

**Class: XI**

**I Terminal Exam(Re- exam)**

**Marks: 80**

**Time:3 hrs**

**Mathematics (041)**

**Date: 10/08/2019**

**SECTION-A**

**Question numbers 1 to 4 carry 1 mark each.**

1. How many elements has  $P(A)$ , if  $A = \phi$
2. Let  $U = \{1, 2, 3, 4, 5, 6\}$ ,  $A = \{2, 3\}$ . Find the complement of  $A$ .
3. Write the domain of the function  $f(x) = \sqrt{x}$
4. Find the value of  $\tan 300^\circ$ .

**SECTION-B**

**Question numbers 5 to 12 carry 2 marks each.**

5. Draw appropriate Venn diagram for  $A' \cup B'$
6. The Cartesian product  $A \times A$  has 9 elements among which are found  $(-1, 0)$  and  $(0, 1)$ . Find the set  $A$  and the remaining elements of  $A \times A$ .
7. Let  $N$  be the set of natural numbers and the relation  $R$  to be defined on  $N$  such that  $R = \{(x, y) : y = 3x, x, y \in N\}$ . What is the domain and range of  $R$ ?
8. Convert  $45^\circ 30'$  into radian measure .
9. Solve  $5x - 8 > 7$ , when (i)  $x$  is an integer (ii)  $x$  is a real number
10. Simplify:  $i^2 + i^3 - i^{15} + 3i^{17}$  .
11. Express the complex number in standard form:  $\frac{4+i}{-i-3}$  .
12. Write down all the subsets of the set  $\{1, 2\}$ .

**SECTION-C**

**Question numbers 13 to 21 carry 4 marks each.**

13. A school awarded 38 medals for Football, 15 in basketball and 20 in cricket. If these medals went to 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?

14. (i) Define a relation R on the set N of natural numbers by  
 $R = \{(x, y) : y = x - 5, x \in N, x < 5, y \in N\}$ . Depict this relation using roster form.  
 Write the domain and its range.
- (ii) If in two circles, arcs of the same length subtend angles  $65^\circ$  and  $110^\circ$  at the centre, find the ratio of their radii.
15. Show that  $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$ .
16. Prove that  $(\cos x - \cos y)^2 + (\sin x - \sin y)^2 = 4 \sin^2 \left( \frac{x - y}{2} \right)$
17. Find the values of (i)  $\cos 3\pi$  (ii)  $\tan \frac{3\pi}{2}$  (iii)  $\sin \frac{5\pi}{4}$  (iv)  $\sec \frac{2\pi}{3}$ .
18. Convert the complex number  $1 - i\sqrt{3}$  into polar form **(OR)**  
 Solve  $37 - (3x + 5) \geq 9x - 8(x - 3)$ .
19. Find the real values of  $x$  and  $y$  for which the following equation is satisfied.  
 $(1 + i)y^2 + (6 + i) = (2 + i)x$
20. Prove that  $\frac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x} = \cot x$  **(OR)**  
 If  $\cos x = \frac{-3}{5}$ ,  $x$  lies in II quadrant, find the values of other five trigonometric functions.
21. Solve:  $x^2 + \frac{x}{\sqrt{3}} - 1 = 0$ .

#### SECTION-D

**Questions 22 to 25 carry 6 marks each.**

22. (i) Find the value of  $2 \tan^2 \frac{3\pi}{4} + 2 \sec^2 \frac{\pi}{3} - 2 \sec^2 \frac{\pi}{3}$   
 (ii) A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second?
23. Prove that  $\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x$
24. Find the values of (i)  $\sin 105^\circ$  (ii)  $\cos 15^\circ$ .
25. Prove that  $\cos 6x = 32 \cos^6 x - 48 \cos^4 x + 18 \cos^2 x - 1$ .

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