

8. MIXED.—1. The result of the Treaties of VERDUN, MUNSTER, ZURICH? 2. (a) In what year did the Moors and Arabs unite? (b) When did they aid the Spanish King? 3. The nature of the PRAGMATIC SANCTION of 1724? 4. Give a brief sketch of the THIRTY YEARS' WAR. 5. Give date of the first and the last Crusade.

## No. 11.

## ALGEBRA—JUNIOR DIVISION.

1. Divide  $5a^2x^6 - 30a^4x^4 + 21a^6x^2 - 26a^5x^3 + 22a^3x^5$  by  $3a^3x - 2a^2x^2 - 5ax^3$ .
2. Resolve  $a^{90} - m^{90}$  into the greatest possible number of elementary factors.
3. Simplify  $a - \left\{ a - (-a - m) \right\} - \left\{ -(-\left\{ -(-\left\{ -(-2a) - 3m \right\} - 4a) - 5m \right\} - 6a - 7m) \right\}$
4. Find the value of:—  

$$\frac{3a^2b - c^2d + 2}{f(a+c) - (2c+b)} + \sqrt[3]{cf(a+b)d} - \frac{(df - c^3 + a)^{\frac{1}{2}}(u+b+c+d+f-5)}{\left\{ abc - (f-d) \right\} \left\{ bcd - (3f-a-b) \right\}}$$

$$+ \frac{ab^3m}{cd}, \text{ where } a=1; b=2; c=4; d=9; f=16; \text{ and } m=0.$$
5. Simplify  $(2a-3b)(2a+3b) - 7(3a-2b)^2 - 11(4a-b)(b-4a) - 2(4a+5b)^2 - 5(3a-7b)(7a+3b) - 9(5a-4b)(4b+5a)$ .
6. Simplify  $\frac{x^2 - 9x + 14}{x^2 + x - 6} - \frac{x^2 - 2x - 15}{x^2 - 15x + 50} - \frac{x^2 - 11x + 10}{x^2 - 8x + 7}$ .
7. Find the G. C. M. of  $2 - 7x - x^2 + 13x^3 + 5x^4$  and  $30x - 85x^2 - 75x^3 + 190x^4 + 150x^5$ .
8. Find the value of  $1 - \frac{1}{1 - \frac{1}{1 - \frac{1}{1 - \frac{1}{1 - \frac{x-a}{x+a}}}}}$
9. Prove that a simple equation can have one root.
10. If  $\frac{a}{b} = \frac{c}{d}$  prove that  $\frac{ma \pm nb}{15a \pm 17b} = \frac{mc \pm nd}{15c \pm 17d}$ .
11. Given  $4x - \frac{3x+7}{5} - \frac{\frac{1}{2}(3x-1)}{3} = \frac{\frac{3}{5}(2x-1)}{2} - \frac{\frac{4}{3}(2x-9)}{1\frac{1}{2}}$  to find the value of  $x$ .
12. Given  $3x - y + z = 14$ ;  $2x + 3y - z = 19$ ; and  $4x - 3y - 2z = m$ , to find the value of  $x$ .
13. Find the cube root of  $84x^5 - 24x^4 + 8x^3 + 125x^6 - 150x^8 + 210x^7 - 128x^6$ .
14. Find the L. C. M. of  $a-x$ ;  $a+x$ ;  $2(a^2-x^2)$ ;  $4(a^2+x^2)$ ;  $6(a^3+x^3)$ ;  $8(a^3-x^3)$ ;  $10(a^6-x^6)$ ;  $12(a^6+x^6)$ ;  $16(a^2-ax+x^2)$ ;  $20(a^2+ax+x^2)$ ;  $25(a^4+a^2x^2+x^4)$ ;  $30(a^4-a^2x^2+x^4)$ ; and  $40(a^5+a^4x+a^3x^2+a^2x^3+ax^4+x^5)$ .
15. Find the coefficients of  $x^6$  and  $x^9$  in the expansions of  
 I.  $(2a-x)^7$ .  
 II.  $(1 - \frac{1}{2}x + \frac{1}{3}x^2 + 2x^3 - 3x^4 - x^5 - 2x^6 - 3x^7)^2$ .
16. A farmer can carry with his team to market 27 bushels of wheat and 28 bushels of oats, or he can carry 12 bushels of wheat and 48 bushels of oats. How many bushels of each could he carry?