



XI-SCI : Maths
Method of Induction and Binomial Theorem,

DATE:

TIME: 1 Hours 30
Minutes

MARKS: 25

SEAT NO:

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Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1. Select and write the correct answer.

(4)

1. The term not containing x in expansion of $(1 - x)^2 \left(x + \frac{1}{x}\right)$ is

- A) ${}^{11}C_5$ B) ${}^{10}C_3$
C) ${}^{10}C_4$ D) ${}^{10}C_7$

2. The coefficient of x^8y^{10} in the expansion of $(x + y)^{18}$ is

- A) ${}^{18}C_8$ B) ${}^{18}P_{10}$
C) 2^{18} D) none of these

Q.2. Answer the following.

(3)

1. State by writing first four terms, the expansion of the following, where $|x| < 1$
 $(1 + x^2)^{-1}$
2. State by writing first four terms, the expansion of the following, where $|x| < 1$
 $(1 + x)^{-4}$
3. Show that $C_0 + C_2 + C_4 + C_6 + C_8 = C_1 + C_3 + C_5 + C_7 = 128$

Section B
Attempt any Four

Q.3 Simplify first three terms in the expansion of the following $(1 + 3x)^{\frac{-1}{2}}$ **(2)**

Q.4 State by writing first four terms, the expansion of the following, where $|b| < |a|$.
 $(a - b)^{-\frac{1}{4}}$ **(2)**

Q.5 Use binomial theorem to evaluate the following upto four places of decimals. $(1.02)^{-5}$ **(2)**

Q.6 Use binomial theorem to evaluate the following upto four places of decimals. $(0.98)^{-3}$ **(2)**

Q.7 State by writing first four terms, the expansion of the following, where $|b| < |a|$.
 $(a + b)^{-4}$ **(2)**

Q.8 Find the middle term (s) in the expansion of $\left(\frac{x}{y} + \frac{y}{x}\right)^{12}$ **(2)**

Section C
Attempt any Two

- Q.9 Using binomial theorem, find the value of $\sqrt[3]{995}$ upto four places of decimals. **(3)**
- Q.10 Prove that $(\sqrt{3} + \sqrt{2})^6 + (\sqrt{3} - \sqrt{2})^6 = 970$ **(3)**
- Q.11 Prove by method of induction, $\log_a x^n = n \log_a x$, $x > 0$, $n \in \mathbb{N}$ **(3)**

Section D
Attempt any One

- Q.12 In the expansion of $(k + x)^8$, the coefficient of x^5 is 10 times the coefficient of x^6 . Find the value of k. **(4)**
- Q.13 Prove by method of induction, for all $n \in \mathbb{N}$ **(4)**
- $$\frac{1}{3.4.5} + \frac{2}{4.5.6} + \frac{3}{5.6.7} + \dots + \frac{n}{(n+2)(n+3)(n+4)} = \frac{n(n+1)}{6(n+3)(n+4)}$$