

INTERNATIONAL INDIAN SCHOOL - DAMMAM

SECOND TERM EXAMINATION- NOV.2017

CLASS : XI

SET - A

SUBJECT: MATHEMATICS

Max Marks : 100

Time: 3 hours

General Instructions:

1. All questions are compulsory.
2. The question paper consists of 29 questions divided into four sections A, B, C, D, Section A contains 4 questions of 1 mark each, Section B is of 8 questions of 2 marks each section C is of 11 questions of 4 marks each and Section D is of 6 questions of 6 marks each.
3. Use of calculator is not permitted. You may ask for logarithmic tables, if required.

Section. A

- 1) How many triangles can be formed by joining the vertices of an octagon ?
- 2) Evaluate $\lim_{x \rightarrow 0} \frac{\sin 3x}{x}$
- 3) Find the sum to infinity of the G.P 6, 1.2, 0.24,
- 4) Find the distance between the parallel lines $12x + 5y - 34 = 0$ and $12x + 5y = 31$.

Section. B

- 5) Find the value of $\sin 1020^\circ$.
- 6) If $\frac{1}{9!} + \frac{1}{10!} = \frac{n}{11!}$ find n ?
- 7) If the 4th, 10th, and 16th terms of a G.P are x, y, z respectively. Prove that x, y, z are in G.P.
- 8) Find the 11th term from the end in the expansion of $\left(2x - \frac{1}{x^2}\right)^{25}$
- 9) Prove that $\frac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x} = \cot x$.
- 10) If $U = \{1,2,3,4,5,6\}$ $A = \{2,3\}$ and $B = \{3,4,5\}$ then show that $(A \cup B)' = A' \cap B'$

11) Evaluate $\lim_{x \rightarrow 0} \left(\frac{e^{\sin x} - 1}{x} \right)$

12) A man has 6 friends. In how many ways can he invite one or more of his friends to a party?

Section. C

13) Prove that $\tan 4x = \frac{4 \tan x (1 - \tan^2 x)}{1 - 6 \tan^2 x + \tan^4 x}$

OR

Prove that $\frac{\sin 5x - 2 \sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

14) Find the term which is independent of x in the expansion of $\left(x^2 + \frac{1}{x}\right)^9$

15) If $A = \{1, 2, 4, 5\}$, $B = \{2, 3, 5, 6\}$ and $C = \{4, 5, 6, 7\}$ then verify

(i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

(ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

16) Find the equation of the line passing through the point of intersection of the lines

$3x + 4y - 7 = 0$ and $x - y + 2 = 0$ and whose slope is 5.

17) Find the coefficient of x^{32} in the expansion of $(1 + 4x + 4x^2)^{17}$

OR

Prove that the coefficient of x^n in the expansion of $(1 + x)^{2n}$ is twice the coefficient of x^n in the expansion of $(1 + x)^{2n-1}$.

18) How many different words with or without meaning can be formed with the letters of the word BHARAT? In how many of these, B and H are never come together? How many of these begin with B and end with T?

19) If $\sin x = \frac{1}{4}$ and x is in quad II then find $\sin \frac{x}{2}$, $\cos \frac{x}{2}$, and $\tan \frac{x}{2}$.

20) Find the sum to n terms of the sequence 8, 88, 888, 8888, ...

21) Evaluate $\lim_{x \rightarrow 2} \left(\frac{x^{10} - 1024}{x^5 - 32} \right)$

- 22) Find the angle between the straight lines $y - \sqrt{3}x - 5 = 0$ and $\sqrt{3}y - x + 6 = 0$.
- 23) The product of three numbers in an A.P is 224 and the largest is 7 times the smallest. Find the numbers?

OR

Find the sum to n terms of the series $5 + 11 + 19 + 29 + 41 + \dots$

Section. D

- 24) (a) Differentiate the function $\frac{\sin x - x \cos x}{x \sin x + \cos x}$.

(b) Evaluate $\lim_{x \rightarrow 0} \left(\frac{\sin \frac{x}{4}}{3x} \right)$

- 25) Find the general solution of the trigonometric equation $2 \sin x + \sqrt{3} \cos x = 1 + \sin x$

OR

Prove that $\sin 3x + \sin 2x - \sin x = 4 \cos \frac{x}{2} \cos \frac{3x}{2} \sin x$

- 26) In a town of 10,000 families, it was found that 40% families buy newspaper A, 20% families buy newspaper B and 10% families buy newspaper C. 5% buy A and B, 3% buy B and C, 4% buy A and C. If 2% buy all three, find the number of families which buy news paper

- (i) A only (ii) B only (iii) None of three
- (iv) Why according to you it is important to read newspaper daily?

- 27) Find the equation of the lines through the point (3, 2) which makes an angle 45° with the line $x - 2y = 3$.

OR

If p and q are the length of perpendiculars from the origin to the lines

$x \cos \theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y \operatorname{cosec} \theta = k$ respectively, prove that

$p^2 + 4q^2 = k^2$

28) The second third and fourth terms in the binomial expansion $(x + a)^n$ are 240, 720 and 1080 respectively. Find x , a , and n .

OR

Show that the middle term in the expansion of $(1 + x)^{2n}$ is $\frac{1.3.5\dots(2n-1)}{n!} 2^n x^n$

29) Find the sum of the following series up to n terms

$$\frac{1^2}{1} + \frac{1^2+2^2}{2} + \frac{1^2+2^2+3^2}{3} + \dots$$
