Dear student following is an Easy level [● O O] test paper. Score of 21 Marks in 15 Minutes would be a satisfactory performance. Questions 1-10 (+3, –1) (All questions have only one option correct)

Q.1 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) 6 (D) 5

Q.2 The number of dissimilar terms in the expansion of $(a + b)^n$ is n + 1, therefore number of dissimilar terms in the expansion of $(a + b + c)^{12}$ is-

(A) 13 (B) 39 (C) 78 (D) 91

Q.3 The value of

${}^nC_0 - {}^nC_1 + {}^nC_2 - ..... + (-1)^n {}^nC_n$ is-

(A) 1 (B) n (C) 2^n (D) 0

Q.4 The number of terms in the expansion of $[(x + 4y)^3 (x - 4y)^3]^2$ is-

(A) 6 (B) 7 (C) 8 (D) 32

Q.5 If $(1 + x)^n = C_0 + C_1x + C_2x^2 + ... + C_nx^n$, then $C_1 + 2C_2x + 3C_3x^2 + ... + nC_nx^{n-1}$ is equal to-

(A) $n(1 + x)^{n-1}$ for $-1 < x < 1$

(B) $n(1 + x)^{n-1}$ for $x > 0$

(C) $n(1 + x)^{n-1}$ for all $x \in R$

(D) None of these

Q.6 5th term from the end in the expansion of $\left(\frac{x^3}{2} - \frac{2}{x^2}\right)^{12}$ is-

(A) $-7920\ x^{-4}$ (B) $7920\ x^{-4}$

(C) $7920\ x^4$ (D) $-7920\ x^4$

Q.7 The value of ${}^{13}C_2 + {}^{13}C_3 + ... + {}^{13}C_{13}$ is-

(A) $2^{13} - 13$

(B) $2^{13} - 14$

(C) An odd number $\neq 2^{13} - 13$

(D) An even number $\neq 2^{13} - 14$.

Q.8 The coefficient of x^{17} in the expansion of $(x - 1)(x - 2) ..... (x - 18)$ is-

(A) 342 (B) –171 (C) $\frac{171}{2}$ (D) 684

Q.9 Coefficient of $a^2 b^5$ in the expansion of $(a + b)^3 (a - 2b)^4$ is-

(A) 24 (B) 96

(C) –24 (D) None of these

Q.10 If the rth term in the expansion of $\left(\frac{x}{3} - \frac{2}{x^2}\right)^{10}$ contains x^4 then r is equal to-

(A) 4 (B) 2

(C) 3 (D) None of these

MATHEMATICS IIT JEE (OCT. 1st WEEK CLASS TEST 1) (BINOMIAL THEOREM) ANSWER KEY

Name : ..... **Roll No. :** .....

	A	B	C	D		A	B	C	D		A	B	C	D
1	○	○	○	○	4	○	○	○	○	7	○	○	○	○
2	○	○	○	○	5	○	○	○	○	8	○	○	○	○
3	○	○	○	○	6	○	○	○	○	9	○	○	○	○
										10	○	○	○	○

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	D	D	D	B	C	B	B	B	C	C

SOLUTIONS

Sol.1 (D)

$$\frac{{}^{n}C_1\, a^{n-1}b}{{}^{n}C_2\, a^{n-2}b^2} = \frac{{}^{n+3}C_2\, a^{n+1}b^2}{{}^{n+3}C_3\, a^{n}b^3}$$

$$\Rightarrow \frac{n}{\frac{n(n-1)}{2}} = \frac{\frac{(n+3)(n+2)}{2}}{\frac{(n+3)(n+2)(n+1)}{6}}$$

$$\Rightarrow \frac{2}{n-1} = \frac{3}{n+1} \Rightarrow n = 5$$

Sol.2 (D)

$(a + b + c)^{12} = ((a + b) + c)^{12}$
$= {}^{12}C_0 (a + b)^{12} + {}^{12}C_1 (a + b)^{11} c + ... + {}^{12}C_{12} (a + b)^0 c^{12}$
and therefore, R.H.S. contains

$13 + 12 + 11 + ... + 1 = \frac{13(13+1)}{2}$ terms

Sol.3 (D)

We know that
$(1 + x)^n = {}^{n}C_0 + {}^{n}C_1x + {}^{n}C_2 x^2 + ... + {}^{n}C_n x^n.$
Substitute $x = -1$.

Sol.4 (B)

$[(x + 4y)^3 (x - 4y)^3]^2 = (x^2 - 16y^2)^6$,
which contains 7 terms.

Sol.5 (C)

Obviously n is a natural number and hence
$(1 + x)^n = C_0 + C_1x + C_2x^2 + ... + C_n x^n$
is a polynomial of degree n.
Differentiating w.r.t. x, we get
$n(1 + x)^{n-1} = C_1 + 2C_2x + 3C_3x^2 + ... + nC_nx^{n-1}$ for all $x \in R$

Sol.6 (B)

5th term from the end in the expansion of $\left(\frac{x^3}{2} - \frac{2}{x^2}\right)^{12}$ is equal to 5th term from the beginning in $\left(-\frac{2}{x^2} + \frac{x^3}{2}\right)^{12}$ which equals

$${}^{12}C_4 \left(-\frac{2}{x^2}\right)^8 \left(\frac{x^3}{2}\right)^4.$$

Sol.7 (B)

${}^{13}C_2 + {}^{13}C_3 + ... + {}^{13}C_{13}$
$= {}^{13}C_0 + {}^{13}C_1 + {}^{13}C_2 + ... + {}^{13}C_{13} - ({}^{13}C_0 + {}^{13}C_1)$
$= 2^{13} - (1 + 13) = 2^{13} - 14.$

Sol.8 (B)

Coefficient of x^{n-1} in
$(x - a_1) (x - a_2) (x - a_3) .... (x - a_n)$
is $-(a_1 + a_2 + a_3 + ... + a_n)$
Hence coefficient of x^{17} in
$(x - 1) (x - 2) ..... (x - 18)$
$= -(1 + 2 + 3 + ... + 18)$

$= -\frac{18(18+1)}{2} = -171.$

Sol.9 (C)

$(a + b)^3 (a - 2b)^4$
$= (a^3 + 3a^2b + 3ab^2 + b^3) \times (a^4 - 8a^3b + 24a^2b^2 - 32ab^3 + 16b^4)$
$= ... + (3 \times 16 + 3(-32) + 1 \times 24) a^2 b^5 + ...$

Sol.10 (C)

$$T_r = {}^{10}C_{r-1} \left(\frac{x}{3}\right)^{11-r} \left(-\frac{2}{x^2}\right)^{r-1}$$

$$= {}^{10}C_{r-1} \frac{(-2)^{r-1}}{3^{11-r}} x^{13-3r}$$

This contains x^4 if $13 - 3r = 4$
i.e. if $r = 3$.