

# DELHI PUBLIC SCHOOL, JAMMU

## CLASS -XI

### ASSIGNMENT FOR FINAL EXAMINATION

#### SECTION-A (1 mark each)

- Q1. Find the number of subsets of a set  $A = \{a, b, c\}$ .
- Q2. Write the equation of any line which is perpendicular to the line  $3x - 4y + 9 = 0$
- Q3. Write the derivative of  $\log_a x$  with respect to  $x$ .
- Q4. Two vertices of a triangle are  $(2, -6, 4)$ ,  $(4, -2, 3)$  and its centroid is  $(8/3, -1, 3)$ . Find third vertex.

#### SECTION – B (2 marks each)

- Q5. Write the negation of the following statement: "The number 2 is greater than 7"
- Q6. Find the centre and radius of the circle  $x^2 + y^2 - 4x + 6y = 12$ .
- Q7. Find the focus and directrix of the parabola  $2x^2 + y = 0$ .
- Q8. Define Modulus function, draw its graph.
- Q9. If  ${}^{16}C_r = {}^{16}C_{r+2}$ , then find  ${}^r C_4$ .
- Q10. If  $\tan \theta = m/m+1$  and  $\tan \phi = 1/2m+1$ , prove that  $\theta + \phi = \pi/4$
- Q11. A ball is drawn from the urn containing one red ball and one black ball. If the ball drawn is red, a coin is tossed and if it is black, a die is thrown. What is the probability of getting an even number?
- Q12. Find the value of  $(\sqrt{-16+30i}) + (\sqrt{-16-30i})$ .

#### SECTION – C (4 marks each)

- Q13. If  $a + b + c \neq 0$  and  $b+c/a, c+a/b, a+b/c$  are in A.P., then prove that  $1/a, 1/b, 1/c$  are also in A.P.
- Q14. Let  $A = \{1, 2, 3, 4, 5\}$ ,  $B = \{2, 3\}$ ,  $C = \{5\}$ . Verify that  $A - (B \cap C) = (A - B) \cup (A - C)$ .
- Q15. Evaluate  $\lim_{x \rightarrow \pi} [\sin(\pi+x)/\pi(\pi-x)]$ .
- Q16. A manufacturer has 600 litres of a 12% solution of acid. How many litres of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 18%.
- Q17. Prove by the principle of mathematical induction that for all  $n \in \mathbb{N}$ :  $1+4+7+\dots+(3n-2) = 1/2 n(3n-1)$ .
- Q18. 5 men and 4 women are to be seated in a row so that women occupy even places. How many such arrangements are possible?
- Q19. Prove that:  $\cos 2x + \cos 2(x+\pi/3) + \cos 2(x-\pi/3) = 3/2$ .
- Q20. Find the domain and range of the function:  $F(x) = x - 4/\sqrt{x-4}$
- Q21. Show that the area of the triangle formed by the lines  $y = m_1x + c_1$ ,  $y = m_2x + c_2$  and  $x = 0$  is

$$(c_1 - c_2) / 2|m_1 - m_2|$$

Q22. Solve the given system of inequalities graphically:  $x - 2y \leq 3$ ,  $3x + 4y \geq 12$ ,  $x \geq 1$ ,  $y \geq 1$ .

Q23. A survey was conducted on students of a hostel, to know about their drinking habits, there are 400 students. Out of these 250 take tea and 200 take milk whereas 50 take neither of these. How many students take both milk and tea?

SECTION – D (6 marks each)

Q24. Calculate the mean and variance for the following distribution:-

Classes	30-40	40-50	50-60	60-70	70-80	80-90	90-100
frequency	3	7	12	15	8	3	2

Q25. If in any  $\Delta ABC$ ,  $b + c/12 = c + a/13 = a + b/15$ , then prove that  $\cos A/2 = \cos B/2 = \cos C/11$ .

Q26. Find the equation of the circle which passes through the points (2, -2) and (3, 4) and whose centre lies on the line  $x + y = 1$ .

Q27. 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 consist of 12 questions divided into 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 at least 3 from each part. In how many ways can a student select the questions? suggest any other quality of students, that should be judge by teacher through the test.

Q28. The third, fourth and fifth terms in the expansion of  $(x + a)^n$  respectively 84, 280 and 560, find the value of  $x$ ,  $a$  and  $n$ .

Q29. If the sum of  $n$  terms of two arithmetic progressions are in the ratio  $14 - 5n : 3n + 5$ , find the ratio of their 8<sup>th</sup> term.