1. If the second, third and fourth term in the expansion of $(x+a)^n$ are 240, 720 and 1080 respectively, then the value of n is

(a) 15 (b) 20 (c) 10 (d) 5

2. The term independent of x in the expansion of $(1+x)^n\left(1+\frac{1}{x}\right)^n$ is

(a) $C_0^2+2C_1^2+.....+(n+1)C_n^2$ (b) $(C_0+C_1+.....+C_n)^2$

(c) $C_0^2+C_1^2+.....+C_n^2$ (d) None of these

3. If the number of terms in the expansion of $(x-2y+3z)^n$ is 45, then $n=$

(a) 7 (b) 8 (c) 9 (d) None of these

4. The sum to $(n+1)$ terms of the following series $\frac{C_0}{2}-\frac{C_1}{3}+\frac{C_2}{4}-\frac{C_3}{5}+.....$ is

(a) $\frac{1}{n+1}$ (b) $\frac{1}{n+2}$ (c) $\frac{1}{n(n+1)}$ (d) None of these

5. The coefficient of x^n in the expansion of $\left(\frac{1}{1-x}\right)\left(\frac{1}{3-x}\right)$ is

(a) $\frac{3^{n+1}-1}{2.3^{n+1}}$ (b) $\frac{3^{n+1}-1}{3^{n+1}}$ (c) $2\left(\frac{3^{n+1}-1}{3^{n+1}}\right)$ (d) None

6. The greatest integer which divides the number $101^{100}-1$ is

(a) 100 (b) 1000 (c) 10000 (d) 100000

7. The term independent of x in $\left(x^2-\frac{1}{x}\right)^9$ is

(a) 1 (b) -1 (c) 48 (d) 84

8. The co-efficient of the middle term in the expansion of $(1+x)^{2n}$ is

(a) $2\,{}^nC_n$ (b) $\frac{1.3.5.\ldots.(2n-1)}{n!}2^n$

(c) 2. 6. …. (4n - 2) (d) None of these

9. Numerically greatest term, in the expansion of $(8-5x)^{18}$; is (where x = 2/5)

(a) 1632×2^{24} (b) 1632×2^{22}

(c) 1632×2^{23} (d) None of these

10. Integral part of $(7+2\sqrt{5})^{2n+1}$ is $(n\in N)$-

(a) An even number (b) An odd number

(c) Even or odd depends on n (d) None of these

11. The coefficient of x^ny^n in the expansion of $\{(1+x)(1+y)(x+y)\}^n$ is -

(a) $\sum_{r=0}^{n}C_r^2$ (b) $\sum_{r=0}^{n}C_r^3$ (c) $\sum_{r+s=0}^{n}{}^nC_r{}^nC_s^2$ (d) None

12. Number of rational terms in the expansion $(7^{1/3}+11^{1/9})^{6561}$

(a) 729 (b) 730 (c) 731 (d) None of these

13. If $(5+2\sqrt{6})^n = I+f$, where $I\in N$, $n\in N$ and $0\le f<1$, then I equals -

(a) $\frac{1}{f}-f$ (b) $\frac{1}{1+f}-f$

(c) $\frac{1}{1-f}-f$ (d) $\frac{1}{1-f}+f$

14. The value of ${}^{47}C_4+\sum_{r=1}^{5}{}^{(52-r)}C_3$

(a) ${}^{53}C_3$ (b) ${}^{52}C_4$ (c) ${}^{52}C_5$ (d) None

15. If ${}^nC_6 : {}^{n-3}C_3 = 33:4$, then the value of n is

(a) 9 (b) 10 (c) 11 (d) 12

16. $\left(2.{}^{10}C_0\right)+\left(\frac{2^2}{2}.{}^{10}C_1\right)+\left(\frac{2^3}{3}.{}^{10}C_2\right)+.....+\left(\frac{2^{11}}{11}.{}^{10}C_{10}\right)=$

(a) $\frac{3^{11}-1}{11}$ (b) $\frac{2^{11}-1}{11}$ (c) $\frac{11^3-1}{11}$ (d) $\frac{11^2-1}{11}$

17. In the expansion of $\left(\sqrt{x^5}+\frac{3}{\sqrt{x^3}}\right)^6$ coefficient of x^3 is -

(a) 0 (b) 120 (c) 420 (d) 540

18. ${}^nC_0+3.{}^nC_1+5.{}^nC_2+.....+(2n+1){}^nC_n=$

(a) 2^n (b) $2^n+n.2^{n-1}$ (c) $2^n(n+1)$ (d) None

19. In the expansion of $\left(\sqrt{x^5}+\frac{3}{\sqrt{x^3}}\right)^6$ coefficient of x^3 is -

(a) 0 (b) 120 (c) 420 (d) 540

20. The sum of the coefficients in the expension of $(1+2x+3x^2+.....nx^n)^2$ is -

(a) $\Sigma 1$ (b) Σn (c) Σn^2 (d) Σn^3

21. The value of $2C_0+\frac{2^2}{2}C_1+\frac{2^3}{3}C_2+\frac{2^4}{4}C_3+....+\frac{2^{11}}{11}C_{10}$ is -

(a) $\frac{3^{11}-1}{11}$ (b) $\frac{2^{11}-1}{11}$ (c) $\frac{11^3-1}{11}$ (d) $\frac{11^2-1}{11}$

22. $x^5+10x^4a+40x^3a^2+80x^2a^3+80xa^4+32a^5=$
(a) $(x+a)^5$ (b) $(3x+a)^5$ (c) $(x+2a)^5$ (d) $(x+2a)^3$ `

23. Sum of odd terms is A and sum of even terms is B in the expansion of $(x+a)^n$, then
(a) $AB=\frac{1}{4}(x-a)^{2n}-(x+a)^{2n}$ (b) $2AB=(x+a)^{2n}-(x-a)^{2n}$
(c) $4AB=(x+a)^{2n}-(x-a)^{2n}$ (d) None of these

24. If $\frac{T_2}{T_3}$ in the expansion of $(a+b)^n$ and $\frac{T_3}{T_4}$ in the expansion of $(a+b)^{n+3}$ are equal, then $n=$
(a) 3 (b) 4 (c) 5 (d) 6

25. The coefficient of x^{-7} in the expansion of $\left(ax-\frac{1}{bx^2}\right)^{11}$ will be
(a) $\frac{462a^6}{b^5}$ (b) $\frac{462a^5}{b^6}$
(c) $\frac{-462a^5}{b^6}$ (d) $-\frac{462a^6}{b^5}$

26. If A and B are the coefficient of x^n in the expansions of $(1+x)^{2n}$ and $(1+x)^{2n-1}$ respectively, then
(a) $A=B$ (b) $A=2B$ (c) $2A=B$ (d) None

27. Let $R=(5\sqrt{5}+11)^{2n+1}$ and $f=R-[R]$ where [.] denotes the greatest integer function. The value of R.f is
(a) 4^{2n+1} (b) 4^{2n} (c) 4^{2n-1} (d) 4^{-2n}

28. Coefficient of x^r in the expansion of $(1-2x)^{-1/2}$
(a) $\frac{(2r)!}{(r!)^2}$ (b) $\frac{(2r)!}{2^r.(r!)^2}$
(c) $\frac{(2r)!}{(r!)^2.2^{2r}}$ (d) $\frac{(2r)!}{2^r.(r+1)!(r-1)!}$

29. The coefficient of x^{25} in $(1+x+x^2+x^3+x^4)^{-1}$ is
(a) 25 (b) - 25 (c) 1 (d) - 1

30. The cube root of $1+3x+6x^2+10x^3+.....$ is
(a) $1-x+x^2-x^3+.....\infty$ (b) $1+x^3+x^6+x^9+.....$
(c) $1+x+x^2+x^3+....$ (d) None of these

31. The sum of rational terms in $(\sqrt{2}+\sqrt[3]{3}+\sqrt[6]{5})^{10}$ is
(a) 12632 (b) 1260 (c) 126 (d) 1262

32. The term independent of x in the product $(4+x+7x^2)\left(x-\frac{3}{x}\right)^{11}$ is
(a) $7\,.{}^{11}C_6$ (b) $3^6\,.{}^{11}C_6$ (c) $3^5.{}^{11}C_5$ (d) $-12\,.\,2^{11}$

33. $\sum\limits_{0\le i<j<k<\ell\le n}\sum\sum\sum\sum$ is equal to
(a) ${}^{n+1}C_4$ (b) $n\,.{}^{n+1}C_4$ (c) ${}^{n+1}C_3$ (d) $n(n+1)$

34. If $b_1, b_2, ...b_n$ are the n^{th} roots of unity, then ${}^nC_1.\,b_1+{}^nC_2.b_2+.....+{}^nC_n.b_n$ is equal to
(a) $\frac{b_1}{b_2}$ (b) $\frac{b_1}{b_2}\left\{(b_1+b_2)^{2n}-1\right\}$
(c) $\frac{b_1}{b_2}\left\{(1+b_2)^n-1\right\}$ (d) None of these

35. The number of terms in the expansion of $(1+7x)^{1/2}$ is -
(a) Expansion not possible (b) Finite terms
(c) Infinite terms (d) Nothing can be said

36. If the coefficients of x^{r-1}, x^r, x^{r+1} in the binomial expansion of $(1+x)^n$ are in A.P., then $n^2-kn+4r^2-2=0$, where k =
(a) r + 1 (b) 2r + 1 (c) 4r + 1 (d) None of these

37. If $x=(2+\sqrt{3})^n$, then the value of $x-x^2+x[x]$, where $[\cdot]$ denotes the greatest integer function, is equal to -
(a) 1 (b) 2 (c) 2^{2n} (d) 2^n

38. If $n\in N$ and $(1+x+x^2+....+x^p)^n=\sum\limits_{r=0}^{np}a_rx^r$, if $0\le r\le np$ and r is not a multiple of p + 1 then, ${}^nC_0a_r-{}^nC_1a_{r-1}+{}^nC_2a_{r-2}-...+(-1)^r a_0{}^nC_r$ is -
(a) 3^n (b) 2^n (c) 0 (d) None of these

39. If $(1+x)^n=C_0+C_1x+C_2x^2+\ldots+C_nx^n$, then the value of $\sum\limits_{0\le r<s\le n}\sum(r+s)(C_r+C_s)$ is -
(a) $n^2\cdot 2^n$ (b) $n\cdot 2^n$ (c) $n^2\cdot 2^{2n}$ (d) None of these

40. If x^{2k} occurs in the expansion of $\left(x+\frac{1}{x^2}\right)^{n-3}$, then
(a) n - 2k is a multiple of 2 (b) n - 2k is a multiple of 3
(c) k = 0 (d) None of these

41. Sum of last 20 coefficients in expansion of $(1+x)^{39}$ when expanded in ascending powers of x is
(a) 2^{20} (b) 2^{38} (c) ${}^{40}C_{20}-2^{19}$ (d) ${}^{40}C_{20}+2^{18}$

42. In the binomial expansion of $(a-b)^n$, $n\ge 5$, the sum of the 5^{th} and 6^{th} terms is zero. Then a/b equals:
(a) (n - 5) / 6 (b) (n - 4) / 5

(c) 5 / (n - 4) (d) 6 / (n - 5)

43. If [x] denotes the greatest integer less than or equal to x and F = R - [R] where $R = \left(5\sqrt{5}+11\right)^{2n+1}$ then RF is equal to -

(a) 4^{2n+1} (b) 4^{2n} (c) 4^{2n-1} (d) None of these

44. The remainder when 5^{99} is divided by 13 is -

(a) 6 (b) 8 (c) 9 (d)10

45. If $(1 - x + x^2)^n = a_0 + a_1 x + a_2x^2 + ...a_{2n} x^{2n}$, then $a_0 + a_2 + a_4 +.....a_{2n}$ is equal to -

(a) $\frac{3^n+1}{2}$ (b) $\frac{3^n-1}{2}$ (c) $\frac{1-3^n}{2}$ (d) $3^n+\frac{1}{2}$

46. In the expansion of $(4^{1/3} + 6^{-1\backslash 4})^{20}$, consider the following statements -

(i) the number of irrational terms = 18

(ii) the number of rational terms = 2

(iii) the middle term is irrational.

Then the correct statements are -

(a) (i) and (iii) (b) (ii) and (iii)

(c) (i) and (ii) (d) All three

47. The coefficient of x^5 in the expansion of $(x^2 - x - 2)^5$ is

(a) - 83 (b) - 82 (c) - 81 (d) 0

48. If (1 + x) (1+ x + x2)(1 + x + x2 + x3)..... (1 + x + x2 + x3 +...+ xn) = a0 + a1x + a2x2 + ...+ amxm then $\sum_{r=0}^{m} a_r$ =

(a) 1 (b) n (c) n + 1! (d)n!

49. If the remainder of 3^{37} is divided by 80 is α and remainder when 4^{101} is divided by the 101 is β, the quadratic equation whose roots are $\alpha\beta^2$, $\beta\alpha^2$ -

(a) $2x^2 - 42x + 1729 = 0$ (b) $x^2 - 84x + 1728 = 0$

(c) $3x^2 - 82x + 729 = 0$ (d) none of these

50. Coefficient of x^{2m+1} in the expansion of

$E=\frac{1}{(1+x)(1+x^2)(1+x^4)(1+x^8).....(1+x^{2^m})}$ $(|x|< 1)$ is -

(a) 3 (b) 2 (c) 1 (d) 0