ESSENCE TEST-7

DATE : 08-09-19

9TH CLASS

ICSE

RATIONAL AND IRRATIONAL NUMBER,
COMPOUND INTEREST,
EXPANSION, FACTORISATION,
SIMULTANEOUS LINEAR EQUATION

MARKS : 80 **MATHEMATICS** **TIME : 3 HR.**

1. (a) Find the coefficient of x^2 and x in the product of $(x^2 + 2x + 3)^2+(x^2–2x+3)^2$. **[3]**
   (b) Find the compound interest to the nearest rupee on Rs. 7,500 for 2 years 4 months at 12% per annum, compounded annually. **[3]**
   (c) Prove that $\sqrt{10}$ is an irrational number. **[4]**

2. (a) Insert four irrational number between $3\sqrt{2}$ and $2\sqrt{3}$. **[3]**
   (b) Using suitable identity, find the value of: **[3]**
   $$\frac{0\cdot86\times0\cdot86\times0\cdot86+0\cdot14\times0\cdot14\times0\cdot14}{0\cdot86\times0\cdot86-0\cdot86\times0\cdot14+0\cdot14\times0\cdot14}$$
   (c) If $x^4+\frac{1}{x^4}=194$ find the values of **[4]**
   (i) $x^2+\frac{1}{x^2}$ (ii) $x+\frac{1}{x}$ (iii) $x^3+\frac{1}{x^3}$

3. (a) If x = 2y + 6, then find the value of $x^3 - 8y^3 - 36xy - 216$. **[3]**
   (b) Solve $83x – 67y = 383$, $67x – 83y = 367$. **[3]**
   (c) Solve $\frac{30}{x-y}+\frac{44}{x+y}=10$, $\frac{40}{x-y}+\frac{55}{x+y}=13$. **[4]**

4. (a) Solve $\frac{2}{x}+\frac{5}{y}=1$, $\frac{60}{x}-\frac{20}{y}=13$. Hence find the value of k if y= kx –2. **[3]**
   (b) Simplify: $\frac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$ **[3]**
   (c) If $x = 3 + 2\sqrt{2}$, find the value of $x^3-\frac{1}{x^3}$. **[4]**

5. (a) If $p=\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$ and $q=\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$, find the value of $p^2 + q^2$. **[3]**
   (b) Find the amount and the compound interest on Rs. 24000 at 10% per annum for $1\frac{1}{2}$ years, compound interest reckoned half-yearly. **[3]**

(c) If $x = 7 - 4\sqrt{3}$, find the value of $\sqrt{x} + \frac{1}{\sqrt{x}}$. **[4]**

6. (a) If $a + b + c = 0$, then find the value of $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab}$. **[3]**

(b) If $x = \frac{3+\sqrt{7}}{2}$, find the value of $4x^2 + \frac{1}{x^2}$. **[3]**

(c) Solve $ax + by = a - b$, $bx - ay = a + b$ **[4]**

7. (a) If the sum of two number is 7 and the sum of their cubes is 133, find the sum of their squares. **[3]**

(b) If a =1, b=–2 and c=–3, find the value of $\frac{a^3 + b^3 + c^3 - 3abc}{ab + bc + ca - (a^2 + b^2 + c^2)}$ **[3]**

(c) If $x^2 + \frac{1}{25x^2} = 8\frac{3}{5}$, find the value of $x^3 + \frac{1}{125x^3}$. **[4]**

8. (a) Factorise: $x^6 - 26x^3 - 27$. **[3]**

(b) Factorise: $(x^2 + x)^2 + 4(x^2 + x) - 12$. **[3]**

(c) If $\frac{a}{b} = \frac{b}{c}$, prove that $(a + b + c)(a - b + c) = a^2 + b^2 + c^2$. **[4]**