INTERNATIONAL INDIAN SCHOOL DAMMAM

FIRST TERMINAL EXAMINATION – JUNE 2013

CLASS XI **SUBJECT : MATHS**

TOTAL MARKS : 100 **TIME : 3 HOUR**

SET- A

General Instructions:

1.All questions are compulsory.

2.this question paper consist of 26 questions divided into sections A, B, C.

Section A contains 6 questions of 1 mark each , section B is of 13 question of 4 marks each and

Section C is of 7 questions of 6 marks each.

3. There is no overall choice. Internal choice has been provided in 4 questions of 4 marks each and 2 questions of 6 marks each. You have to attempt only one of the alternative in such questions,

SECTION - A

1.If $\emptyset$ is an empty set then find the number of element present in $p(\emptyset)$ where $p(\emptyset)$ is a power set of $\emptyset$.

2. If set A has 3 and set B has 2 element write the no of relation from set A to set B.

3.Find the value of cosec (-1410^0).

4.Find the angle in radians through which a pendulum swings if its length is 75cm and its tip describe an arc length 10 cm.

5. Find the multiplicative inverse of 4- 3i .

6.If I.Q of a person is given by the formula $I\,Q = \left(\frac{M.A}{C.A}\right) \times 100$ where M. A = mental age and C. A = chronological age . If $80 \leq I.Q. \leq 140$ for 12 years children. Find the range of their mental age.

SECTION – B

7.Let S = {1,2,3,4,5,6,7,8,9} be a universal set and A= {2,,4,,6,,8,} and B = {2,3,,5,7} verify that

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

8.Let A ∩X = B ∩ X = Ø and A ∪ X = B ∪ X for some set X show that A = B.

9.Let P={1,2,3} ; Q= {3,4} ; R={4,5,6} then prove that :

(i)P X (Q ∪ R) = (P X Q) ∪ (P x R) (ii) P X (Q ∩ R) = (P X Q) ∩ (P X R) .

10. (a) Let A= {1,2,3,4 ……14} Define a relation R from A to A by R ={$(x, y): 3x - y = 0$ *where* $x, y \in A$}

Write its (i) domain (ii) range

10.(b). The Cartesian product of A x A has 9 elements among which are found (-1,0) and (0,1) . Find set A and remaining elements of A X A.

11.Find domain and range of function f(x) = $\frac{x^2 - 9}{x - 3}$

Or

Find the domain of f(x) = $\frac{x}{\sqrt{x^2 - 3x + 2}}$

12 If tanθ =$\frac{3}{4}$ find the value of 4cos2θ +3sin3θ

13.Show that tan3A. tan2A. tan A = tan 3A – tan2A - tan A

Or

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

14. Find the general solution of sin2x + cosx = 0

15.In a triangle if the angles are in the ratio of 1:2:3 prove that the corresponding sides are in the ratio 1:$\sqrt{3}$:2 .

Or Prove that 2 cos$\frac{\pi}{13}$ cos$\frac{9\pi}{13}$ + cos$\frac{3\pi}{13}$ + cos $\frac{5\pi}{13}$ = 0

16.Using Principal of mathematical induction prove that $x^{2n} - y^{2n}$ is divisible by x – y

17.Convert $z = \frac{-16}{1 + i\sqrt{3}}$ in polar form.

Or

If $a+ib = \frac{(x+i)^2}{2x^2 + 1}$ show that $a^2 + b^2 = \frac{(x^2 + 1)^2}{(2x^2 + 1)^2}$

18.Find the square root of $\sqrt{5 - 12i}$

19.A manufacturer has 600 litres of 12 % solution of acid .how many litres of 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 % .

SECTION – C

20. solve the following system of linear inequalities graphically.

$X+ 2y \leq 10$

$x+y + \geq 1$

$x- y \leq 0$: $x \geq 0$;$y \geq 0$

21.Prove by principle of mathematical induction

P(n): $1 + \frac{1}{1+2} + \frac{1}{1+2+3} + \dots \dots \dots$ $\frac{1}{1+2+3+\dots+n} = \frac{2n}{n+1}$

22.Prove that $\cos^2 x + \cos^2 (x + \frac{\pi}{3}) + c\,os^2 (x - \frac{\pi}{3}) = \frac{3}{2}$

23.In a triangle ABC prove that $2 (b \cos^2 \frac{C}{2} + c \cos^2 \frac{B}{2}) = a+b+c$

Or

In Δ ABC prove that $(b+c) \sin\frac{A}{2} = a \cos(\frac{B-C}{2})$ where a,b,c are sides and A,B,C vertices of triangle.

24.If α and β are different complex numbers with $|\beta| = 1$ then find the value of $\left|\frac{\beta - \alpha}{1 - \bar{\alpha}\beta}\right|$.

Or

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

25 (i). Let f= $\{(1,1),(2,3),(0,-1),\ (-1,-3)\}$ be a function from Z to Z defined by f(x) = ax+b for some Integer a and b . Find a and b.

25(ii). Draw the graph of f(x) = $|x-1|$ +1 where $|x-1|$ is modulus of (x-1)

26.At break some students out of 123 students of class XI decided to go on for a campus cleaning drive .

They selected three areas to begin with (i) areas near canteen (ii) corridor near their classes and (iii)ground.42 students help in cleaning the ground,36 help in cleaning the corridor near their classes and 10 help only in cleaning areas near the canteen. 15 students help in cleaning the areas near their corridor and ground,10 help in cleaning areas near canteen and ground .4 help in cleaning areas near canteen and corridor near their classes but not ground and 11 help in cleaning areas of ground and corridor near their classes but no areas near canteen .Draw a Venn diagram to illustrate the above information and find:

(i)How many students do not help at all.

(ii) how many student help in cleaning at least two places.

(iii)What qualities (values) of students are depicted in their action.

60 — 20
100 — ?
33.33 /
100 x 20

60

50 — 80
? 100
100 x 50

80

42 — 90
100

100 x 42

90

420

9