

**Q1.**

2 (i) Find the first 3 terms in the expansion of  $\left(2x - \frac{3}{x}\right)^5$  in descending powers of  $x$ . [3]

(ii) Hence find the coefficient of  $x$  in the expansion of  $\left(1 + \frac{2}{x^2}\right)\left(2x - \frac{3}{x}\right)^5$ . [2]

**Q2.**

2 (i) Find the first three terms, in descending powers of  $x$ , in the expansion of  $\left(x - \frac{2}{x}\right)^6$ . [3]

(ii) Find the coefficient of  $x^4$  in the expansion of  $(1 + x^2)\left(x - \frac{2}{x}\right)^6$ . [2]

**Q3.**

1 Find the coefficient of  $x$  in the expansion of  $\left(x + \frac{2}{x^2}\right)^7$ . [3]

**Q4.**

1 The coefficient of  $x^3$  in the expansion of  $(a + x)^5 + (1 - 2x)^6$ , where  $a$  is positive, is 90. Find the value of  $a$ . [5]

**Q5.**

2 Find the coefficient of  $x^6$  in the expansion of  $\left(2x^3 - \frac{1}{x^2}\right)^7$ . [4]

**Q6.**

3 The first three terms in the expansion of  $(1 - 2x)^2(1 + ax)^6$ , in ascending powers of  $x$ , are  $1 - x + bx^2$ . Find the values of the constants  $a$  and  $b$ . [6]

**Q7.**

2 (i) In the expression  $(1 - px)^6$ ,  $p$  is a non-zero constant. Find the first three terms when  $(1 - px)^6$  is expanded in ascending powers of  $x$ . [2]

(ii) It is given that the coefficient of  $x^2$  in the expansion of  $(1 - x)(1 - px)^6$  is zero. Find the value of  $p$ . [3]

**Q8.**

- 4 (i) Find the first three terms in the expansion of  $(2 + ax)^5$  in ascending powers of  $x$ . [3]
- (ii) Given that the coefficient of  $x^2$  in the expansion of  $(1 + 2x)(2 + ax)^5$  is 240, find the possible values of  $a$ . [3]

**Q9.**

- 3 (i) Find the first 3 terms in the expansion of  $(2 - x)^6$  in ascending powers of  $x$ . [3]
- (ii) Given that the coefficient of  $x^2$  in the expansion of  $(1 + 2x + ax^2)(2 - x)^6$  is 48, find the value of the constant  $a$ . [3]

**Q10.**

- 2 In the expansion of  $(1 + ax)^6$ , where  $a$  is a constant, the coefficient of  $x$  is  $-30$ . Find the coefficient of  $x^3$ . [4]

**Q11.**

- 1 Find the term independent of  $x$  in the expansion of  $\left(x - \frac{1}{x^2}\right)^9$ . [3]

**Q12.**

- 1 Find the term independent of  $x$  in the expansion of  $\left(2x + \frac{1}{x^2}\right)^6$ . [3]

**Q13.**

- 1 The coefficient of  $x^2$  in the expansion of  $\left(k + \frac{1}{3}x\right)^5$  is 30. Find the value of the constant  $k$ . [3]

**Q14.**

- 4 (i) Find the first 3 terms in the expansion of  $(2x - x^2)^6$  in ascending powers of  $x$ . [3]
- (ii) Hence find the coefficient of  $x^8$  in the expansion of  $(2 + x)(2x - x^2)^6$ . [2]

**Q15.**

- 1 Find the coefficient of  $x^3$  in the expansion of  $\left(2 - \frac{1}{2}x\right)^7$ . [3]

**Q16.**

- 1 (i) Find the first three terms when  $(2 + 3x)^6$  is expanded in ascending powers of  $x$ . [3]
- (ii) In the expansion of  $(1 + ax)(2 + 3x)^6$ , the coefficient of  $x^2$  is zero. Find the value of  $a$ . [2]

**Q17.**

- 8 (i) Find the coefficient of  $x^8$  in the expansion of  $(x + 3x^2)^4$ . [1]
- (ii) Find the coefficient of  $x^8$  in the expansion of  $(x + 3x^2)^5$ . [3]
- (iii) Hence find the coefficient of  $x^8$  in the expansion of  $[1 + (x + 3x^2)]^5$ . [4]