Some questions (Assertion–Reason type) are given below. Each question contains **Statement – 1 (Assertion)** and **Statement – 2 (Reason)**. Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct. So select the correct choice :***Choices are :***

(A)**Statement – 1** is True, **Statement – 2** is True; **Statement – 2 is** a correct explanation for **Statement – 1**.
(B)**Statement – 1** is True, **Statmnt – 2** is True; **Statement – 2 is NOT** a correct explanation for **Statement – 1**.
(C) **Statement – 1** is True, **Statement – 2** is False.
(D) Statement – 1 is False, Statement – 2 is True.

BINOMIAL THEOREM

373. **Statement-1:** The binomial theorem provides an expansion for the expression $(a + b)^n$. where a, b, n $\in$ R.
Statement-2: All coefficients in a binomial expansion may be obtained by Pascal's triangle.

374. **Statement-1:** If n is an odd prime then integral part of $(\sqrt{5}+2)^n - 2^{n+1}([x]$ is divisible by 20 n.
Statement-2: If n is prime then $^nC_1$, $^nC_2$, $^nC_3$, ….. $^nC_{n-1}$ must be divisible by n.

375. **Statement–1** : 2^{60} when divided by 7 leaves the reminder 1.
Statement–2 : $(1 + x)^n = 1 + n_1x$, where n, $n_1 \in$ N.

376. **Statement–1** : $^{21}C_0 + ^{21}C_1 + ... + ^{21}C_{10} = 2^{20}$
Statement–2 : $^{2n+1}C_0 + ^{2n+1}C_1 + ... ^{2n+1}C_{2n+1} = 2^{2n+1}$ and $^nC_r = {^nC_{n-r}}$

377. Let n be a positive integers and k be a whole number, $k \le 2n$.
Statement–1 : The maximum value of $^{2n}C_k$ is $^{2n}C_n$.
Statement–2 : $\frac{^{2n}C_{k+1}}{^{2n}C_k} > 1$, for k = 0, 1, 2, . . . , n – 1.

378. Let n be a positive integer. **Statement–1** : $3^{2n+2} - 8n - 9$ is divisible by 64.
Statement–2 : $3^{2n+2} - 8n - 9 = (1+8)^{n+1} - 8n - 9$ and in the binomial expansion of $(1+8)^{n+1}$, sum of first two terms is 8n + 9 and after that each term is a multiple of 8^2.

379. **Statement–1** : If n is an odd prime, then integral part of $\left(\sqrt{5}+2\right)^n$ is divisible by 20n.
Statement–2 : If n is prime, then $^nc_1$, $^nc_2$, $^nc_3$ . . . $^nc_{n-1}$ must be divisible by n.

380. **Statement–1** : The coefficient of x^{203} in the expression $(x – 1)(x^2 – 2)(x^2 – 3) . . . (x^{20} – 20)$ must be 13.
Statement–2 : The coefficient of x^8 in the expression $(2 + x)^2 (3 + x)^3 (4 + x)^4$ is equal to 30.

381. **Statement–1 :** $C_0^2 + C_1^2 + C_2^2 + C_3^2 + ... + C_n^2 = \frac{2n!}{(n!)^2}$ **Statement–2 :** $^nC_0 - {^nC_1} + {^nC_2} .... + (-1)^n\,{^nC_n} = 0$

382. **Statement–1 :** Some of coefficient $(x – 2y + 4z)^n$ is 3^n
Statement–2 : Some of coefficient of $(c_0x_0 + c_1x_1 + c_2x_2 + ... + c_nx^n)^n$ is 2^n

383. **Statement-1:** The greatest coefficient in the expansion of $(a_1 + a_2 + a_3 + a_4)^{17}$ is $\frac{17!}{(3!)^3\,4!}$
Statement-2: The number of distinct terms in $(1 + x + x^2 + x^3 + x^4 + x^5)^{100}$ is 501.

384. **Statement-1:** The co-efficient of x^5 in the expansion of $(1 + x^2)^5 (1 + x)^4$ is 120
Statement-2: The sum of the coefficients in the expansion of $(1 + 2x – 3y + 5z)^3$ is 125.

385. **Statement-1:** The number of distinct terms in $(1 + x + x^2 + x^3 + x^4)^{1000}$ is 4001
Statement-2: The number of distinct terms in the expansion $(a_1 + a_2 + ... + a_m)^n$ is $^{n+m-1}C_{m-1}$

386. **Statement-1:** In the expansion of $(1 + x)^{30}$, greatest binomial coefficient is $^{30}C_{15}$
Statement-2: In the expansion of $(1 + x)^{30}$, the binomial coefficients of equidistant terms from end & beginning are equal.

387. **Statement-1:** Integral part of $\left(\sqrt{3}+1\right)^{2n+1}$ is even where n$\in$I.
Statement-2: Integral part of any integral power of the expression of the form of p + $\sqrt{q}$ is even.

388. **Statement-1 :** $\sum_{r=4}^{20} {}^{r}C_4 = {}^{21}C_4$ **Statement-2:** $1 + x + x^2 + x^3 + ... + x^{n-1} = \frac{1-x^n}{1-x}$ = sum of n terms of GP.

389. **Statement-1:** Last two digits of the number $(13)^{41}$ are 31.
Statement-2: When a number in divided by 1000, the remainder gives the last three digits.

390. **Statement-1:** ${}^nC_0 + {}^nC_1 + {}^nC_2 + ... + {}^nC_n = 2^n$ where $n \in N$.
Statement-2: The all possible selections of n distinct objects are 2^n.

391. **Statement-1 :** The integral part of $(5+2\sqrt{6})^n$ is odd, where $n \in N$.
Statement-2 : $(x + a)^n - (x - a)^n = 2[{}^nC_0x^n + {}^nC_2x^{x-2}a^2 + {}^nC_4 + x^{n-4}a^4 + ...]$

392. **Statement-1:** If n is even than ${}^{2n}C_1 + {}^{2n}C_3 + {}^{2n}C_5 + ... + {}^{2n}C_{n-1} = 2^{2n-1}$
Statement-2: ${}^{2n}C_1 + {}^{2n}C_3 + {}^{2n}C_5 + ... + {}^{2n}C_{2n-1} = 2^{2n-1}$

393. **Statement-1 :** Any positive integral power of $\left(\sqrt{2}-1\right)$ can be expressed as $\sqrt{N}-\sqrt{N-1}$ for some natural number N > 1.
Statement-2 : Any positive integral power of $\sqrt{2}-1$ can be expressed as A + B $\sqrt{2}$ where A and B are integers.

394. **Statement-1 :** The term independent of x in the expansion of $\left(x+\frac{1}{x}+3\right)^m$ is $\frac{4m!}{(2m!)^2}$.
Statement-2: The Coefficient of x^b in the expansion of $(1 + x)^n$ is ${}^nC_b$.

395. **Statement-1:** The coefficient of x^8 in the expansion of $(1 + 3x + 3x^2 + x^3)^{17}$ is ${}^{51}C_2$.
Statement-2 : Coefficient of x^r in the expansion of $(1 + x)^n$ is ${}^nC_r$.

396. **Statement-1:** If $(1 + x)^n = c_0+c_1x + c_2x^2 + ... + c_nx^n$ then
$c_0 - 2.c_1 + 3.c_2 -..... + (-1)^n (n + 1)c_n = 0$
Statement-2: Coefficients of equidistant terms in the expansion of $(x + a)^n$ where $n \in N$ are equal.

397. **Statement-1:** $\sum_{k=1}^{n} k\left({}^nC_n\right)^2 = n\ {}^{2n-1}C_{n-1}$
Statement-2: If 2^{2003} is divided by 15 then remainder is 8.

398. **Statement-1:** The co-efficient of $(1 + x^2)^5 (1 + x)^4$ is 120.
Statement-2: The integral part of $(\sqrt{5}+2)^{10}$ is odd.

ANSWER

373. D 374. A 375. A 376. A 377. A 378. A 379. A 380. C 381. B 382. C 383. D
384. D 385. B 386. B 387. C 388. D 389. D 390. A 391. B. 392. D 393. A 394. D 395. D
396. B 397. B 398. D 399. A

QUE. FROM COMPT. EXAMS.

1. The value of $(\sqrt{2}+1)^6 + (\sqrt{2}-1)^6$ will be **[RPET 1997]**
(a) – 198 (b) 198 (c) 99 (d) – 99

2. If $(1+ax)^n = 1 + 8x + 24x^2 + ...$, then the value of a and n is **[IIT 1983; Pb. CET 1994, 99]**
(a) 2, 4 (b) 2, 3 (c) 3, 6 (d) 1, 2

3. The coefficient of x^5 in the expansion of $(1+x^2)^5(1+x)^4$ is **[EAMCET 1996; UPSEAT 2001; Pb. CET 2002]**
(a) 30 (b) 60 (c) 40 (d) None of these

4. If $\frac{(1-3x)^{1/2}+(1-x)^{5/3}}{\sqrt{4-x}}$ is approximately equal to $a+bx$ for small values of x, then $(a,b) =$
(a) $\left(1,\frac{35}{24}\right)$ (b) $\left(1,-\frac{35}{24}\right)$ (c) $\left(2,\frac{35}{12}\right)$ (d) $\left(2,-\frac{35}{12}\right)$

5. The value of x in the expression $[x + x^{\log_{10}(x)}]^5$, if the third term in the expansion is 10,00,000 **[Roorkee 1992]**
(a) 10 (b) 11 (c) 12 (d) None of these

6. If the coefficient of the middle term in the expansion of $(1+x)^{2n+2}$ is p and the coefficients of middle terms in the expansion of $(1+x)^{2n+1}$ are q and r, then

(a) $p+q=r$ (b) $p+r=q$ (c) $p=q+r$ (d) $p+q+r=0$

7. In the polynomial $(x-1)(x-2)(x-3).........(x-100)$, the coefficient of x^{99} is **[AMU 2002]**

(a) 5050 (b) – 5050 (c) 100 (d) 99

8. The coefficient of x^{100} in the expansion of $\sum_{j=0}^{200}(1+x)^j$ is

[UPSEAT 2004]

(a) $\binom{200}{100}$ (b) $\binom{201}{102}$ (c) $\binom{200}{101}$ (d) $\binom{201}{100}$

9. If the coefficient of x^7 in $\left(ax^2+\frac{1}{bx}\right)^{11}$ is equal to the coefficient of x^{-7} in $\left(ax-\frac{1}{bx^2}\right)^{11}$, then ab =

[MP PET 1999; AMU 2001; Pb. CET 2002; AIEEE 2005]

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

10. If the coefficient of x in the expansion of $\left(x^2+\frac{k}{x}\right)^5$ is 270, then k = **[EAMCET 2002]**

(a) 1 (b) 2 (c) 3 (d) 4

11. The coefficients of three successive terms in the expansion of $(1+x)^n$ are 165, 330 and 462 respectively, then the value of n will be **[UPSEAT 1999]**

(a) 11 (b) 10 (c) 12 (d) 8

12. If the coefficient of $(2r+4)^{th}$ and $(r-2)^{th}$ terms in the expansion of $(1+x)^{18}$ are equal, then r=

[MP PET 1997; Pb. CET 2001]

(a) 12 (b) 10 (c) 8 (d) 6

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

[Pb. CET 1998]

(a) $\frac{1.3.5....(5n-1)}{n!}x^n$ (b) $\frac{2.4.6....2n}{n!}x^{2n+1}$ (c) $\frac{1.3.5....(2n-1)}{n!}x^n$ (d) $\frac{1.3.5....(2n-1)}{n!}2^n x^n$

14. The value of $\binom{30}{0}\binom{30}{10}-\binom{30}{1}\binom{30}{11}$

$+\binom{30}{2}\binom{30}{12}+.......+\binom{30}{20}\binom{30}{30}$

[IIT Screening 2005]

(a) ${}^{60}C_{20}$ (b) ${}^{30}C_{10}$ (c) ${}^{60}C_{30}$ (d) ${}^{40}C_{30}$

15. Middle term in the expansion of $(1+3x+3x^2+x^3)^6$ is

[MP PET 1997]

(a) 4^{th} (b) 3^{rd} (c) 10^{th} (d) None of these

16. Two middle terms in the expansion of $\left(x-\frac{1}{x}\right)^{11}$ are

(a) $231x$ and $\frac{231}{x}$ (b) $462x$ and $\frac{462}{x}$ (c) $-462x$ and $\frac{462}{x}$ (d) None of these

17. The term independent of y in the expansion of $(y^{-1/6}-y^{1/3})^9$ is **[BIT Ranchi 1980]**

(a) 84 (b) 8.4 (c) 0.84 (d) – 84

18. The coefficient of the term independent of x in the expansion of $(1+x+2x^3)\left(\frac{3}{2}x^2-\frac{1}{3x}\right)^9$ is **[DCE 1994]**

(a) $\frac{1}{3}$ (b) $\frac{19}{54}$ (c) $\frac{17}{54}$ (d) $\frac{1}{4}$

19. The term independent of x in $\left[\frac{\sqrt{x}}{3}+\frac{\sqrt{3}}{x^2}\right]^{10}$ is

[EAMCET 1984; RPET 2000]

(a) $\frac{2}{3}$ (b) $\frac{5}{3}$ (c) $\frac{4}{3}$ (d) None of these

20. The term independent of x in $\left(\sqrt{x}-\frac{2}{x}\right)^{18}$ is **[EAMCET 1990]**

(a) ${}^{18}C_6 2^6$ (b) ${}^{18}C_6 2^{12}$ (c) ${}^{18}C_{18} 2^{18}$ (d) None of these

21. The largest term in the expansion of $(3+2x)^{50}$ where $x=\frac{1}{5}$ is **[IIT Screening 1993]**

(a) 5^{th} (b) 51^{st} (c) 7^{th} (d) 6^{th}

22. $\frac{C_1}{C_0}+2\frac{C_2}{C_1}+3\frac{C_3}{C_2}+....+15\frac{C_{15}}{C_{14}}=$ **[IIT 1962]**

(a) 100 (b) 120 (c) -120 (d) None of these

23. $\binom{n}{0}+2\binom{n}{1}+2^2\binom{n}{2}+.....+2^n\binom{n}{n}$ is equal to **[AMU 2000]**

(a) 2^n (b) 0 (c) 3^n (d) None of these

24. If C_r stands for ${}^nC_r$, the sum of the given series

$\frac{2(n/2)!(n/2)!}{n!}[C_0^2-2C_1^2+3C_2^2-.....+(-1)^n(n+1)C_n^2]$, Where n is an even positive integer, is **[IIT 1986]**

(a) 0 (b) $(-1)^{n/2}(n+1)$ (c) $(-1)^n(n+2)$ (d) $(-1)^{n/2}(n+2)$

25. Sum of odd terms is A and sum of even terms is B in the expansion $(x+a)^n$, then **[RPET 1987; UPSEAT 2004]**

(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

26. In the expansion of $(x+a)^n$, the sum of odd terms is P and sum of even terms is Q, then the value of (P^2-Q^2) will be **[RPET 1997; Pb. CET 1998]**

(a) $(x^2+a^2)^n$ (b) $(x^2-a^2)^n$ (c) $(x-a)^{2n}$ (d) $(x+a)^{2n}$

27. The sum of the coefficients in the expansion of $(1+x-3x^2)^{2163}$ will be **[IIT 1982]**

(a) 0 (b) 1 (c) -1 (d) 2^{2163}

28. If the sum of the coefficients in the expansion of $(1-3x+10x^2)^n$ is a and if the sum of the coefficients in the expansion of $(1+x^2)^n$ is b, then **[UPSEAT 2001]**

(a) $a=3b$ (b) $a=b^3$ (c) $b=a^3$ (d) None of these

29. The sum of the coefficients in the expansion of $(x+y)^n$ is 4096. The greatest coefficient in the expansion is **[Kurukshetra CEE 1998; AIEEE 2002]**

(a) 1024 (b) 924 (c) 824 (d) 724

30. If the sum of the coefficients in the expansion of $(\alpha x^2-2x+1)^{35}$ is equal to the sum of the coefficients in the expansion of $(x-\alpha y)^{35}$, then $\alpha=$

(a) 0 (b) 1

(c) May be any real number (d) No such value exist

31. For every natural number n, $3^{2n+2}-8n-9$ is divisible by **[IIT 1977]**

(a) 16 (b) 128 (c) 256 (d) None of these

32. The least remainder when 17^{30} is divided by 5 is

[Karnataka CET 2003]

(a) 1 (b) 2 (c) 3 (d) 4

33. The value of the natural numbers n such that the inequality $2^n > 2n+1$ is valid is **[MNR 1994]**

(a) For $n \geq 3$ (b) For $n < 3$ (c) For mn (d) For any n

34. Let $P(n)$ be a statement and let $P(n) \Rightarrow p(n+1)$ for all natural numbers n, then $P(n)$ is true

(a) For all n (b) For all $n > 1$

(c) For all $n > m$, m being a fixed positive integer

(d) Nothing can be said

35. $(1+x)^n - nx - 1$ is divisible by (where $n \in N$)

(a) $2x$ (b) x^2 (c) $2x^3$ (d) All of these

ANSWER KEY

1	b	2	a	3	b	4	b	5	a
6	c	7	b	8	a	9	a	10	c
11	a	12	d	13	d	14	b	15	c
16	c	17	d	18	c	19	b	20	a
21	c	22	b	23	c	24	d	25	c
26	b	27	c	28	b	29	b	30	b
31	a	32	d	33	a	34	d	35	b