0100693

23. Solve x +13x+6=0 using Cardano's method.

Reg. No.:.....



K19U 2472

III Semester B.Sc. Degree (CBCSS-Supplementary)

Examination, November - 2019

(2014-2016 Admissions)

CORE COURSE IN MATHEMATICS

3B 03 MAT : ELEMENTS OF MATHEMATICS- 1

Time: 3 Hours Max. Marks: 48

SECTION - A

All the first 4 questions are compulsory. They carry 1 mark each.

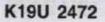
- 1. If A is a set with m elements and B is a set with n elements and if $A \cap B = \varphi$ Then $A \cup B$ has _____ elements.
- 2. Give the remainder when f(x) is divided by x-a
- 3. State Stern's theorem.
- 4. The greatest common devisor of -5 and 5 is

SECTION - B

Answer any 8 questions from among the questions 5 to 14. These questions carry 2 marks each.

- 5. Prove that the union of two disjoint denumerable set is denumerable.
- 6. Determine the truth value of the following statements
 - a) 5+3=9 or 6+2=8
 - b) 1+5=8 and 2+3=5
- 7. Form a polynomial equation of fourth degree with rational coefficients having one root $\sqrt{2} + \sqrt{-3}$.

P.T.O.





8. If α, β, γ are the roots of $2x^3 + 3x^2 - x - 1 = 0$ find the equation whose roots are $\alpha - 1, \beta - 1, \gamma - 1$.

(2)

- 9. If $\alpha, \beta, \gamma, \delta$ are the roots of $ax^4 + 4bx^3 + 6cx^2 + 4dx + e = 0$ find the value of $\sum (\alpha \beta)^2$.
- 10. If p,q,r,s are positive show that $x^4+qx^2+rx-s=0$ has one positive one negative and two imaginary roots
- 11. Find the sum of the trigonometric series $1 \frac{1}{2}\cos\alpha + \frac{1}{2}\frac{3}{4}\cos3\alpha + \dots$
- 12. If gcd(a,b) = 1 prove that gcd(a+b,ab) = 1
- 13. Prove that there is an infinite number of primes.
- 14. Find the remainder when 250 is divided by 7.

SECTION - C

Answer any 4 questions from among the questions 15 to 20. These questions carry 4 marks each.

- 15. State and prove Cantor's theorem.
- 16. Solve $x^4 2x^3 + 4x^2 + 6x 21 = 0$ given that sum of two of its roots is zero.
- 17. Solve the reciprocal equation $x^4 + 6x^3 5x^2 + 6x + 1 = 0$.
- 18. Solve the Diophantine equation 172x + 20y = 1000.
- 19. Find the remainder when $2^{20}+3^{30}+4^{40}+5^{50}+6^{60}$ is divided by 7.
- 20. Using the Sieve of Eratosthenes find all primes not exceeding 60.

(3)

SECTION - D

Answer any 2 questions from among the questions 21 to 24. These questions carry 6 marks each.

- 21. a) Prove that the Q of rational numbers is denumerable.
 - b) Verify that the proposition $p \vee \neg (p \wedge q)$ is a taughtology.
- 22. If α, β, γ are the roots of $x^3 + qx + r = 0$ find the equation whose roots are $\frac{\beta}{\gamma} + \frac{\gamma}{\beta}, \frac{\gamma}{\alpha} + \frac{\alpha}{\gamma}, \frac{\alpha}{\beta} + \frac{\beta}{\alpha}$.
- 23. Solve $x^3+15x+8=0$ using Cardano's method.
- 24. If a and b are positive integers prove that g.c.d(a,b)l.c.m(a,b)=ab.