

## PAST EXAMINATION QUESTIONS : BINOMIAL THEOREM

1. In the expansion of  $(k + x)^8$ , where  $k$  is a positive constant, the coefficients of  $x^2$  and  $x^3$  are equal. Find the value of  $k$ . (N93/P1/4)
2. The expansion of  $(2 + 3x)(1 - \frac{x}{2})^n$ , in ascending powers of  $x$  as far as the term in  $x^2$ , is  $2 - 5x + ax^2$ . Find the value of  $n$  and of  $a$ . (J94/P1/5)
3. Find the coefficient of  $x^3$  in the expansion of  $(2 + 3x)(1 - \frac{x}{2})^8$ . (N94/P1/5)
4. Given that the coefficients of  $x^2$  and  $x^3$  in the expansion of  $(3 + x)^{20}$  are  $a$  and  $b$  respectively evaluate  $\frac{a}{b}$ . (J95/P1/6)
5. Given that the coefficient of  $x^2$  in the expansion of  $(4 + kx)(2 - x)^6$  is zero, find the value of  $k$ . (N95/P1/3)
6. (a) In the expansion of  $(1 - 2x)^{11}$  the coefficient of  $x^3$  is  $k$  times the coefficient of  $x^2$ . Evaluate  $k$ .  
(b) Find the coefficient of  $a^4b^4$  in the expansion of  $(a + \frac{b}{2})^8$ . (J96/P1/5)
7. (a) Evaluate the coefficient of  $x^9$  in the expansion of  $(1 + 2x)(3 + x)^{11}$ .  
(b) Evaluate the coefficient of  $x^5$  in the expansion of  $(x^2 - \frac{2}{x})^7$ .  
(c) The first three terms in the binomial expansion of  $(a - b)^n$ , in ascending powers of  $b$ , are denoted by  $p$ ,  $q$  and  $r$  respectively. Show that  $\frac{q^2}{pr} = \frac{2n}{n-1}$ . Given that  $p = 4$ ,  $q = 32$  and  $r = 96$ , evaluate  $n$ . (N96/P1/11)
8. The coefficient of  $x^3$  in the expansion of  $(2 + ax)(1 - 3x)^6$  is 405. Find the value of  $a$ .
9. Find the coefficient of  $x^3$  in the expansion of  $(9 + 8x)(1 - \frac{x}{3})^9$ .
10. Find (i) the coefficient of  $x$  in the expansion of  $(x - \frac{2}{x})^7$ ,  
(ii) the coefficient of  $x^3$  in the expansion of  $(2 + 5x)(1 - \frac{x}{2})^8$ .

1. 2

2.  $n=8, a=2$

3. 7

4.  $\frac{1}{2}$

5. 5

6. (a) -6 (b)  $4\frac{3}{8}$

7. (a) 9405

(b) -280

(c)  $n=4$

8.  $a=11$

9. 4

10. (a) -280 (b) 21