

INTERNATIONAL INDIAN SCHOOL, DAMMAM

FIRST TERMINAL EXAMINATIONS, JUNE-2012

SET-B

GRADE: XI

Max Marks-100

SUBJECT: MATHEMATICS

Time – 3 hours

General Instructions

1. All questions are compulsory.
2. the question paper consists of 29 questions divided into three sections A, B, C
- 3, Section A contains 10 questions of 1 mark each, section B contains 12 questions of 4 marks each and section C contains 7 questions of 6 marks each.

SECTION-A (10X1=10 Marks)

- 1) If R is the set of real numbers and Q is the set of rational numbers, then what is $R - Q$?
- 2) If power set of the set A have 32 elements, then how many elements A have?
- 3) Find the value of $\cot \frac{19\pi}{3}$
- 4) Find radian measure of $40^{\circ}20'$
- 5) If $n(A) = m$ and $n(B) = n$, then how many relations are possible from set A to set B.
- 6) Evaluate $\lim_{x \rightarrow 0} \frac{5 \tan 5x}{x}$
- 7) Find the principal solutions of $\sec x = -2$
- 8) Find multiplicative inverse of $2 + 3i$
- 9) If $f(x) = x^2 - 1$ and $g(x) = 2x + 3$, find $(fg)(x)$
- 10) Find modulus of $\frac{1}{1-i}$

SECTION-B (12X4 = 48 Marks)

- 11) Solve the following inequality $6 \leq -3(2x - 4) < 12$



$(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$

13) If $f(x) = \frac{1-x^2}{1+x^2}$, show that $f(\tan \theta) = \cos 2\theta$

14) If $(x + iy)^3 = u + iv$, then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$

15) Prove in ΔABC , $\frac{b^2 - c^2}{a^2} = \frac{\sin(B-C)}{\sin(B+C)}$

16) If $P(A) = P(B)$, then prove that $A = B$.

17) Draw the graph of the following function

$$f(x) = \begin{cases} 1 - X, & x < 0 \\ 1, & x = 0 \\ x + 1, & x > 0 \end{cases}$$

18) Solve the following equation: $\tan^2 x + (1 - \sqrt{3})\tan x - \sqrt{3} = 0$

19) Find square root of $(-5 + 12i)$

OR

Convert $\frac{-16}{1+i\sqrt{3}}$ into polar form.

20) If $A = \{ 1,2,3 \}$, $B = \{ 2,3,3 \}$ & $C = \{ 4,5 \}$, verify that

$A \times (B \cup C) = (A \times B) \cup (A \times C)$ & $A \times (B - C) = (A \times B) - (A \times C)$

21) Evaluate $\lim_{x \rightarrow 0} \frac{\cos 2x - 1}{\cos 2x + 1}$

22) Prove that $\frac{\sin^2 A - \sin^2 B}{\sin A \cos A - \sin B \cos B} = \tan(A + B)$

OR

Show that $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$

[Type text]

OR

If $\tan x = -\frac{4}{3}$ (X lies in 2nd quadrant), find $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ & $\tan\frac{x}{2}$

25) Solve graphically: $2x+y \geq 4$; $x+y \leq 3$; $2x-3y \leq 6$; $x \geq 0$; $y \geq 0$

26) Solve the following quadratic equation:

$$X^2 - (7 - i)x + (18 - i) = 0$$

27) (i) Find the domain of the following function: $f(x) = \frac{x^2+2x+1}{x^2-8x+12}$

(ii) Find domain & range of - $f(x) = \frac{3-x}{x-3}$

28) (i) Find derivative of $\frac{x^2 \cos x}{\sin x}$

(ii) Find derivative of $\sin 2x$ by first principle.

29) In a class of 60 students, 23 plays Volleyball, 15 plays Basketball, 20 play Football, 7 play Volleyball & Basketball, 5 play Football & Basketball, 4 play Volleyball & Football, 15 students do not play any game, find

(i) How many play all three games?

(ii) How many play only Football?

(iii) How many play Volleyball & Football but not Basketball?



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SECTION-A (10X1=10 Marks)

- 1) If R is the set of real numbers and Q is the set of rational numbers, then what is $R - Q$?
- 2) If power set of the set A have 16 elements, then how many elements A have?
- 3) Find the value of $\tan \frac{19\pi}{3}$
- 4) Find radian measure of $36^{\circ}18'$
- 5) If $n(A) = 3$ and $n(B) = 2$, then how many relations are possible from set A to set B.
- 6) Evaluate $\lim_{x \rightarrow 0} \frac{5 \sin 5x}{x}$
- 7) Find the principal solutions of $\operatorname{cosec} x = -2$
- 8) Find multiplicative inverse of $2 - 3i$
- 9) If $f(x) = x^2$ and $g(x) = 2x + 1$, find $(fg)(x)$
- 10) Find modulus of $\frac{1}{1+i}$

SECTION-B (12X4 = 48 Marks)

- 11) If $P(A) = P(B)$, then prove that $A = B$.



[Type text]

12) Find square root of $(-5 + 12i)$

OR

Convert $\frac{-16}{1+i\sqrt{3}}$ into polar form.

13) Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{2, 4, 6, 8\}$ & $B = \{2, 3, 5, 7\}$, verify that $(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$

14) Draw the graph of the following function

$$f(x) = \begin{cases} 1 - X, & x < 0 \\ 1, & x = 0 \\ x + 1, & x > 0 \end{cases}$$

15) If $f(x) = \frac{1-x^2}{1+x^2}$, show that $f(\tan \theta) = \cos 2\theta$

16) Solve the following inequality $6 \leq -3(2x - 4) \leq 12$

17) Prove in ΔABC , $\frac{b^2 - c^2}{a^2} = \frac{\sin(B-C)}{\sin(B+C)}$

18) Evaluate $\lim_{x \rightarrow 0} \frac{\cos 2x - 1}{\cos 2x + 1}$

19) If $A = \{1, 2, 3\}$, $B = \{2, 3, 3\}$ & $C = \{4, 5\}$, verify that

$$A \times (B \cup C) = (A \times B) \cup (A \times C) \text{ \& } A \times (B - C) = (A \times B) - (A \times C)$$

20) If $(x + iy)^3 = u + iv$, then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$

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OR

Show that $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$

22) Solve the following equation: $\tan^2 x + (1 - \sqrt{3})\tan x - \sqrt{3} = 0$

SECTION-C (7 X 6 = 42 Marks)

23) Prove that $\frac{\sin 3x + \sin 5x + \sin 7x + \sin 9x}{\cos 3x + \cos 5x + \cos 7x + \cos 9x} = \tan 6x$

24) In any ΔABC , prove that

$$(b^2 - c^2)\cot A + (c^2 - a^2)\cot B + (a^2 - b^2)\cot C = 0$$

SECTION-C (7 X 6 = 42 Marks)

23) In any ΔABC , prove that

$$(b^2 - c^2)\cot A + (c^2 - a^2)\cot B + (a^2 - b^2)\cot C = 0$$

OR

If $\tan x = -\frac{4}{3}$ (X lies in 2nd quadrant), find $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ & $\tan\frac{x}{2}$

24) Prove that $\frac{\sin 3x + \sin 5x + \sin 7x + \sin 9x}{\cos 3x + \cos 5x + \cos 7x + \cos 9x} = \tan 6x$

25) (i) Find the domain of the following function : $f(x) = \frac{x^2 + 2x + 1}{x^2 - 8x + 12}$

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