# First Term Examination (19 September 2017)

## Class XI Sub - Mathematics (Set-B)

Time 3hrs

Note: i) All questions are compulsory.

- ii) This question paper contains 29 questions.
- iii) Question 1-4 in Section A carry 1 mark each.
- iv) Question 5-12 in Section B carry 2 marks each.
- v) Question 13-23 in Section C carry 4 marks each.
- vi) Question 24-29 in Section D carry 6 marks each.

### **SECTION - A**

- Q1. Write negation of the sentence, " $\sqrt{7}$  is a rational number"
- Q2. Find value of  $\tan \frac{19\pi}{3}$
- Q3. Solve 7x + 3 < 5x + 9. Show the graph of solution on number line.
- Q4. Let  $A\{1,2,3,4,5...10\}$ ,  $B\{2,3,5,7\}$ . Show that  $A \cap B = B$

### SECTION - B

Q5. Find values of other five trigonometric functions if  $Cos x = \frac{-1}{2}$ ; x lies in 3<sup>rd</sup> quadrant

Q6. Solve  $\frac{2x+4}{x-1} \ge 5$ 

- Q7. Find the component of the statement, "All primes are either odd or even" and check whether it is true or false.
- Q8. Prove that  $\sin^2 6x \sin^2 4x = \sin 2x \cos 10x$
- Q9. Let *A*{1,2,3}, *B*{1,2,3,4,5}. Is ACB? What is AUB?

Q10. Express: 
$$\frac{(3+i\sqrt{5})(3-i\sqrt{5})}{(\sqrt{3}+\sqrt{2}i)-(\sqrt{3}-i\sqrt{2})}$$
 in  $a+ib$  form

Q11. Prove that 
$$\frac{\tan\left(\frac{\pi}{4} + x\right)}{\tan\left(\frac{\pi}{4} - x\right)} = \left(\frac{1 + \tan x}{1 - \tan x}\right)^2$$

Q12. Solve 
$$\frac{1}{2}\left(\frac{3x}{5}+4\right) \ge \frac{1}{3}(x-6)$$

**M.M. 100** 

#### **SECTION - C**

- Q13. Prove by PMI  $3^{n+2} 8n 9$  is divisible by 8.
- Q14. Draw appropriate Venn diagrams for (i)  $(A \cup B)'$  (ii)  $(A \cap B)'$
- Q15. Complete mean deviation from the Median of following data:

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	10	20	5	10

- Q16. Find the general and principal solution of  $\cos 3x + \cos x \cos 2x = 0$
- Q17. Convert the following in the polar form :  $\frac{1+7i}{(2-i)^2}$
- Q18. Solve  $\sqrt{3}x^2 \sqrt{2}x + 3\sqrt{3} = 0$  by factorization method.
- Q19. Find real values of x & y for which  $-3 + ix^2 y$  and  $x^2 + y + 4i$  are conjugate of each other.
- Q20. Solve for real *x*, |x+1| + |x| > 3

Q21. Rewrite the following statement with 'if-then' in fine different ways:

"If a natural number is odd, then its square is also odd".

- Q22. Ravi obtained 80 and 75 marks in first unit test. Find minimum marks he should get in the third test to have an average of atleast 70 marks.
- Q23. Prove that  $(\cos x \cos y)^2 + (\sin x \sin y)^2 = 4\sin^2 \frac{x y}{2}$ SECTION - D
- Q24. Solve  $x^2 (7-i)x + (18-i) = 0$  by using general expression for the roots of quadratic equations.
- Q25. Exhibit graphically the solution set of linear in equations  $x + y \ge 1$ ,  $7x + 9y \le 63$ ,  $x \le 6$ ,  $y \le 5$

Q26. If 
$$\sin x = \frac{\sqrt{5}}{3}$$
 and x lies in 2<sup>nd</sup> quadrant then find values of  $\cos \frac{x}{2}$ ,  $\sin \frac{x}{2}$  and  $\tan \frac{x}{2}$ 

Q27. Calculate Mean, Variance and standard Deviation for the following distribution:

Marks	20-30	30-40	40-50	50-60	60-70	70-80	80-90		
No. of students	3	6	13	15	14	5	4		
n(n+1)(n+2)(n+3)									

Q28. Prove by PMI 1.2.3+2.3.4+--+ $n(n+1)(n+2) = \frac{n(n+1)(n+2)(n+3)}{4}$ 

- Q29. In a survey of 25 students, it was found that 15 had taken mathematics, 12 had taken Physics and 11 had taken Chemistry, 5 had taken Maths & Chemistry 9 had taken Maths & Physics 4 had taken Physics & Chemistry and 3 had taken all three subjects. Find the number of students that had taken:
  - i) Only Physics
  - ii) Only Mathematics
  - iii) Only Chemistry