પુના International School
Shree Swaminarayan Gurukul, Zundal

Examination S A 1					
Student Name				**Grade 11(Sci)**	**SET - A**
Date				**Subject**	**MATHEMATICS**
		Time		**Total Marks**	**80**

General Instructions:

1. This question paper contains two parts A and B. Each part is compulsory. Part A carries 24 marks and Part B carries 56 marks

2. Part-A has Objective Type Questions and Part –B has Descriptive Type Questions

3. Both Part A and Part B have choices.

Part –A:

1. It consists of two sections-I and II.

2. Section I comprises of 16 very short answers type questions.

3. Section II contains 8 M C Q each carry 1 mark.

Part –B:

1. It consists of three sections-III, IV and V.

2. Section III comprises of 10 questions of 2 marks each

.3.SectionIV comprises of 7 questions of 3 marks each.

4. Section V comprises of 3 questions of 5 marks each

.5.Internal choice is provided in 3 questions of Section –III, 2 questions of Section-IV and 3 questions of Section-V. You have to attempt only one of the alternatives in all such questions.

Part –A

Section I

1. Which of the following are sets? Justify your answer.

The collection of all the months of a year beginning with the letter J.

Or

The collection of ten most talented writers of India.

2. Write the following sets in roster form:

$A = \{x : x \text{ isaninteger and } -3 < x < 7\}$

3. Write the following sets in the set-builder form: $\{3, 6, 9, 12\}$

Or

Write the following sets in the set-builder form: {2, 4, 8, 16,32}

4. If the set A has 3 elements and the set B = {3, 4, 5}, then find the number of elements in (A × B).

5. If G= {7, 8} and H = {5, 4, 2}, find G × H and H × G.

Or

If A × B = $\{(a,x),(a,y),(b,x),(b,y)\}$, find A and B.

6. Let A = {1, 2} and B = {3, 4}, write A X B. How many subsets will A X B have?

7. Find the radian measures corresponding to the following degree measures: 25^0

8. Find the degree measures corresponding to the following radian measures (Use π = 22/7)

11/16 Or

Find the degree measures corresponding to the following radian measures (Use π = 22/7)

-4

9. Find the angle in radians through which a pendulum swings if its length is 75 cm and the tip describes an arc of length: 10 cm

10. Express each of the complex numbers given in the exercises 1 to 10 in the form a+ib :

(5i) ($\frac{-3}{5}$ i)

.

11. Express each of the complex numbers given in the exercises 1 to 10 in the form a+ib:

$\mathbf{i^9 + i^{19}}$

12. Find the multiplicative inverse of each of the complex number: 4 – 3i

13. Solve 24x < 100 when: x is a natural number

14. Solve $-12x > 30$ when: (i) x is a natural number (ii) x is an integer

Or

Solve $5x - 3 < 7$ when: (i) x is an integer (ii) x is a real number

15. Solve the inequalities : 4x + 3 < 5x + 7

16. Solve the inequalities : 3x – 7 > 5x – 1

Section II

. M C Q each carry 1 mark.

17. The set congaing all the elements a, satisfy a is less than 5 and a ∈ N, is

a {1,2,3,4} b. {1,2,3,4,5} c. {5,6,7,8,9,10} d.{6,7,8,9,10}

18. Let A = {1, 2}, B = {3, 4} then, number of subsets of AXB is

a. 4 b. 8 c. 18 d. 16

19. The value of arg(x), when x < 0 is

a. 0 b. $\frac{\pi}{2}$ c. π d. none

20. If – 3x + 17 < - 13, then

a. x ∈ (10, ∞) b. x ∈ [10, ∞) c x ∈ (-∞ , 10] d. x ∈ [-10 , 10)

21. If $z = i^{-39}$, then simplest form of z is equal to

a. 1+0i b 0+I c 0+0i d. 1+i

22. The value of $\tan 1^0 \tan 2^0 \tan 3^0 \ldots\ldots\ldots \tan 89^0$ is

a. 0 b. 1 c. ½ d. Not define

23. If $x = \sqrt{-16}$, then

a. X= 4i b. x=4 c. x=-4 d. All of these

24. Which of the following is true?

a. 1 – i < 1 + i b. 2i + 1 > - 2i +1 c. 2i >1 d. None

Part –B

Section III

Comprises of 10 questions of 2 marks each

25. Which of the following are examples of the null set:

(i) Set of odd natural numbers divisible by 2.

(ii) Set of even prime numbers.

26. Which of the following sets are finite or infinite:

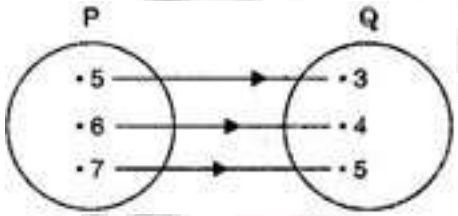
(i) The set of months of a year.

(ii) {1,2,3,..... }

27. Define a relation R on the set N of natural numbers R = $\{(x, y): y = x + 5, x$ is a natural number less than 4: $x, y \in N\}$. Depict this relationship using roster form. Write down the domain and the range.

Or

Figure shows a relationship between the sets P and Q. Write this relation:
(i) in set-builder form (ii) roster form



What is its domain and range?

28. Let A= $\{x, y, z\}$ and B = {1, 2}. Find the number of relations from A to B.

29. Find the values of other trigonometric functions: cosx = -1/2, x lie in third quadrant

30. Prove that:

. $$\sin^2\frac{\pi}{6} + \cos^2\frac{\pi}{3} - \tan^2\frac{\pi}{4} = -\frac{1}{2}$$

Or

. Prove that:

$$2\sin^2\frac{\pi}{6} + \operatorname{cosec}^2\frac{7\pi}{6}\cos^2\frac{\pi}{3} = \frac{3}{2}$$

31. solve each of the equation: $x^2 + 3 = 0$

32. Find the modulus and the argument of each of the complex numbers: $z = -1 - i\sqrt{3}$

Or

Find the modulus and the argument of each of the complex number: $z = -\sqrt{3} + i$

33. Solve the inequalities and show the graph of the solution on numberline: $3x - 2 < 2x + 1$

34. Solve the inequalities and show the graph of the solution on numberline: $5x - 3 \geq 3x - 5$

Section IV

Comprises of 7 questions of 3 marks each.

35. Are the following pairs of sets equal? Give reason.

A = {2, 3} and B = $\{x : x \text{ is a solution of } x^2 + 5x + 6\}$

Or

Are the following pairs of sets equal? Give reason.

A = $\{x : x \text{ is a letter in the word } FOLLOW\}$ and B = $\{y : y \text{ is a letter in the word } WOLF\}$

36. The CartesianProduct A X A has 9 elements among which are found (-1, 0) and (0, 1). Find the set A and the remaining elements of A x A.

37. Prove that: $\cot^2\frac{\pi}{6} + \operatorname{cosec}\frac{5\pi}{6} + 3\tan^2\frac{\pi}{6} = 6$

38. Find the value of: $\sin 75^0$

Or

. Find the value of: $\tan 15^0$

39. solve each of the following equations: $x^2 + 3x + 9 = 0$

40. solve each of the following equations: $\sqrt{2}\,x^2 + x + \sqrt{2} = 0$

41. Ravi obtained 70 and 75 marks in first two unit tests. Find the minimum marks he should get in the third test to have an average of at least 60 marks.

Section V

Comprises of 3 questions of 5 marks each

42. Find the union of each of the following pairs of sets:

(i) X = {1, 3, 5} and Y = {1, 2, 3}

(ii) A = {a,e,i,o,u} and B = {a,b,c}

(iii) A = {x:x is a natural number and multiple of 3} and B = {x:x is a natural number less than 6}

(iv) A = {x:x is a natural number and $1 < x \leq 6$} and B = {x:x is a natural number and 6<x<10}

(v) A = {1, 2, 3} and B = ϕ

Or

Solve each of the following equations: $x^2 + \frac{x}{\sqrt{2}} + 1 = 0$

43. Prove that: $\dfrac{\cos(\pi+x)\cos(-x)}{\sin(\pi-x)\cos\left(\frac{\pi}{2}+x\right)} = \cot^2 x$

Or

. Prove that: $\dfrac{\tan\left(\frac{\pi}{4}+x\right)}{\tan\left(\frac{\pi}{4}-x\right)} = \left[\dfrac{1+\tan x}{1-\tan x}\right]^2$

44. To receive Grade 'A' in a course, one must obtain an average 90 marks or more in five examinations (each of 100 marks). If Sunita's marks in first four examinations are 87, 92, 94 and 95, find minimum marks that Sunita must obtain in fifth examination to get Grade 'A' in the course.