PART-III

MATHEMATICS

PAPER-II (A)

MODEL PAPER 1

Time : 3 Hours | Max. Marks : 75

Note : This question paper consists of **three** sections **A, B** and **C.**

SECTION - A (10 × 2 = 20)

I. **Very short** answer type questions.

(i) Attempt **all** the questions.

(ii) Each question carries **two** marks.

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1. If $z = 2 - 3i$, then show that, $z^2 - 4z + 13 = 0$.

2. Find the square roots of $(-5 + 12i)$.

3. If 1, ω. ω^2 are the cube roots of unity, prove that $(1 - \omega + \omega^2)^6 + (1 - \omega^2 + \omega)^6 = 128$.

4. If α and β are the roots of $ax^2 + bx + c = 0$, find the value of $\alpha^2 + \beta^2$.

5. If -1, 2 and α are the roots of the equation $2x^3 + x^2 - 7x - 6 = 0$, then find α.

6. Find the number of ways of selecting 3 vowels and 2 consonants from the letters of word 'EQUATION'

7. If ${}^{12}C_{s+1} = {}^{12}C_{2s-5}$, then find s.

8. Find the middle terms in the expansion of $\left(\frac{3x}{7} - 2y\right)^{10}$

9. Find the mean deviation from the mean of the following discrete data : 3, 6, 10, 4, 9, 10.

10. The mean and variance of a Binomial distribution is 4 and 3 respectively. Find its parameters.

SECTION - B (5 × 4 = 20)

II. **Short answer** type questions.

(i) Attempt any **five** questions.

(ii) Each question carries **four** marks.

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11. Show that the four points in the Argand plane represented by the complex numbers $2 + i$, $4 + 3i$, $2 + 5i$, $3i$ are the vertices of a square.

12. Determine the range of expression $\frac{x^2 + x + 1}{x^2 - x + 1}$.

13. Prove that for $3 \le r \le n$, ${}^{(n-3)}C_r + 3.{}^{(n-3)}C_{r-1} + 3.{}^{(n-3)}C_{r-2} + {}^{(n-3)}C_{r-3} = {}^{n}C_r$

14. If the letters of the word 'RUBLE' are permuted in all possible ways and if the words thus formed are arranged in the dictionary order, find the rank of the word 'LUBER'.

15. Resolve the partial fractions $\frac{2x^2+3x+4}{(x-1)(x^2+2)}$

16. A and B are events with $P(A) = 0.5$, $P(B) = 0.4$ and $P(A \cap B) = 0.3$ Find the probability that

(i) A does not occur

(ii) neither A nor B occurs

17. A speaks truth in 75% of the cases and B in 80% cases. What is the probability that their statements about an incident do not match ?

SECTION - C (5 × 7 = 35)

III. **Long answer** type questions.

(i) Attempt **any five** questions.

(ii) Each question carries **seven** marks.

18. If $\cos\alpha + \cos\beta + \cos\gamma = 0 = \sin\alpha + \sin\beta + \sin\gamma$, then prove that : $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = \frac{3}{2}$

19. Solve the equation $2x^5 + x^4 - 12x^3 - 12x^2 - x + 2 = 0$

20. If P and Q are the sum of odd terms and the sum of even terms respectively, in the expansion of $(x + a)^n$ then prove that

(i) $P^2 - Q^2 = (x^2 - a^2)^n$ (ii) $4PQ = (x + a)^{2n} - (x - a)^{2n}$

21. If the coefficient of x^{10} in the expansion of $\left(ax^2+\frac{1}{bx}\right)^{11}$ is equal to the coefficient of x^{10} in the expansion of $\left(ax-\frac{1}{bx^2}\right)^{11}$

Find the relation between a and b, where a and b are real numbers.

22. Find the mean deviation about the mean for the following data :

Marks Obtained	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Number of students	5	8	15	16	6

23. State and prove the addition theorem on probability.

24. The range of a random variable X is {0, 1, 2} Given that $P(X = 0) = 3C^3$,
$P(X = 1) = 4C - 10C^2$, $P(X = 2) = 5C - 1$.

(i) Find the value of C.

(ii) $P(X < 1)$, $P(1 < X \leq 2)$ and $P(0 < X \leq 3)$.

MODEL PAPER 2

PART-III

MATHEMATICS

PAPER-II (A)

Time : 3 Hours | Max. Marks : 75

Note : This question paper consists of **three** sections **A, B** and **C.**

SECTION - A $(10 \times 2 = 20)$

I. **Very short** answer type questions.

(i) Attempt **all** questions.

(ii) Each question carries **two** marks.

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1. Find the complex conjugate of $(3 + 4i)(2 - 3i)$
2. Represent the complex number $2 + 3i$ in argand plane.
3. If $x = \text{cis}\,\theta$, then find the value of $\left(x^6 + \frac{1}{x^6}\right)$.
4. If α, β are the roots of the equation $ax^2 + bx + c = 0$,
   Find the value of $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ in terms of a, b, c.
5. Form a quadratic equation whose roots are $7 \pm 2\sqrt{5}$.
6. Find the number of ways in which 4 letters can be put in 4 addressed envelopes so that no letter goes into the envelope meant for it.
7. Find the number of ways of selecting 4 boys and 3 girls from a group of 8 boys and 5 girls.
8. Find the coefficient of x^7 in the expansion of $\left(\frac{3x^2}{7} + \frac{4}{5x^3}\right)^{11}$.
9. Find the mean deviation from the mean of the following discrete data 6, 7, 10, 12, 13, 4, 12, 16.
10. A Poisson variable satisfies : $P(X = 1) = P(X = 2)$, find $P(X = 5)$.

SECTION - B $(5 \times 4 = 20)$

II. **Short answer** type questions.

(i) Attempt any **five** questions.

(ii) Each question carries **four** marks.

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11. If the point P denotes the complex number $z = x + iy$ in the Argand plane and if $\frac{z - i}{z - 1}$ is a purely imaginary number, find the locus of P.

12. Prove that $\frac{1}{3x+1} + \frac{1}{x+1} - \frac{1}{(3x+1)(x+1)}$ does not lie between 1 and 4 if x is real.

13. Prove that ${}^{n}C_r + {}^{n}C_{r-1} = {}^{(n+1)}C_r$.

14. If letters of the word "MASTER" are permuted in all possible ways and the words thus formed are arranged in the dictionary order, then find the rank of the word "MASTER"

15. Resolve $\frac{x^2-3}{(x+2)(x^2+1)}$ into partial fractions.

16. Let A and B be independent events with P(A) = 0.2. P(B) = 0.5 Then find:

(i) P(A/B)

(ii) P(B/A)

(iii) $P(A \cap B)$

(iv) $P(A \cup B)$

17. A, B, C are three horses in a race. The probability of A to win the race is twice that of B, and the probability of B is twice that of C what are the probabilities of A, B and C to win the race ?

SECTION - C $(5 \times 7 = 35)$

III. **Long answer** type questions.

(i) Attempt **any five** questions.

(ii) Each question carries **seven** marks.

18. If α, β are the roots of the equation $x^2 - 2x + 4 = 0$, then for any $n \in N$. Show that $\alpha^n + \beta^n = 2^{n+1}\cos\left(\frac{n\pi}{3}\right)$.

19. Solve the following equation : $x^5 - 5x^4 + 9x^3 - 9x^2 + 5x - 1 = 0$.

20. Find the sum to inifinite terms of the series

$$\frac{7}{5}\left(1+\frac{1}{10^2}+\frac{1.3}{1.2}\cdot\frac{1}{10^4}+\frac{1.3.5}{1.2.3}\cdot\frac{1}{10^6}+\ldots\ldots\right)$$

21. If the co-efficients of 4 consecutive terms in the expansion of $(1+x)^n$ are a_1, a_2, a_3, a_4 respectively then show that

$$\frac{a_1}{a_1+a_2}+\frac{a_3}{a_3+a_4}=\frac{2a_2}{a_2+a_3}$$

22. Calculate the variance and standard deviation of the following continuous frequency distribution :

Class interval	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100
Frequency	3	7	12	15	8	3	2

23. State and prove Baye's theorem.

24. The range of a random variable X is {1, 2, 3 .....} and $P(X = k) = \frac{c^k}{k!}$; (k = 1, 2, 3 ......). Find the value of c and $P(0 < X < 3)$.

PART-III

MATHEMATICS

MODEL PAPER 3

PAPER-II (A)

Time : 3 Hours | Max. Marks : 75

Note : This question paper consists of **three** sections **A, B and C.**

SECTION - A (10 × 2 = 20)

I. **Very short** answer type questions.

(i) Attempt **all** the questions.

(ii) Each question carries **two** marks.

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1. If $z_1 = (2, -1)$, $z_2 = (6, 3)$ find $z_1 - z_2$.
2. Write the following complex numbers in the form A + iB. i^{-19}
3. Find all the values of $(1+i)^{\frac{2}{3}}$
4. If $x^2 + bx + c = 0$, $x^2 + cx + b = 0$ $(b \neq c)$ have a common root, then show that $b + c + 1 = 0$.
5. If -1, 2 and α are the roots of $2x^3 + x^2 - 7x - 6 = 0$, then find α.
6. If ${}^{n}P_7 = 42 . {}^{n}P_5$ find n.
7. A man has 4 sons and there are 5 school within his reach. In how many ways can he admit his sons in the schools so that no two of them will be in the same school.
8. Write down and simplify

   10^{th} term in $\left(\frac{3p}{4} - 5q\right)^{14}$
9. Find the variance for the discrete data given below.

   350, 361, 370, 373, 376, 379, 385, 387, 394, 395
10. Suppose that a coin is tossed three times. Let event A be "getting three heads " and B be the event of "getting a head on the first toss ". Show that A and B are dependent events.

SECTION - B (5 × 4 = 20)

II. **Short answer** type questions.

(i) Attempt any **five** questions.

(ii) Each question carries **four** marks.

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11. If $z = 3 - 5i$, then show that $z^3 - 10z^2 + 58z - 136 = 0$.
12. Find the maximum value of function $\dfrac{x^2 + 14x + 9}{x^2 + 2x + 3}$ over R.
13. Find the sum of all 4-digited numbers that can be formed using the digits 1, 2, 4, 5, 6 without repetition.
14. Find the number of ways of forming a committee of 5 members out of 6 Indians and 5 Americans so that always the Indians will be in majority in the committee.

15. Resolve $\frac{1}{(x-1)^2(x-2)}$ into partial fractions.

16 Two persons A and B are rolling a die on the condition that the person who gets 3 will win the game. If A starts the game, then find the probabilities of A and B respectively to win the game.

17. If A, B are two events with $P(A \cup B) = 0.65$, $P(A \cap B) = 0.15$, then Find the value of $P(A^c) + P(B^c)$.

SECTION - C (5 × 7 = 35)

III. Long answer type questions.

(i) Attempt **any five** questions.

(ii) Each question carries **seven** marks.

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18. Show that one value of $\left[\frac{1+\sin\frac{\pi}{8}+i\cos\frac{\pi}{8}}{1+\sin\frac{\pi}{8}-i\cos\frac{\pi}{8}}\right]^{\frac{8}{3}}$ is -1.

19. Solve $18x^3 + 81x^2 + 121x + 60 = 0$ given that one root is equal to half the sum of the remaining roots. [(TS) May-18, Q19 | May-11, Q18]

20. Prove that, $(C_0 + C_1)(C_1 + C_2)(C_2 + C_3) \ldots\ldots (C_{n-1} + C_n) = \frac{(n+1)^n}{n!} . C_0 . C_1 . C_2 \ldots\ldots C_n$

21. Find the sum of the infinite series

$\frac{3}{4} + \frac{3.5}{4.8} + \frac{3.5.7}{4.8.12} + \ldots$

22. Find the mean deviation from the mean of the following data, using step deviation method

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of Students	6	5	8	15	7	6	3

23. If one ticket is randomly selected from tickets numbered 1 to 30, then find the probability that the number on the ticket is (i) a multiple of 5 or 7 (ii) a multiple of 3 or 5.

24. In a city 10 accidents take place in a span of 50 days. Assuming that the number of accidents follows the Poisson distribution, find the probability that there will be 3 or more accidents in a day.

PART-III

MATHEMATICS

PAPER-II (A)

GUESS PAPER 1

Time : 3 Hours | Max. Marks : 75

Note : This question paper consists of **three** sections **A, B** and **C.**

SECTION - A $(10 \times 2 = 20)$

I. **Very short** answer type questions.

(i) Attempt **all** the questions.

(ii) Each question carries **two** marks.

1. If $z_1 = -1$ and $z_2 = i$, then find $\text{Arg}\left(\frac{z_1}{z_2}\right)$

2. Find the complex conjugate of $(3 + 4i)(2 - 3i)$.

3. If $1, \omega, \omega^2$ are the cube roots of unity, then prove that $\frac{1}{2+\omega} + \frac{1}{1+2\omega} = \frac{1}{1+\omega}$

4. Find the values of m for which the equation $x^2 - 15 - m(2x - 8) = 0$ have equal roots.

5. If the product of the roots of $4x^3 + 16x^2 - 9x - a = 0$ is 9, then find a.

6. If ${}^nC_5 = {}^nC_6$, then find ${}^{13}C_n$.

7. Find the number of ways of permuting the letters of the word PICTURE so that all the vowels come together.

8. Find the coefficient of x^{-7} in the expansion of $\left(\frac{2x^2}{3} - \frac{5}{4x^5}\right)^{11}$

9. Find the mean deviation about the median for the following data : 4, 6, 9, 3, 10, 13, 2.

10. If the mean and variance of a binomial variable x are 2.4 and 1.44 respectively, then find n.

SECTION - B $(5 \times 4 = 20)$

II. **Short answer** type questions.

(i) Attempt any **five** questions.

(ii) Each question carries **four** marks.

11. If $x + iy = \frac{1}{1 + \cos\theta + i\sin\theta}$, then show that $4x^2 - 1 = 0$.

12. Determine the range of the expression $\frac{x^2 + x + 1}{x^2 - x + 1}$.

13. Simplify ${}^{34}C_5 + \sum_{r=0}^{4} {}^{(38-r)}C_4$

14. Prove that, $\frac{{}^{4n}C_{2n}}{{}^{2n}C_n} = \frac{1.3.5.....(4n-1)}{[1.3.5.....(2n-1)]^2}$

15. Resolve $\frac{x^4}{(x-1)(x-2)}$ into partial fractions.

16. In a committee of 25 members, each member is proficient either in mathematics or in statistics or in both, If 19 of these are proficient in mathematics, 16 in statistics, find the probability that a person selected from the committee is proficient in both.

17. If A, B are two events with $P(A \cup B) = 0.65$, $P(A \cap B) = 0.15$, then find the value of $P(A^C) + P(B^C)$.

SECTION - C $(5 \times 7 = 35)$

III. **Long answer** type questions.

(i) Attempt **any five** questions.

(ii) Each question carries **seven** marks.

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18. If n is positive integer, show that : $(p+iq)^{\frac{1}{n}} + (p-iq)^{\frac{1}{n}} = 2(p^2+q^2)^{\frac{1}{2n}}.\cos\left[\frac{1}{n}\tan^{-1}\frac{q}{p}\right]$.

19. Find the polynomial equation whose roots are the translates of the roots of the equation $x^5 - 4x^4 + 3x^2 - 4x + 6 = 0$ by -3.

20. If n is a positive integer and x is non-zero real number, then prove that

$$C_0 + C_1.\frac{x}{2} + C_2.\frac{x^2}{3} + C_3.\frac{x^3}{4} + ... + C_n.\frac{x^n}{n+1} = \frac{(1+x)^{n+1}-1}{(n+1)x}$$

21. If the coefficients of 4 consecutive terms in the expansion of $(1+x)^n$ are a_1, a_2, a_3, a_4 respectively, then show that :

$$\frac{a_1}{a_1+a_2} + \frac{a_3}{a_3+a_4} = \frac{2a_2}{a_2+a_3}.$$

22. Calculate variance and standard deviation of the following continuous frequency distribution.

Class Interval	Frequency
30 – 40	3
40 – 50	7
50 – 60	12
60 – 70	15
70 – 80	8
80 – 90	3
90 – 100	2

23. Three urns have the following composition of balls :

Urn I : 1 white, 2 black

Urn II : 2 white, 1 black

Urn III : 2 white, 2 black

One of the urns is selected at random and a ball is drawn. It runs out to be white. Find the probability that it came from urn III.

24. The probability distribution of a random variable X is given below.

$X = x_i$	1	2	3	4	5
$P(X = x_i)$	k	2k	3k	4k	5k

Find the value of k and the mean and variance of X.

x

PART-III

MATHEAMTICS

PAPER-II(A)

GUESS PAPER 2

Time : 3 Hours | Max. Marks : 75

SECTION - A $(10 \times 2 = 20)$

Note : (i) Answer **all** questions.

(ii) Each question carries **two** marks.

(iii) All are **Very Short Answer Type Questions.**

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1. Write $(-\sqrt{3}+\sqrt{-2})(2\sqrt{3}-i)$ in the form A + iB.

2. If $(\sqrt{3}+i)^{100} = 2^{99}(a+ib)$, then show that $a^2+b^2=4$.

3. Prove that $-\omega$ and $-\omega^2$ are the roots of $z^2 - z + 1 = 0$, where ω and ω^2 are the complex cube roots of unity.

4. Find the maximum or minimum of the expression $2x + 5 - 3x^2$ as x varies over R.

5. If the product of the roots of $4x^3 + 16x^2 - 9x - a = 0$ is 9, then find a.

6. If $10 \cdot {}^{n}C_2 = 3 \cdot {}^{n+1}C_3$, find n.

7. If ${}^{n}C_4 = 210$, find n.

8. Find the set of values of x for which the binomial expansion of the $\left(4-\frac{x}{3}\right)^{\frac{-1}{2}}$ is valid.

9. Find the mean deviation about the mean for the following data
38, 70, 48, 40, 42, 55, 63, 46, 54, 44.

10. Two dice are rolled. What is the probability that none of the dice shows the number 2?

SECTION - B $(5 \times 4 = 20)$

Note : Short answer type questions.

(i) Attempt any **five** questions.

(ii) Each question carries **four** marks.

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11. Show that the four points in the Argand plane represented by the complex numbers 2 + i, 4 + 3i, 2 + 5i, 3i are the vertices of a square.

12. Determine the range of $\frac{2x^2-6x+5}{x^2-3x+2}$.

13. Find the number of numbers that are greater than 4000 which can be formed using the digits 0, 2, 4, 6, 8 without repetition.

14. Simplify ${}^{34}C_5 + \sum_{r=0}^{4} {}^{(38-r)}C_4$

15. Resolve $\frac{3x-18}{x^3(x+3)}$ into partial fractions.

[redacted]

16. In a committee of 25 members, each member is proficient either in mathematics or in statistics or in both. If 19 of these are proficient in mathematics, 16 in statistics, find the probability that a person selected from the committee is proficient in both.

17. Suppose A and B are independent events with $P(A) = 0.6$, $P(B) = 0.7$. Then compute

    (i) $P(A \cap B)$

    (ii) $P(A \cup B)$

    (iii) $P(B/A)$

    (iv) $P(A^c \cap B^c)$.

SECTION - C $(5 \times 7 = 35)$

Note : Long answer type questions.

(i) Attempt any **five** questions.

(ii) Each question carries **seven** marks.

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18. If n is an integer then show that $(1 + \cos\theta + i\sin\theta)^n + (1 + \cos\theta - i\sin\theta)^n = 2^{n+1}\cos^n\left(\frac{\theta}{2}\right)\cos\left(\frac{n\theta}{2}\right)$.

19. Find the polynomial equation whose roots are the translates of those of the equation,

    $x^5 - 4x^4 + 3x^2 - 4x + 6 = 0$ by -3.

20. Find the sum of the infinite series $\frac{3}{4.8} - \frac{3.5}{4.8.12} + \frac{3.5.7}{4.8.12.16} - \dots$

21. If $t = \frac{4}{5} + \frac{4.6}{5.10} + \frac{4.6.8}{5.10.15} + \dots\dots\infty$, then prove that $9t = 16$.

22. The mean of 5 observations is 4.4. Their variance is 8.24. If three of the observations are 1, 2, and 6. Find the other two observations.

23. On a festival day, a man plans to visit 4 holy temples A, B, C, D in a random order. Find the probability that he visits (i) A before B (ii) A before B and B before C.

24. The probability of a bomb hitting a bridge is $\frac{1}{2}$ and three direct hits (not necessarily consecutive) are needed to destroy it. Find the minimum number of bombs required so that the probability of the bridge being destroyed is greater than 0.9.

BOARD MODEL PAPER (2013 - 2014)

MATHEMATICS - IIA

Time : 3hrs

SECTION-A

Max.Marks : 75

I. Very Short Answer type Questions

i) Answer all questions

ii) Each Question carries 2 marks **10 x 2 = 20**

1. Find the square root of $-5+12i$.

2. If $z_1=-1, z_2=i$ then find $Arg\left(\frac{z_1}{z_2}\right)$.

3. Find the value of $(1+i)^{16}$.

4. If α, β are the roots of the equation $ax^2+bx+c=0$, then find the value of $\frac{1}{\alpha^2}+\frac{1}{\beta^2}$.

5. Find the algebraic equation whose roots are two times the roots of $x^5-2x^4+3x^3-2x^2+4x+3=0$.

6. Find the number of ways of arranging the letters of the word "INTERMEDIATE".

7. If ${}^nP_r=5040$ and ${}^nC_r=210$ find n and r.

8. If $(1+x+x^2)^n=a_0+a_1x+a_2x^2+......+a_{2n}x^{2n}$ then find the value of $a_0+a_2+a_4+....+a_{2n}$.

9. The variance of 20 observations is 5. If each observation is multiplied by 2, then find the new variance of the resulting observations.

10. A poisson variable satisfies $P(x=1)=P(x=2)$. Find $P(X=5)$.

SECTION-B

II. Short Answer type Questions

i) Answer any five questions

ii) Each Question carries 4 marks **5 x 4 = 20**

11. If $z=x+iy$ and if the point P in the Argand plane represents z, find the locus of z satisfying the equation $|z-2-3i|=5$.

12. Find the range of $\frac{x+2}{2x^2+3x+6}$.

13. If the letters of the word MASTER are permuted in all possible ways and the words thus formed are arranged in the dictionary order, then find the rank of the word "REMAST".

14. Find the number of ways of selecting a cricket team of 11 players from 7 batsmen and 6 bowlers such that there will be atleast 5 bowlers in the team.

15. Resolve $\frac{x^2-3}{(x+2)(x^2+1)}$ into partial fractions.

16. Two persons A and B are rolling a die on the condition that the person who gets 3 will win the game. If A starts the game, then find the probabilities of A and B respectively to win the game.

17. A problem in calculus is given to two students A and B whose chances of solving it are $\frac{1}{3}$ and $\frac{1}{4}$ respectively. Find the probability of the problem being solved if both of them try independently.

SECTION -C

III. Long Answer type Questions

i) Answer any five questions

ii) Each Question carries 7 marks **$5 \times 7 = 35$**

18. Find all the roots of the equation $x^{11} - x^7 + x^4 - 1 = 0$.

19. Solve : $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$.

20. If n is a positive integer and x is any nonzero real number, then prove that

$$C_0 + C_1\frac{x}{2} + C_2.\frac{x^2}{3} + C_3.\frac{x^3}{4} + ... + C_n.\frac{x^n}{n+1} = \frac{(1+x)^{n+1} - 1}{(n+1)x}.$$

21. If $x = \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + \frac{1.3.5.7}{3.6.9.12} + ...$ then prove that $9x^2 + 24x = 11$.

22. Calculate the variance and standard deviation for the following distribution :

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

23. The probabilities of three events A, B, C are such that $P(A) = 0.3$, $P(B) = 0.4$, $P(C) = 0.8$, $P(A \cap B) = 0.08$, $P(A \cap C) = 0.28$, $P(A \cap B \cap C) = 0.09$ and $P(A \cup B \cup C) \geq 0.75$, show that $P(B \cap C)$ lies in the interval [0.23, 0.48]

24. A random variable x has the following probability distribution

$X = x_i$	0	1	2	3	4	5	6	7
$P(X = x_i)$	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2 + k$

Find (i) k (ii) the mean (iii) $P(0 < X < 5)$