Jain College, Jayanagar
I PUC Mock Paper 2016
Subject: Mathematics(35)

Duration: 3 hrs 15 minutes **Max. Marks: 100**

I Answer all the following questions: **10×1=10**

1. Write the power set of X={1,2}
2. If the set A has 3 elements and the set B = {3,4,5} then find the number of elements is (A×B).
3. If tanx= $\frac{3}{4}$ and x lies in the third quadrant. Find sin x.
4. Find the modulus of $\frac{1+i}{1-i}$
5. How many 3-digit numbers can be formed by using the digits 0 to 9 if no digits are repeated?
6. Find 20th term of GP $\frac{5}{2}, \frac{5}{4}, \frac{5}{8}, \ldots\ldots$
7. Reduce the equation x-$\sqrt{3}$ y+8=0 to slope intercept form.
8. Evaluate $\lim_{x\to 0} \frac{Cos\, x}{\pi - x}$.
9. Write the negation of the statement "Intersection of two disjoint sets is not an empty set"
10. Define mutually exclusive events.

PART - B

II Answer any Ten of the following **10× 2 = 20**

11. If U = {x : x ≤ 10, x ∈ N} A = {x:x ∈ N, s is prime}B={x : x ∈ N, x is even }write $A \cap B^{l}$ in roaster form.
12. If A×B = {(a,1), (a,2) (a,3) (b,1) (b,2) (b,3)}. Find the sets A and B & hence find B ×A.
13. Prove that $\text{Sin}^2\frac{\pi}{6} + Cos^2\frac{\pi}{3} - \tan^2\frac{\pi}{4} = \frac{-1}{2}$.
14. Find the value of $\text{Sin}\left(\frac{-11\pi}{3}\right)$.
15. Find the radius of the circle in which a central angle of $\frac{\pi}{3}$ radians intercepts an arc of length 37.4cm (use $\pi = \frac{22}{7}$)
16. Express $(-\sqrt{3} + i\sqrt{2})\,(2\sqrt{3} - i)$ in the form a+ib
17. Solve 3x+2y>6 graphically.
18. Find the equation of straight line interesting y-axis at a distance of 2 units above origin & making an angle of 30^0 with +ve x-axis.
19. Find the equation of line passing through (2,3) & cutting off equal intercept on co-ordinate axes
20. Find the angle between $\sqrt{3}x - y + 5 = 0$ & $\sqrt{3}y - x + 6 = 0$.
21. Evaluate $\lim_{x\to 0} \frac{a\,x + x\cos x}{b\,Sin\ x}$.
22. Write the converse & contrapositive for the statement. "If a number is divisible by 9, then it is divisible by 3".
23. Find mean deviation about mean for the data 2,4,5,7,8,10,12,17,19,26.
24. A die is thrown. Write the sample space. Also find the probability of the event "A number is greater than or equal to 3 will appear".

PART - C

III. Answer any Ten of the following: 10×3=30

25. Let U = {1,2,3,4,5,6,7,8,9}, A = {2,4,6,8} and B={2,3,5,7}. Show that $(A \cap B)' = A' \cup B'$.
26. Define signum function. Write its range; also draw the graph of the function.
27. Find the general solution of sinx + sin3x+sin5x=0
28. Convert the complex number – 3 into polar form
29. Find the roots of the equation $2x^2+10x+20=0$
30. Prove that ${}^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$.
31. Find $(x+1)^6 + (x-1)^6$. Hence evaluate $(\sqrt{2}+1)^6 + (\sqrt{2}-1)^6$
32. The sum of first three terms of G.P is $\frac{13}{12}$ and their product is -1. Find the common ratio and the terms.
33. Find the sum to n term of the sequence 8,88,888,.....
34. Find the co-ordiantes of focus, equation of directrix and length of latus rectum of parabola $y^2=8x$
35. Find the derivative of Sinx from first principles.
36. By the method of contrapositive, check the validity of the statement "If a,b,∈Z such that ab is odd, then both 'a' and 'b' are odd.
37. A committee of two persons is selected from two men and two women. What is the probability that committee will have i) no men ii) two men
38. One card is drawn from a well shuffled deck of cards. What is the probability that it will be:
    i) Diamond ii) not ace iii) a black card

PART-D

IV. Answer any six of the following: 6× 5 = 30

39. Define modulus function. Draw the graph of it. Also write its domain and range.
40. Prove that $\frac{Cos4x + Cox3x + Cos2x}{Sin4x + Sin3x + Sin2x} = Cot\,3x$
41. Prove using mathematical induction: $\frac{1}{1.2.3} + \frac{1}{2.3.4} + \frac{1}{3.4.5} + ... + \frac{1}{n(n+1)(n+2)} = \frac{n(n+3)}{4(n+1)(n+2)}$
42. Solve the following system of linear inequalities graphically $x+2y\leq 10$, $x+y\geq 1$, $x-y\leq 0$: $x,y\geq 0$
43. State and prove binomial theorem for positive integer 'n'.
44. How many words, with or without meaning can be formed using the letter of the word MONDAY, assuming that no letter is repeated if : i) 4 letter are used at a time
    ii)All letters are used at a time iii) All letters are used but first letter is a vowel?
45. If P(a,b) is midpoint of line segment between axis show that equation of line is x/a + y/b = 2
46. Derive section formula in 3D. Hence find midpoint of line joining points $P(x_1, y_1, z_1)$ & $Q(x_2,y_2,z_2)$
47. Prove geometrically that $\lim_{x\to 0} \frac{Sinx}{x} = 1$, where x is measured in radians.
48. Find mean deviation about mean for the following

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No of studen	2	3	8	14	8	3	2

PART-E

V. Answer any One of the following: 1×10=10

49. a)Prove geometrically that Cos(x-y)=Cosx Cosy+Sinx. Siny Hence show that $Cos2x = 1- 2Sin^2x$

    b) If $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ is the A.M between a and b, then find the valued of 'n'

50. a) Define Hyperbola. Derive its standard equation

    b) Find the derivative of the function $f(x) = 2x^2+3x-5$ at x=-1. Also prove that f '(0) + 3 f '(-1)=0

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