<u>THE INDIAN SCHOOL</u> <u>KINGDOM OF BAHRAIN</u> <u>ANNUAL EXAMINATION – FEBRUARY 2010</u>

STD: XI SUBJECT: MATHEMATICS

MAX.MARKS: 100 TIME: 3HOURS

General Instructions

- 1. All questions are compulsory
- 2. The question paper consists of **29** questions divided in to three sections A, B and C.
- Question numbers 1 to 10 are of 1 mark each, Question numbers 11 to 22 are of 4 marks each and Question numbers 23 to 29 are of 6 marks each.
- 4. All the questions in section A are to be answered in one word, one sentence or as per the exact requirement of the question.
- 5. This question paper contains 3 printed pages

SECTION A

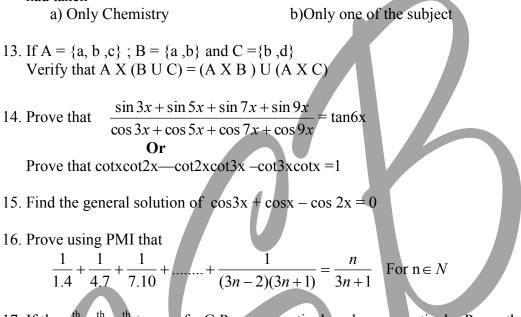
1. Find the value of $\tan 75^{\circ}$

- 2. If $A = \{1,2,3,4,5,6\}$ and $B = \{3,4,5,6,7,8\}$, find A-B
- 3. Find the domain of $f(x) = \sqrt{4 x^2}$
- 4. Find the modulus of the complex number $\frac{1}{2+2i}$
- 5. Find the middle term in the expansion of $\left(3 \frac{x^3}{6}\right)^8$
- 6. Which term of the sequence $\sqrt{3}, 3, 3\sqrt{3}, \dots$ *is* 729
- 7. Reduce the line $\sqrt{3}x y + 8 = 0$ in the normal form
- 8. Evaluate $\lim_{x \to 0} \frac{\sin 5x}{\sin 4x}$
- 9. Differentiate $\frac{x-1}{x+1}$ with respect to x

10. If $P(A) = \frac{1}{4}$ and $P(B) = \frac{1}{2}$ and if A and B are mutually exclusive find P(AUB) SECTION B

11. If U = {1,2,3,4,5,6,7,8,9} A = {2,4,6,8} and B = {1,2,5,7} Verify that
1)
$$(AUB)' = A' \cap B'$$
 2) $(A \cap B)' = A' \cup B'$

12. In a survey of 30 students, it was found that 15 had taken Mathematics, 12 had taken Physics and 11 had taken Chemistry, 5 had taken Mathematics and Chemistry, 9 had taken Mathematics and Physics and 4 had taken Physics and Chemistry and 2 had taken all the three subjects. Find the number of students that had taken



17. If the pth, qth, rth terms of a G.P are respectively a, b, c respectively, Prove that a^{q-r}.b^{r-p}. c^{p-q}=1 Or

Find the sum to n terms of the series $1x2x3 + 2x3x4 + 3x4x5 + \dots$ 18. If 'a' and 'b' are the lengths of the perpendiculars from the origin to the lines $x \cos \theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y \csc \theta = k$ respectively Prove that $a^2 + 4b^2 = k^2$

- 19. Find the coordinate of the foci, vertices, length of the latus rectum and eccentricity of the ellipse $36x^2 + 4y^2 = 144$
- 20. Find the ratio in which the line joining (2,4,-3) and (-3,5,4) is divided by the XY plane

21. Evaluate
$$\lim_{x \to \frac{\pi}{2}} \frac{1 - \sin x}{(\pi - 2x)^2}$$

Or
Find the derivative of $\frac{x+2}{x+3}$ from first principle

22. Prove that $\sqrt{3}$ is irrational by contradiction method Or

Check the validity of the statement "If x is a real number such that $x^3 + 4x = 0$, then x = 0" is true by

a) Direct method b) method of contra positive

SECTION C

23. If $\tan x = \frac{3}{4}$ and $\pi \prec x \prec \frac{3\pi}{2}$ find the values of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$, $\tan \frac{x}{2}$ Prove that $\frac{\sin A \cdot \sin 2A + \sin 3A \cdot \sin 6A}{\sin A \cdot \cos 2A + \sin 3A \cdot \cos 6A} = \tan 5A$

- 24. If $(x+iy)^{\frac{1}{3}} = u + iv$, then Prove that $\frac{x}{u} + \frac{y}{v} = 4(u^2 v^2)$
- 25. Solve the following system of linear in equations graphically: $3x + 2y \le 24$; $x + 2y \le 16$; $x + y \le 10$, $x \ge 0$; $y \ge 0$
- 26. A group consists of 5 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has b) at least one boy and one girl a) At most 2 girls c) at least 2 girls
- 27. The Coefficients of a ^{r-1}, a ^r, a ^{r+1} in the expansion of $(1+a)^n$ are in arithmetic progression. Prove that $n^2 n(4r+1) + 4r^2 2 = 0$ Or

The coefficients of the $(r-1)^{th}$, r^{th} , $(r+1)^{th}$ terms in the expansion of $(x+1)^n$ are in the ratio 1:3:5. Find n and r

28. Find the mean and variance of the following frequency distribution

Marks Obtained	0-10	10-20	20-30	30-40	40-50
No of students	2	3	8	5	2

- 29. In a class of 50 students 30 opted for Biology and 18 opted for Biotechnology. 6 students opted for both Biology and Biotechnology. If one student is selected at random, find the probability that
 - a) The student opted for Biology or Biotechnology
 - b) The student has opted neither Biology nor Biotechnology
 - c) The Student has opted Biotechnology but not Biology