MODEL QUESTION PAPER - 3
I PUC MATHEMATICS (35)

PART-A

I. Answer All the multiple-choice questions. **10×1=10**

1. If A= {1,2} then number of elements in power set of A
   A) 4 B) 2 C) 3 D) 8
2. A function f is defined by f(x)=2x-5. Write the value of f (0)
   A) 5 B) -5 C) -3 D) 10
3. Find the value of cos (-1710^{o})
   A)0 B)1 C)-1 D)90
4. for any integer k, i^{4k+2}=
   A)1 B) -i C) -1 D) i
5. find the value of $\frac{7!}{5!}$
   A) 42 B) 71 C) 64 D) 35
6. The 3rd term of the sequence defined by a_n=2n+5
   A) 9 B) 7 C) 11 D) 13
7. Slope of the line 3x-4y+10=0 is
   A) $\frac{3}{4}$ B) $\frac{-3}{4}$ C) $\frac{-10}{3}$ D) $\frac{5}{2}$
8. $\lim_{x\to -2} \frac{\frac{1}{x}+\frac{1}{2}}{x+2}$ is equal to
   A) -1 B) $\frac{1}{4}$ C) $\frac{-1}{4}$ D) -4
9. Which of the following is a statement?
   A) Mathematics is difficult.
   B) There are 35 days in a month
   C) Answer this question
   D) Tomorrow is Friday
10. A card is selected from a pack of 52 cards. How many points are there in the sample space?
    A) 52 B) 26 C) 13 D) 1

II. Fill in the blanks by choosing the appropriate answer from those given in bracket **5×1=5**
(7, 9, -2, 10, 20)

11. If cos x= $-\frac{1}{2}$, x lies in third quadrant then sec x=____
12. If ${}^{n}C_{8} = {}^{n}C_{2}$ then n= ____
13. The number of terms in the expansion of $(x+2y)^8$ is _____
14. The point (-2, -4, -7) lies in ___ octant
15. Derivative of $f(x)=x^2-2$ at x=10 is _____

III. Answer the following questions **5×1=5**

16. Writ the set A= {1,4,9, 16… 100} in set-builder form.
17. Solve 24x<100 when x is a natural number
18. Write the equation of the line, which makes intercepts -3 and 2 on the x and y axes respectively
19. Find the equation of parabola which has Focus (6,0) and directrix is x=-6
20. Find the median from the following data 3,9,5,3,12,10,18,4,7,19,21

PART-B

Answer any NINE questions **9×2=18**

21. **If** A= {3,5,7,9,11} B= {7,9,11,13} then find i) $A \cup B$ ii) A-B
22. If X and Y are two sets such that $X \cup Y$ has 50 elements, X has 28 elements, Y has 32 elements, then how many elements does $X \cap Y$ have?
23. Determine the domain and range of the relation R defined by
    R= {(x, x+5): $x \in \{0,1,2,3,4,5\}$
24. In a circle of diameter 40 cm, the length of a chord is 20 cm. Find the length of minor are of the chord.
25. Prove that $2\sin^2\left(\frac{3\pi}{4}\right)+2\cos^2\left(\frac{\pi}{4}\right)+2\sec^2\frac{\pi}{3}=10$
26. Solve $x^2+3x+5=0$
27. Solve for real 'x' $x+\frac{x}{2}+\frac{x}{3}<11$
28. Find the value of x for which (x, -1), (2,1), (4,5) are collinear
29. Find the equation of the line through the point (0,2)| making an angle $\frac{2\pi}{3}$ with the positive x-axis
30. Find the distance between the following points (2, -1, 3) and (-2, 1, 3)
31. Evaluate $\lim_{x\to 1}\frac{x^2+x-2}{x^2-3x+2}$
32. Write contrapositive and converse of the statement "If a number is divisible by 9, then it is divisible by 3
33. Co-efficient of variation of two distributions are 60 and 70 and their standard deviations are 21 and 16 respectively. What are their arithmetic means?
34. A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed. Find the probability that the sum of numbers that turn up is i) 3 ii) 12

PART-C

Answer any NINE of the following **9 x 3 = 27**

35. In a survey of 400 students in a school, 100 were listed as taking apple juice 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Find how many students were taking neither apple juice nor orange juice.
36. If $f(x)=x^2$ $g(x)=2x+1$ then find
    i) f(x)+g(x) ii) f(x)-g(x) iii) f(x) g(x)
37. Find the general solution of cos 3x+cosx-cos2x=0
38. Find multiplicative inverse of z= $\sqrt{5}+3i$
39. Covert the following complex number into polar form z = -1+i
40. How many words with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated if
    i) 4 letters are used at a time
    ii) All letters are used at a time
    iii)All letters are used but first letter is a vowel?
41. Find the term independent of x in the expansion $\left[\frac{3x^2}{2}-\frac{1}{3x}\right]^6$
42. If the sum of n terms of an A. P is $3n^2+5n$ and its m^{th} term is 164. Find the value of m
43. In a G.P 3^{rd} term 24 and the 6^{th} term is 192. Find the 10^{th} term.
44. Find the centre and radius of the circle $x^2+y^2+8x+10y-8=0$

45. Find the derivative of f(x)=sin x from First principle
46. Verify by the method of contradiction "$\sqrt{7}$ is irrational"
47. A and B are events such that P(A)=0.42 P(B)=0.48 and P (A and B) =0.16 Determine
    i) P(not A) ii) P(not B) iii) P(A or B)
48. In each of the following experiment. Describe sample space.
    i) Two coins are tossed once ii) A coin is tossed 3 times
    iii) Simultaneous throw of a die and coin

PART-D

Answer any FIVE question **5×5=25**

49. Define Greatest Integer function. Determine its Domain and Range sketch the Graph.
50. Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$
51. Prove by mathematical induction that $1^2+2^2+3^2+ \ldots \ldots + n^2 = \frac{n(n+1)(2n+1)}{6} \forall n \in N$
52. Solve the following system of inequalities Graphically.
    $x-2y \le 3,\ 3x+4y \ge 12, x \ge 0, y \ge 1$
53. A committee of 7 has to be formed from 9 boys and 4 girls in how many ways can this be done when the committee consists as
    A) Exactly 3 girls B) Atmost 3 girls
54. State and prove binomial theorem for any positive integer n
55. Derive an expression for perpendicular distance of a point p (x_1, y_1) from the line Ax+By+C=0
56. Derive the formula to find the coordinates of the point which divides the lines segment joining the points (x_1, y_1, z_1) and (x_2, y_2, z_2) in the ratio m: n internally
57. Prove that $\lim_{\theta \to 0} \frac{\sin\theta}{\theta} = 1$ (where θ is in radian measure)
58. Find the mean deviation about median for the following data.

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	6	7	15	16	4	2

PART-E

Answer the following questions

59. Prove geometrically that **(6)**

    cos(x+y)=cos x cos y-sin x sin y hence find $\cos\left(\frac{\pi}{2}+x\right)$

    OR

    Define ellipse and derive its equation in the form of $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

60. Differentiate $\frac{x+\cos x}{\tan x}$ with respect to x **(4)**

    OR

    Find the sum to 'n' terms of the series 1×2 + 2×3 + 3×4 + 4×5+ ... .

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