

First PUC Annual Examination, January - February - 2019

Time : 3-15 Hrs.

Subject - Basic Mathematics (75)

Max. Marks : 100

Instructions

1. The question paper consists of five parts A, B, C, D, and E
2. Part A carries 10 Marks, Part B carries 20 Marks, Part C carries 30 Marks, Part D carries 30 marks and Part E carries 10 Marks.
3. Write the question numbers properly as indicated in the question paper.

PART - A

I Answer any TEN questions

10x1=10

1. Define a prime number
2. If $A = \{a, b, c, d\}$, $B = \{d, e, f, g\}$, find $A-B$
3. Simplify $\left\{\frac{5x^3}{y}\right\}^2$
4. Find x if $\log_x 625 = 4$
5. Find the 11th term of the AP 3, 5, 7, 9
6. Solve for x if $(x+2)(x+3) = (x-2)(x-4)$
7. Find simple interest on Rs. 600 for 3 years at 4% p. a.
8. Find the present value of a perpetuity of Rs. 3000 to be received forever at 4% p.a.
9. Convert $\frac{1}{4}$ into percentage.
10. Express $\frac{3\pi}{4}$ in degrees.
11. Find the value of $\sin^2 120^\circ + \cos^2 120^\circ$
12. Find the Slope of line $2x + 5y - 11 = 0$

PART - B

II Answer any TEN questions.

10x2=20

13. Find the number of divisors of 825
14. Find the number which, when divided by 16, 20 and 40 leaves the same remainder 4
15. If $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 5, 6\}$ and $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$ verify $(A \cup B)^c = A^c \cap B^c$
16. Simplify $\left[\frac{x^a}{x^b}\right]^{a+b} \left[\frac{x^b}{x^c}\right]^{b+c} \left[\frac{x^c}{x^a}\right]^{c+a}$
17. Which element of the GP 5, 10, 20..... is 80
18. The sum of two numbers is 107 and their difference is 17. Find the numbers.
19. Solve by formula method : $5x^2 - 7x - 12 = 0$
20. Solve $3x - 2 < 2x + 1$; $x \in \mathbb{R}$ and represent on the number line.
21. Find the future value of an annuity due of Rs. 800 for 3 years at 5% p.a.
22. Prove that : $\tan^2 A (1 - \sin^2 A) = \sin^2 A$
23. Find the value of $\cot^2 60^\circ + \sin^2 45^\circ + \sin^2 30^\circ + \cos^2 90^\circ$
24. A point P moves such that $PA^2 = 3PB^2$. If $A = (5, 0)$, $B = (-5, 0)$ Find the equation of the locus of P.
25. If the distance between the points $(3, -2)$ and $(-1, a)$ is 5 units find the values of a .

PART - C

III Answer any TEN questions

10x3=30

26. Prove that $\sqrt{2}$ is an irrational number
27. If $f(x) = x + 1$ and $g(x) = x^2 + 1$. Find 1) $f \circ g(1)$ 2) $f \circ g(2)$ 3) $g \circ f(2)$
28. If $a^x = b^y = c^z$ and $b^2 = ac$ show that $\frac{1}{x} + \frac{1}{z} = \frac{2}{y}$
29. Solve $\log x + \log(x-4) - \log(x-6) = 0$

30. Find the three numbers in GP whose sum is 39 and their product is 729.
31. Find the quotient and remainder when $x^4 + 10x^3 + 39x^2 + 76x + 65$ is divided by $x + 4$
32. Solve graphically $x + 2y \leq 8$
 $2x + y \leq 8$
33. Find the compound interest on Rs. 7000 at 5% p. a. for 4 years.
34. Ramya purchased 3 varieties of cooking oil 4 kg of oil at Rs. 50 / kg, 5kg of oil at Rs. 60/kg and 9kg of oil at Rs. 70/kg. What is the average price of the oil / kg.
35. The price of a pair of trousers was decreased by 22% of Rs. 390 what was the original price of the trousers.
36. Find the value of $\frac{\sin \frac{\pi}{2} \cos^2 \frac{\pi}{6} \sec^2 \frac{\pi}{4}}{\tan \frac{\pi}{3} + \cot \frac{\pi}{3}}$
37. Find the third vertex of a triangle if two of its vertices are at (-2, 4) and (7, -3) and the centroid at (3, -2)
38. Find the distance between two lines $2x - 3y + 4 = 0$ and $4x - 6y - 5 = 0$

PART - D

6x5=30

IV Answer any SIX questions

39. In a group of 50 people, 35 speak kannada and 25 speak both english and kannada and all the people speak atleast one of the two languages. How many speak English? How many speak only English and not Kannada? How many speak only kannada?
40. Evaluate $\frac{213.78 \times 7.434}{6.321}$ using logarithmic tables
41. Find the sum of all integers between 60 and 400 which are divisible by 13
42. A mother is 32 years older than her son. After 4 years the mother's age will be 8 years more than twice that of her son. Find their present ages.
43. Find the difference between simple interest and compound interest on 18,000 invested for 4 years at 8% p. a. where compound interest is compounded annually.
44. If you want to has Rs. 80,000 after 5 years. how much should you deposit every year if the bank offers 12% p.a. interest compounded quarterly.
45. A business man sells an article for Rs. 720 and earns a profit of 20%. Find the a) cost price b) profit percentage at selling price.
46. If $\cot \theta = \frac{5}{2}$, θ is acute. Show that $\frac{3\cos\theta + 2\sin\theta}{3\cos\theta - 4\sin\theta} = \frac{19}{7}$
47. Find the ratio in which the line joining the points (3, 5) and (-7, 9) is divided by the point ($\frac{1}{2}$, 6)
48. Find the equation of a line which passes through (-4, 1) and portion of it between the axes is divided by the point in the ratio 1 : 2

PART - E

V Answer any ONE question

1x10=10

49. a) Find the sum to n terms of the series $5 + 55 + 555 + \dots$ n terms. 4
 b) A manufacture produced and sells balloons at Rs. 8 per unit. His fixed cost is Rs. 6500 and the variable cost per Balloon is Rs. 3.50 Calculate. 4
 i) Revenue function
 ii) Cost function
 iii) Profit function
 iv) Break even point
- c) The weight of 6 men are 90kg, 70.5kg., 56kg, 45.5kg. 85kg and 78kg. Find the average weight. 2
50. a) Find the equation of the straight line which passes through the point of intersection of $2x - 3y = 4$ and $2x + 2y = 1$ and perpendicular to the line $x + 4y = 8$ 4
 b) If $A = \{1, 3, 5\}$ $B = \{5\}$ $C = \{7\}$ verify $A \times (B-C) = (A \times B) - (A \times C)$ 4
 c) If the HCF of two numbers is 42 and their product is 52920 Find their LCM 2

