

**FIRST YEAR HIGHER SECONDARY SAMPLE QUESTION PAPER 2023**  
**MATHEMATICS(COMMERCE)**

Time : 2Hours  
Cool off time 15 minutes

Maximum ; 60 Scores

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**Answer any 6 from 1 to 8. Each carries 3 scores**

1. Let  $A = \{1, 2, 3, 4, 5, 6\}$  and  $B = \{x : x \text{ is a natural number between 4 and 10}\}$   
Find a) Write B in roaster form . (1)  
b) Find  $A \cup B$  and  $A - B$  (2)
2. Solve the inequality for real x and show the graph of the solution on number Line  $4x + 5 < 2x + 3$  (3)
3. Let  $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$   
Define a relation R from A to A by  $R = \{(x, y) : y = 2x\}$   
a) write the relation in Roaster Form (1)  
b) Write down the domain, co domain and the range of R (2)
4. i) Evaluate  $6!$  (1)  
ii) If  $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$ , Find x ? (2)
5. Write the following Complex Number in a+ib form  
a)  $i^9 + i^{20}$  (1)  
b)  $(4 + 3i)(8 + 5i)$  (2)
6. Find the equation of the circle with the centre (-2,3) and the radius 4. (3)
7. Evaluate  
a)  $\lim_{x \rightarrow 1} x^2 + 2$  (1)  
b)  $\lim_{x \rightarrow 0} \frac{\sin 6x}{x}$  (2)
8. What is the probability that a leap year may contain at least 53 sundays. (3)

**Answer any 6 from 9 to 16. Each question contain 4 marks.**

9. a) Let  $f(x) = x^2 + 1$  and  $g(x) = 2x$ . Find  $(f+g)(x)$ . (1)  
b) Draw the graph of the function  $f(x) = |x| - 1$ . Find the range and domain (3)
10. Find  $(a + b)^4 + (a - b)^4$ . Hence evaluate  $(\sqrt{5} + \sqrt{2})^4 + (\sqrt{5} - \sqrt{2})^4$  (4)
11. a) Find  $\frac{d}{dx}(\log x)$  (1)

- b) Find the derivative of  $\sin x$  using First principle (3)
12. a) The point  $(6, -3, -1)$  lies in the \_\_\_\_\_ octant (1)
- b) Verify that  $(0, 7, 10)$ ,  $(-1, 6, 6)$  and  $(-4, 9, 6)$  are the vertices of a right-angled triangle. (3)
13. a) If  ${}^nC_8 = {}^nC_{10}$ , then  $n =$  \_\_\_\_\_ (1)
- b) A committee of 4 persons is to be constituted from a group of 3 men and 2 women. In how many ways can this be done? How many of these committees would consist of 2 men and 2 women? (4)
14. a) Convert  $45^\circ$  into radian measure. (1)
- b) Prove that  $\frac{\sin 5x + \sin 3x}{\cos 5x - \cos 3x} = -\cot x$  (3)
15. Consider the ellipse  $\frac{x^2}{4} + \frac{y^2}{25} = 1$ , Find the Coordinates of the foci, the vertices, the length of major axis, centricity and the length of the latus rectum (4)
16. The marks obtained by 40 students in Mathematics test are given below.  
Calculate i) Mean (1)  
ii) Mean deviation about Mean (3)

Marks	2	5	6	8	10	12
No: of Students	2	8	10	7	8	5

**Answer any 3 from 17 to 20. Each question contain 6 marks.**

17. a) Find the sum of the sequence  $7, 77, 777, 7777, \dots$  to  $n$  terms. (3)
- b) Insert 3 numbers between 1 to 256 such that the resulting sequence is a G.P. (3)
18. a) Write the equation of the line through the points  $(1, -1)$  and  $(3, 5)$  (3)
- b) Write the equation of the lines for which  $\tan \theta = 1/2$ , where  $\theta$  is the inclination of the line and i)  $y$  intercept is  $-3/2$  (3)  
ii)  $x$  intercept is 4
19. a) If  $E$  and  $F$  are mutually independent events such that  
 $P(E) = \frac{1}{4}$ ,  $P(F) = \frac{1}{2}$  and  $P(E \cap F) = \frac{1}{8}$   
Find i)  $P(E \text{ or } F)$  (1)  
ii)  $P(\text{not } E \text{ and not } F)$  (1)

b) In a class of 60 students 30 opted for NCC,32 opted for NSS and 24 opted for both NCC and NSS. If one of these students is selected at random ,

Find the probability that

i)The student has opted neither NCC nor NSS. (2)

ii)The student had opted NSS but not NCC (2)

20. Using the following frequency distribution table :

Calculate i) Mean,  $\bar{x}$  (2)

ii) Variance (3)

iii) Standard Deviation ( $\sigma$ ) (1)

Marks Obtained	0 -10	10 - 20	20 -30	30 - 40	40 – 50	50 - 60
Number of Students	12	18	27	20	17	6

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