Jain College, Jayanagar
Mock Paper Dec - 2018
Subject: I PUC Mathematics (35)

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

PART-A

I. Answer all the TEN questions: **10X1=10**

1. Write the power set of A = { a, b}.
2. If (x-1, y+4) = (3,9). Find x and y.
3. If tan x = $\frac{3}{4}$, x lies in 3rd quadrant. Find sin x.
4. Find n if ${}^{n}C_7 = {}^{n}C_6$.
5. Find the 20th term of G P $\frac{5}{2}, \frac{5}{4}, \frac{5}{8}, \ldots\ldots$
6. Find the slope and y intercept of 3x + 4y – 10 = 0
7. Find the eccentricity of ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$
8. Find the derivative of $2x - \frac{3}{4}$.
9. Write the negation of "Every natural number is greater than zero".
10. Write the sample space for the experiment "a coin is tossed repeatedly 3 times".

PART-B

II. Answer any TEN questions: **10X2=20**

11. If A = {1, 2, 3, 4} B={2,3,5} C = {3, 5, 6} find A∪(B∩C).
12. If X and Y are 2 sets such that X ∪Y has 50 elements, X has 28 elements and Y has 32 elements. How many elements does X ∩ Y have?
13. Taking set of natural numbers as the universal set If A = {x : xεN and 2x+1 > 10} and B = {x: x ε N and 3x-1>8}. Find A' and B'.
14. A wheel makes 360 revolutions in one minute; through how many radians does it turn in one second.
15. Find the value of sin 15^0.
16. Find the least positive integer m such that $\left(\frac{1+i}{1-i}\right)^{4m} = 1$
17. Solve 7x + 1 ≤ 4x + 5 and represent the solution graphically on the number line.
18. Find the distance of the point (3,-5) from the line 3x – 4y – 5 = 0.
19. Find the equation of the line parallel to 3x – 4y + 2 = 0 and passing through the point (-2, 3).
20. Find the ratio in which the line joining (4, 8, 10) and (6, 10, -8) is divided by YZ - plane.
21. Evaluate $\lim_{x \to 0} \frac{1 - \cos x}{x}$.
22. Write the converse and contrapositive of "if a parallelogram is a square then it is square".
23. Write the mean of the given data 6, 7, 10, 12,13,4,6,12.
24. Given P(A) = 0.54 and P (B) = 0.69 and P (A∩B) = 0.35, find P ($A' \cap B'$).

PART-C

III. Answer any TEN questions:

10X3=30

25. In a survey of 600 students 150students were found taking tea and 225 taking coffee, 100 were taking both tea & coffee. Find how many students were taking neither tea nor coffee?
26. Write the relation R defined as R = {(x, x + 5): x $\in${0,1,2,3,4}} in roster form. Write down its rage and domain.
27. Find the general solution of $\sec^2 2x = 1 - \tan 2x$.
28. Express $\frac{-1+i}{\sqrt{2}}$ in the polar form.
29. Solve the equation $2x^2 + \sqrt{3}x - 1 = 0$.
30. If $5.4\, p_r = 6.\, 5p_{r-1}$ find r.
31. Find the coefficient of x^6y^3 in the expression of $(x+2y)^6$.
32. Find the sum of the sequence: 7+77+777+ …. n terms.
33. Insert 3 arithmetic mean between 8 and 24.
34. Find the derivative of 'sin x' w. r. to x from 1st principles.
35. A parabola with vertex at origin has its focus at the centre of $x^2 + y^2 - 10x + 9 = 0$. Find it's derectrix and lactus rectum.
36. Verify by method of contradiction that $\sqrt{7}$ is irrational.
37. Find the number of different 8 – letter arrangements that be made from the letters of the word DAUGHTER so that: a) all vowels occur together b) All vowels do not occur together.
38. Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards, it contains : a) 3 kings b) at least 3 kings.

PART-D

IV. Answer any SIX of the following: 6X5=30

39. Define modulus function. Draw the graph of modulus function. Write down its domain and range.
40. Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$.
41. Prove by mathematical induction $1^3 + 2^3 + 3^3 + \ldots . n^3 = \left[\frac{n(n+1)}{2}\right]^2$
42. Solve graphically $2x+y \geq 4$, $x+y \leq 3$, $2x-3y \leq 6$.
43. State and prove Binomial theorem.
44. Derive an expression for the coordinate of a point that divides the line joining A (x_1, y_1, z_1) and B(x_2, y_2, z_2) internally in the ratio m:n and hence find the co-ordinate of the mid point of AB where A=(1,2,3,) and B= (5,6,7)
45. Derive a formula for the angle between lines with slopes m_1 and m_2. Hence find the slopes of the lines which make an angle $\frac{\pi}{4}$ with the line x – 2y + 5 = 0.
46. Prove that $\lim_{\theta \to 0} \frac{Sin\theta}{\theta} = 1$ (θ *being in radians*) and hence prove that $\lim_{\theta \to 0} \frac{\tan\theta}{\theta} = 1$

47. A group consists of 7 boys and 5 girls. Find the number of ways in which a team of 5 members can be selected so as to have at least one boy and one girl in team.

48. Find the mean deviation about the mean for the following data

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

PART-E

V. Answer any one of the following: **1X10=10**

49. a) Prove geometrically that cos (A+B) = cos A cos B – sin A sin B. (6+4)

b) Find the derivative of f(x) = $\frac{3+4\sin x}{5+6\cos x}$.

50) a) Define ellipse as a set of points. Derive its equation in the form $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. (6+4)

b) Find the sum to 'n' terms of the series $1^2 + (1^2+2^2)(1^2 + 2^2 + 3^2) +$……..

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