sin x + \sqrt{\sin x + ...\infty}}$. Prove that $\frac{dy}{dx} = \frac{\cos x}{2y-1}$.

24. The total cost function is given by $C = q^3 - 3q^2 + 15q + 27$ where q is the output. Find the marginal cost and fixed cost.

25. Find the area bounded by the curve $x^2 = 8y$, y$-axis$ and the abscissae $y = 3, y = 6$.

PART-C

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

26. Solve by Cramer's rule: $2x + y = 1, \quad x - 3y = 4.$

27. Find the number of words can be formed by using all the letters of the word '**RAINBOW**'

a) How many of them begin with **R** and end with **W**

b) How many of them end with **BOW**

28. Two taps can separately fill a tank in 12 minutes and 15 minutes respectively. The tank when full can emptied by a drain tap in 20 minutes. When the tank was empty, all the three taps were opened simultaneously. In what time will the tank be filled up?

29. For **₹512.50** due 6 months at 15% p.a. Find the true present value and discounted value

30. Prathik sells out**₹**6000 of 7.5% stock at 108 and reinvests the proceeds in 9% stock. If Prathik's income increases by **₹**270, at what price did Prathik buy 9% stock?

31. A shopkeeper sells an item at the price of **₹**810 including ST of 8%. What should a customer pay for the same item, if the ST is reduced to 6%.

32. A spherical balloon is being inflated so that its volume is increasing at the rate of 30 cc/min. How fast its area increasing when its volume is 36π cc.

33. Evaluate: $\int \frac{3}{(x+1)(x+2)} dx$

34. Evaluate: $\int_1^2 x\, e^x\, dx$

PART-D

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

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

36. Resolve into partial fraction: $\frac{9}{(x+1)(x+2)^2}$

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

38. XYZ Company supplies water tankers to the Government. The first water tanker takes **₹**20,000 labour

hours. The government auditors suggest that there should be a 90% learning effect rate. The management expects an order of 8 water tankers in the next year. What will be the labour cost if the company will incur at the rate of ₹20 per hour.

39. Maximize: $Z = 2.5x + y$

Subject to the constraints $x + 3y \leq 12, 3x + y \leq 12$ and $x \geq 0, y \geq 0$

40. Prove that: $\frac{\sin 5A+\sin 4A+\sin 2A+\sin A}{\cos 5A+\cos 4A+\cos 2A+\cos A} = \tan 3A$

41. If $y = \log\left(x + \sqrt{x^2 + 1}\right)$ show that $(x^2 + 1)y_2 + xy_1 = 0$

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

b) The angle of elevation of the top of a tower from the base and top of a building are 60° and 45° respectively. The building is 20m high. Find the height of the tower. **(4 marks)**

(OR)

Find the value of $(1.02)^5$ using Binomial theorem, upto 4 decimal places.

PART-F

(Only for visually challenged students)

39. A firm manufactures two types of products A and B sells them at a profit at ₹2 on one unit of A and ₹3 on one unit of B. Each product is processed on 2 machines M1 and M2. Each A requires 1 hour of on M1 and 2 hours on M2. Each B requires 1hour of time on M1 and 1 hour on M2. The machine M1 is available for not more than 6 hours and machine M2 is available for 10 hours, per day. Formulate an LPP to find how many units of the 2 products must be produced so that the profit is maximized.