KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD–32
SAMPLE PAPER 02 FOR SESSION ENDING EXAM (2018-19)

SUBJECT: MATHEMATICS(041)

BLUE PRINT : CLASS XI

Unit	Chapter	VSA (1 mark)	SA (2 marks)	LA – I (4 marks)	LA– II (6 marks)	Total
Sets & functions	**Sets**	1(1)	--	4(1)	6(1)	**11(3)**
	Relations and Functions	--	**2(1)***	4(1)	--	**06(2)**
	Trigonometric Functions	--	2(1)	**4(1)***	**6(1)***	**12(3)**
Algebra	**Principle of Mathematical Induction**	--	--	--	**6(1)***	**6(1)**
	Complex Numbers and Quadratic Equations	--	2(1)	4(1)	--	**6(2)**
	Linear Inequalities	--	--	4(1)	--	**4(1)**
	Permutations and Combinations	**1(1)***	--	--	6(1)	**7(2)**
	Binomial Theorem	--	**2(1)***	**4(1)***	--	**6(2)**
	Sequences and Series	--	**2(1)***	--	**6(1)***	**8(2)**
Coordinate geometry	**Straight Lines**	1(1)	--	**4(1)***	--	**5(2)**
	Conic Sections	--	--	4(1)	--	**4(1)**
	Introduction to Three Dimensional Geometry	--	--	4(1)	--	**4(1)**
Calculus	**Limits and Derivatives**	--	2(1)	4(1)	--	**6(2)**
Mathematical reasoning	**Mathematical Reasoning**	1(1)	2(1)	--	--	**3(2)**
Statistics & probability	**Statistics**	--	--	--	6(1)	**6(1)**
	Probability	--	2(1)	4(1)	--	**6(2)**
	Total	**4(4)**	**16(8)**	**44(11)**	**36(6)**	**100(29)**

Note: * - Internal Choice Questions

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SUBJECT: MATHEMATICS **MAX. MARKS : 100**

CLASS : XI **DURATION : 3 HRS**

General Instruction:

(i) **All** questions are compulsory.
(ii) This question paper contains **29** questions.
(iii) Question **1- 4** in **Section A** are very short-answer type questions carrying **1** mark each.
(iv) Question **5-12** in **Section B** are short-answer type questions carrying **2** marks each.
(v) Question **13-23** in **Section C** are long-answer-I type questions carrying **4** marks each.
(vi) Question **24-29** in **Section D** are long-answer-II type questions carrying **6** marks each.

SECTION – A

Questions 1 to 4 carry 1 mark each.

1. Let A = { 1, 2, 3, 4, 5, 6}, B = { 2, 4, 6, 8 }. Find A – B and B – A.

2. If ${}^{16}C_r = {}^{16}C_{r+2}$, then find ${}^{r}C_4$

OR

Find n, if : Find the L.C.M. of 6!, 8!, 9!, 11!.

3. Line through the points (- 2, 6) and (4, 8) is perpendicular to the line through the points (8, 12) and (x, 24). Find the value of x.

4. Write converse of, if two lines are parallel, then they do not intersect in same plane.

SECTION – B

Questions 5 to 12 carry 2 marks each.

5. Let A = {1, 2, 3, 5} and B = {4, 6, 9}. Define a relation R from A to B by R = {(x, y) : x -y is odd natural number, x $\in$ A, y $\in$ B}. Write R in roster form.

6. Solve the equation: $\sqrt{5}x^2 + x + 5 = 0$.

7. Find the coefficient of x^6y^3 in the expansion of $(x + 2y)^9$.

OR

Find a positive value of m for which the coefficient of x^2 in the expansion $(1 + x)^m$ is 6.

8. One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be (i) a diamond (ii) not an ace

9. Write the component statements of the following compound statements and check whether the compound statement is true or false: "A line is straight and extends indefinitely in both directions."

10. Let A = {1, 2, 3, 4, 6}. Let R be the relation on A defined by {(*a*, *b*): *a*, *b* $\in$ A, *b* is exactly divisible by *a*}. (i) Find the domain of R (ii) Find the range of R.

OR

Let f = {(1, 1), (2, 3), (0, – 1), (–1, –3)} be a function from Z to Z defined by f (x) = ax + b, for some integers a and b. Determine a, b.

11. In any triangle ABC, prove that $\frac{\sin(A-B)}{\sin(A+B)} = \frac{(a^2-b^2)}{c^2}$

12. If a, b, c are in A.P., prove that the following is also in A.P. : b + c – a, c + a – b, a + b – c

OR

Insert 3 arithmetic means between 2 and 10.

SECTION – C

Questions 13 to 23 carry 4 marks each.

13. Find the domain and range of the function $f(x) = \sqrt{9-x^2}$

14. Show that for any sets A and B, A = (A $\cap$ B) $\cup$ (A – B) and A $\cup$ (B – A) = (A $\cup$ B)

15. A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of: (i) exactly 3 girls ? (ii) at least 3 girls ? (iii) at most 3 girls ?

16. Find the distance of the line $4x - y = 0$ from the point P (4, 1) measured along the line making an angle of 135° with the positive x-axis.

OR

In the triangle ABC with vertices A (2, 3), B (4, –1) and C (1, 2), find the equation and length of altitude from the vertex A.

17. The second, third and fourth terms in the binomial expansion $(x + a)^n$ are 240, 720 and 1080, respectively. Find x, a and n.

OR

The coefficients of three consecutive terms in the expansion of $(1 + a)^n$ are in the ratio 1: 7 : 42. Find n.

18. Find the modulus and argument of the complex number $\frac{1+i}{1-i} - \frac{1-i}{1+i}$.

19. Find the derivative of sin (5x – 8) with respect to first principle.

20. A point R with x-coordinate 4 lies on the line segment joining the points P(2, –3, 4) and Q (8, 0, 10). Find the coordinates of the point R.

21. A man running a racecourse notes that the sum of the distances from the two flag posts from him is always 10 m and the distance between the flag posts is 8 m. Find the equation of the posts traced by the man.

22. In a relay race there are five teams A, B, C, D and E. (a) What is the probability that A, B and C finish first, second and third, respectively. (b) What is the probability that A, B and C are first three to finish (in any order) (Assume that all finishing orders are equally likely)

23. Prove that: $\frac{\sin 7x + \sin 5x + \sin 9x + \sin 3x}{\cos 7x + \cos 5x + \cos 9x + \cos 3x} = \tan 6x$

OR

Solve : secx – tanx = $\sqrt{3}$

SECTION – D

Questions 24 to 29 carry 6 marks each.

24. Prove by Principle of Mathematical Induction $\forall n \in N$:

$$1.2.3 + 2.3.4 + 3.4.5 + ... + n(n+1)(n+2) = \frac{n(n+1)(n+2)(n+3)}{4}$$

OR

Prove that $\frac{1}{3.5} + \frac{1}{5.7} + \frac{1}{7.9} + ... + \frac{1}{(2n-1)(2n+1)} = \frac{n}{3(2n+3)}$ by principle of Mathematical induction for $\forall n \in N$

25. Find the sum of the following series up to n terms: $\frac{1^3}{1} + \frac{1^3 + 2^3}{1+3} + \frac{1^3 + 2^3 + 3^3}{1+3+5} + ...$

OR

Let S be the sum, P the product and R the sum of reciprocals of n terms in a G.P. Prove that $P^2R^n = S^n$.

26. If $\tan x = \frac{3}{4}, \pi < x < \frac{3\pi}{2}$ then find the value of $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ and $\tan\frac{x}{2}$.

OR

In any triangle ABC, prove that $(b^2 - c^2)\cot A + (c^2 - a^2)\cot B + (a^2 - b^2)\cot C = 0$.

27. A well known thinking about the students of senior secondary school is that they are brilliant, unique in maths. A maths teacher taught them properly and then he decided to take a test to justify them. He prepared a test consists 12 questions divided in two parts say part I and part II, containing 5 and 7 questions respectively. A student is required to attempt 8 questions in all, selecting atleast 3 from each part. In how many ways can a student select the questions ?

28. A college warded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got medals in all the three sports, how many received medals in exactly two of the three sports ? How many received exactly one medal of the three sports?

29. The mean of 5 observations is 4.4 and their variance is 8.24. If three of the observations are 1, 2 and 6, find the other two observations.