

The Indian School
Kingdom Of Bahrain

FIRST TERM EXAMINATION 2011

Class 11
Subject : MATHEMATICS

Max. Marks 100
Time: 3hrs

General Instructions

1. All questions are compulsory
 2. The question paper consists of 29 questions divided in to three sections A, B and C.
 3. 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.
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SECTION A

1. Find $\tan A$ if $\sin A = -\frac{12}{13}$ and A is in the third quadrant.
2. Evaluate $\cos(600^\circ)$
3. Evaluate $\sin 75^\circ \cos 15^\circ - \cos 75^\circ \sin 15^\circ$
4. If $Z = (2-3i)$ find $(Z\bar{Z})$
5. Simplify $i^{10} + i^{11} + i^{12} + i^{13}$.
6. Write down the multiplicative inverse of the complex number $2-i$ in the standard form.
7. Solve $4x+3 \leq 6x+7$
8. Solve $(-2 - \frac{x}{4}) \geq 2(x+3)$
9. Find ${}^n P_r$ if $n = 9$ and $r = 5$.
10. Find r if ${}^5 P_r = 5 {}^4 P_3$

SECTION B

11. Find the values of $\sin 15^\circ$ and $\tan 15^\circ$.
12. Prove that $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = (1/16)$
13. Prove that $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2\cos 8A}}} = 2\cos A$

OR

Solve $2\sin^2 A = \sin A$

14. Show that $1.2 + 2.3 + \dots + n(n+1) = \frac{n(n+1)(n+2)}{3}$, using PMI.

OR

Show that $1^2 + 2^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$

15. Prove by PMI that $10^{2n-1} + 1$ is divisible by 11

16. Find the conjugate of the complex number $\frac{(2+i)}{(1+i)(1-2i)}$

17. Express $3 - \sqrt{3}i$ in the modulus amplitude form

18. If $x - iy = \sqrt{\frac{a-ib}{c-id}}$, prove that $(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$

OR

$$\text{Solve } \sqrt{3}x^2 - \sqrt{2}x + 3\sqrt{3} = 0$$

19. Solve $2x-7 < 11$, $3x >$ and represent using a number line

20. In an experiment, a solution of hydrochloric acid is to be kept between 30° and 35°C . What is the range of temperature in degree Fahrenheit if conversion formula is given by $C = \frac{5}{9}(F - 32)$

21. A coin is tossed three times and the outcomes are recorded. How many possible outcomes are there?

OR

How many three digit numbers can be formed using the digits 0,1,2,3,4,5.

22. How many words with or without meaning can be formed using the letters of the word MISSISSIPPI using all at a time.

SECTION C

23. Derive the relation $\cos(A-B) = \cos A \cos B + \sin A \sin B$

24. Find $\sin\left(\frac{x}{2}\right)$ and $\cos\left(\frac{x}{2}\right)$ and $\tan\left(\frac{x}{2}\right)$, if $\tan x = -\left(\frac{4}{3}\right)$

OR

Prove that $\sin x + \sin 2x + \sin 5x + \sin 7x = 4 \cos x \cos 2x \sin 4x$

25. Prove that $\frac{1}{1.2.3} + \frac{1}{2.3.4} + \dots + \frac{1}{n(n+1)(n+2)} = \frac{n(n+3)}{4(n+1)(n+2)}$

OR

Show that $n(n+1)(n+5)$ is divisible by 3

26. Find the square root of $-7 - 24i$

27. Find real A if $\frac{3 + 2i \sin A}{1 - 2i \sin A}$ is a) purely real, b) purely imaginary

28. Solve the following system of inequalities graphically: $x + 2y \leq 8$, $2x + y \leq 8$, $x \geq 0$, $y \geq 0$.

29. The letters of the word FATHER are used to make different words and arranged as in the dictionary. Find the chronological rank of the word FATHER.