FIRST TERMINAL EXAMINATION – JUNE 2012

Subject : Mathematics

Max Marks : 10

Class : XI

Time : 3h

Instructions

Section A - Questions from 1 – 10 carries 1 mark each

Section B - Questions from 11 – 22 carries 4 marks each

Section C – Questions 23 – 29 carries 6 marks each

All questions are compulsory however internal choices are given.

This question paper contains 2 printed pages and 29 questions

Section A

1. Find the value of $\sin(1020^\circ)$
2. Find the value of sinx if secx = 13/5 and x lies in the forth quadrant.
3. Convert 120° to radian.
4. Find the length of the arc which subtends an angle of 35° at the centre of a circle with radius18cm.
5. Find the modulus of 2-4i
6. Evaluate $i^{20} + i^{21} + i^{22} + i^{23}$
7. If $x + 2i = -7 + 4yi$, find the value of x and y.
8. Find the multiplicative inverse of 1+i.
9. Find the amplitude of 2-2i
10. If $2x + 5 > 4 - x$, solve for x

Section B

11. Show that $\tan3x \cdot \tan2x \cdot \tan x = \tan3x - \tan2x - \tan x$
12. Prove that $\frac{\cos4x+\cos3x+\cos2x}{\sin4x+\sin3x+\sin2x} = \cot3x$
13. Solve $\sin x + \sin3x + \sin5x = 0$

    OR

    Evaluate $2\cos^2 x + 3\sin x = 0$

14. In any ΔABC, prove that $\frac{a^2-c^2}{b^2} = \frac{\sin[A-C]}{\sin[A+C]}$

OR

Prove that $a(b\cos C - c\cos B) = b^2 - c^2$

15. Prove that $\cos 4x = 1 - 8\sin^2 x \cos^2 x$

16. Solve $2x+y \geq 6$, $3x+4y \leq 12$, graphically.

17. For every positive integer n, prove using PMI, that $7^n - 4^n$ is divisible by 3.

OR

For all $n \geq 1$, prove that $1+3+5+\ldots\ldots+(2n-1) = n^2$, by the method of PMI.

18. Prove that $n(n+1)(n+5)$ is a multiple of 3

19. Find the square root of the complex number 3+4i.

OR

Convert in to polar form $\frac{1+3i}{1-2i}$

20. Solve $2x^2+x+1 = 0$.

21. Find the conjugate of $\frac{1-2i}{2-i}$.

22. If $x+iy = \frac{a-ib}{a+ib}$, show that $x^2+y^2 = 1$.

Section C

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

24. In any triangle ABC, prove that $\frac{b^2-c^2}{a^2}\sin 2A + \frac{c^2-a^2}{b^2}\sin 2B + \frac{a^2-b^2}{c^2}\sin 2C = 0$

OR

Find $\sin(X/2)$, $\cos(X/2)$ and $\tan(X/2)$, if $\tan X = (-4/3)$ and X is in the II quadrant.

25. Prove using PMI, $1.2 + 2.3 + 3.4 \ldots\ldots + n(n+1) = \frac{n(n+1)(n+2)}{3}$

26. Prove using PMI, $\frac{1}{2.5} + \frac{1}{5.8} + \cdots \frac{1}{(3n-1)(3n+2)} = \frac{n}{(6n+4)}$

27. Solve the system of inequalities graphically. $x + 2y \leq 10$, $x + y \geq 1$, $x - y \leq 0$, $x, y \geq 0$.

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

29. Convert $\frac{1+3i}{1-2i}$ into polar form.

OR

Find real A such that $\frac{3+2i\sin A}{1-2i\sin A}$ is purely real.