

# INTERNATIONAL INDIAN SCHOOL, DAMMAM

II<sup>nd</sup> TERM EXAMINATIONS NOV-2014

SET-A

GRADE: XI

Max Marks-100

SUBJECT: MATHEMATICS

Time -3hours

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## General Instructions

1. All questions are compulsory.
2. The question paper consists of 26 questions divided into three sections A, B, C
3. Section A contains 6 questions of 1 mark each, section B contains 13 questions of 4 marks each and section C contains 7 questions of 6 marks each.

### SECTION-A (6X1 = 6 Marks)

- 1) Find the slope of a line which makes an angle of  $\frac{5\pi}{3}$  with positive x-axis.
- 2) Find the 4<sup>th</sup> term in the expansion of  $(x - 2y)^{12}$ .
- 3) If 5, x, 125 are in G.P, then find the value of x.
- 4) Find  ${}^n C_{10}$  if  ${}^n C_5 = {}^n C_7$
- 5) If n(A) = 2 & n(B) = 3, then find the number of relations from A to B.
- 6) Find the value of  $\tan 15^\circ$

### SECTION-A (13X4 = 52 Marks)

- 7) The sum of two numbers is 6 times their G.M, show that the numbers are in the  $(3+2\sqrt{2}) : (3-2\sqrt{2})$

OR

Find the sum of  $1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \dots$  up to n terms.

- 8) The number of students who joined the "Keep your place clean" campaign are represented by 13<sup>th</sup> term in the expansion of  $(9x - \frac{1}{3\sqrt{x}})^{18}$  find the number of students. Do you also wish to join this campaign?
- 9) The derivative of  $x^4(5\sin x - 3\cos x)$  w.r.t x.

OR

Evaluate  $\lim_{x \rightarrow 0} \frac{\sin ax + bx}{ax + \sin bx}$

- 10) Find the general solutions of  $7\cos^2x + 3\sin^2x = 4$
- 11) Find the number of arrangement of the letters of the word **INDEPENDENCE**,  
In how many of these arrangements do all vowels always occur together?
- 12) The sum of three numbers in G.P is 56, if we subtract 1,7,21 from these numbers in that order, we obtain an A.P, find the numbers.
- 13) Find  $(a + b)^4 - (a - b)^4$ . Hence evaluate  $(\sqrt{3} + \sqrt{2})^4 - (\sqrt{3} - \sqrt{2})^4$
- 14) Find the equation of the line passing through  $(-3, 5)$  and perpendicular to the line through the points  $(2, 5)$  and  $(-3, 6)$ .
- 15) Prove that  $\cos\left(\frac{\pi}{4} + x\right) + \cos\left(\frac{\pi}{4} - x\right) = \sqrt{2}\cos x$
- 16) Find the domain and range of  $f(x) = \sqrt{16 - x^2}$
- 17) Let  $U = \{x \in N: x \leq 9\}$ ,  $A = \{x: x \text{ is an even number}, 0 < x < 10\}$ ,  
 $B = \{2,3,5,7\}$ , Verify that  $(A \cup B)' = A' \cap B'$
- 18) Find the equation of the line through the point  $(0,2)$  making an angle  $\frac{2\pi}{3}$  with the positive  $x$ - axis. Also find the equation of the line parallel to it and crossing the  $y$ -axis at a distance of 2 units below the origin.
- 19) Determine  $n$  if  ${}^{2n}C_3 : {}^nC_3 = 11: 1$

**SECTION-C (7X6 = 42 Marks)**

- 20) In a  $\Delta ABC$  prove that:  $\frac{b^2 - c^2}{a^2} \sin 2A + \frac{c^2 - a^2}{b^2} \sin 2B + \frac{a^2 - b^2}{c^2} \sin 2C = 0$
- 21) In a class of 60 students, 23 play Hockey, 15 plays Basketball and 20 play Cricket. 7 play Hockey and Basketball, 5 play Cricket and Basketball, 4 play Hockey and Cricket and 15 do not play any of these games. Find: (i) How many play all three games? (ii) How many play Hockey but not Cricket? (iii) How many play Hockey and Cricket but not Basketball?

22) The 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> terms in the expansion of  $(x + a)^n$  are 240,720 and 1080 respectively. Find  $x, a$  &  $n$ .

23) Find the derivative of  $\sqrt{\frac{\sec 2x - 1}{\sec 2x + 1}}$

24) In  $\Delta ABC$  with vertices  $A(2,3), B(4,-1)$  and  $C(1,2)$ , find the equation and length of altitude from the vertex  $A$ .

25) Let  $S$  be the sum,  $P$  the product and  $R$  the sum of reciprocals of  $n$  terms in a G.P. Prove that  $P^2 R^n = S^n$

26) What is the number of ways of choosing 4 cards from a pack of 52 playing

Cards? In how many of these

(i) four cards of belong to four different suits,

(ii) two red and two black cards,

(iii) cards are of same colour ?

OR

In how many ways can the letters of the word PERMUTATIONS be arranged if

(i) words start with P and end with S ?

(ii) vowels are all together?