MODEL QUESTION PAPER
MATHEMATICS

MAX: Score: 80
Time: 2 ½ hrs.

1. Consider the universal set $U=\{x:x \text{ is a natural no. } 1\leq x\leq 10\}$
   $A = \{x : x \text{ is an even natural no. } 1\leq x\leq 10$
   $B = \{ x: x \text{ is a prime no, } 1\leq x\leq 10 \}$

   i) Write A and B in roster form $(1 + 1)$
   ii) AUB)ii) Verify $(AUB)' = A' \cap B'$ $(1 + 2)$ (5)

2. A real valued function f is defined by $f(x) = \frac{3}{X - 3}$

   i) Find the domain of f
   ii) Find the range of f
   iii) Find f (-4) (3)

3. Let $A = \{1,2,3\}$, $B=\{3,4\}$ and $C=\{4,5,6\}$ Find
   i) $A \times (B \cap C)$ ii) $(A \times B) \cap (A \times C)$ 1+1 ½ + ½
   iii) Verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$ (3)

4. i) Find the degree measure of $\frac{3\Pi^c}{2}$

   ii) Prove that $\frac{\sin 5x + \sin 3x}{\cos 5x + \cos 3x} = \tan 4x$
   iii) Solve $2\cos^2 x + 3\sin x = 0$ 1+2+3(6)

5. Consider the statement P(n): $1+3+3^2+\ldots\ldots+3^{n-1}=\frac{3^n-1}{2}$

   i) PT P(1) is true
   ii) Using the Principle of Mathematics induction show that P (n) is true for any natural no. n. 1+3 = 4

6. i) Convert the complex number $\frac{1+3i}{1-2i}$ in a+ib form

   ii) Convert the complex number $1 - i\sqrt{3}$ into Polar form 2+3=5

7. i) Solve $3(2-x) \geq 2(1-x)$

ii) Solve the following system of inequalities graphically

$2x+y \geq 6$

$3x+4y \leq 12$

$x \geq 0$, $y \geq 0$ 2+

8. 1) A polygon has 44 diagonals. Find its number of sides

2) The letters of the word 'PARAMU' are permuted among themselves and arranged as if in a dictionary. Find the Rank of the word PARAMU

3) If $n c_7 = n c_5$ find the value of n

9. 1) Find the term independent of x in the expansion of $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^6$

2. Find the number of terms in the expansion of $(1-x)^{100}$

10. Consider the series $3.5 + 5.7 + 7.9 + \ldots\ldots$

a) 1. Write the n^{th} term of the series

2. Find sum of first 'n' terms

b) Find the three consecutive terms in a G.P. whose sum is 39/10 and product is 1

11. 1) Consider the straight line $3x + y - 8 = 0$ Reduce it to the normal form and find the values of 'P' and ω

2) Find the ratio in which the line $x+y = 4$ Divides the join of the points (-1,1) and (5,7)

3) Find the co-ordinates of the dividing points

12. 1) Find the eccentricity, foci, directrix and length of Latus rectum of the hyperbola $36y^2 - 9x^2 = 144$

2) Find the equation of the parabola passing through (2,5) and Symmetric along the x – axis

13 1) Name the octant in which the point (1,2,-3) lies 1

2) Find the ratio in which the line joining the points (-1,0,2) and (3, 4, -5) crosses the XY plane. 2

3) Show that the points (-2, 3,5), (1,2,3) and (7,0,-1) are collinear 1

14. 1) Evaluate $\lim_{X \to 0} \frac{\sqrt{1+x} - 1}{x}$ 2

2) Using first principles, find the derivative of tan x 2

3) Differentiate sin 2x with respect to x 2

15. 1) Consider the statement, "If 'x' is an even number Then 'x' is divisible by 4". Write its converse and Contrapositive 2

2) Prove by contradiction method that the statement "the sum of an irrational number and a rational number is irrational" is valid 2

16. Consider the following frequency distribution

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

1) Find the mean
2) Find standard deviation
3) Find coefficient of variation (2+2+1 = 5)

17. If E and F are events such that P(E)= ¼, P(F) = ½ , P (E and F) = 1/8 Find
1) P (E or F)
2) P (not E and not F) 2+2 = 4

Prepared by Ernakulam Cluster – Group 3.

SHABANA SHARAF	(07143)
MANJU M	(07006)
SHAJIRA A	(07032)
SONIA A.V	(07020)
BISINI K.A.	(07037)
SAHEERA I	(07071)
DEEPA.M	(07071)
MARGARET SALAY K.S	(07070)
SAUMYA CLEETUS	(07067)
ANTONY JOSEPH	(07004)
BIJU GEORGE	(07063)
NEELIMA AUGUSTINE	(07063)
VIJIMOLE VARGHESE	(07034)
SHAMEENA.S	(07034)