

JAIN COLLEGE

463/465, 18th Main Road, SS Royal, 80 Feet Road, Rajarajeshwari Nagar,
Bangalore - 560 098

Date: Dec 2017

SUBJECT: BASIC MATHS

I PUC MOCK PAPER

Timings Allowed: 3Hrs.

Total Marks: 100

Part-A

Answer any TEN questions

10X1=10

1. Write the imaginary part of $4-5i$
2. If $A=\{1,2\}$ and $B=\{a,b\}$ then find $B \times A$
3. If $f: R \rightarrow R$ is defined by $f(x) = 3x+5$ then find $f^{-1}(-1)$?
4. Simplify $(5^0)^2$
5. Express $3^3=27$ in logarithmic form
6. Find the 12th element of the G.P. given by 0.5, 1.5, 4.5,
7. Solve for x: $(x+2)(x+3)=(x-2)(x-4)+20$
8. Convert $\frac{1}{4}$ into percentage
9. Define a radian
10. Convert 450° into radians
11. Define annuity
12. Find the slope of the line joining the points (1,2) and (-1,-2)?

Part- B

Answer any TEN questions

10x2=20

13. Find the HCF and LCM of $\frac{1}{3}, \frac{5}{6}, \frac{2}{9}, \frac{4}{27}$
14. If $A=\{1,2,3,4\}$ and $B=\{3,4,5,6\}$ and $U=\{1,2,3,4,5,6,7,8\}$ verify $(A \cup B)^c = A^c \cap B^c$
15. Simplify $\frac{3^{n+1}+3^n}{3^n-3^{n-1}}$
16. Prove that $\log x + \log(x-4) - \log(x-6) = 0$
17. The fourth element is square the second term and third element is 27 .find the g.p.
18. If $\frac{2}{3}, x, \frac{1}{2}$ are in H.P. find x
19. If α and β are the roots of the equation $x^2-x+2=0$ then show that $\alpha^2\beta + \beta^2\alpha = 2$
20. Solve $5x-3 < 3x+1$ when x is an integer and x is a real number

21. Sowmya invested rs 1500 for 8 years and anisha invested rs 7500 for 3 years at the same rate of interest. If altogether they received rs.1725 as interest find the rate of simple interest charged
22. If the cost price of a machine is rs150 and selling price is rs100 find the loss percentage?
23. Prove that $\frac{1}{1+\cos A} + \frac{1}{1-\cos A} = 2\operatorname{cosec}^2$
24. Derive the equation of the line in one point form $y - y_1 = m(x - x_1)$ geometrically, where m is the slope and $p(x_1, y_1)$ is the given point
25. Find the value of x if the distance between $(x, 3)$ and $(4, 5)$ is 5 units

Part-c

Answer any TEN questions

10x3=30

26. Prove that $\sqrt{2}$ is an irrational number
27. Define an equivalence relation with an example also give an example of a relation which is only symmetric
28. In a group of 600 people .150 students were found to be taking tea, 225 like coffee, 100 like both tea and coffee. Find out how many were taking neither tea nor coffee? Represent using Venn diagram .
29. Prove that $x^{\log y - \log z} \cdot y^{\log z - \log x} \cdot z^{\log x - \log y} = 1$
30. If the first term of a G.P. is 729 and the 7th term is 64 find the sum of first seven terms of the g.p.
31. Find the present value of an annuity immediate for rs.3000 for 5 years at 10% p.a.
32. Solve the linear inequalities graphically $x+2y \leq 8$, $2x+y \leq 8$, $x \geq 0$ and $y \geq 0$
33. In what time a sum of rs.500 will earn rs.975 at the rate of 6% p.a. if the compound interest is payable half yearly?
34. Find the ratio in which the point $(-5, 2)$ divides the join of $(-7, 1)$ and $(3, 6)$.
35. Show that the points A $(3, 2)$ B $(6, 3)$ and C $(4, 11)$ form a right angled triangle.
36. If $\tan^2 \theta + \sec \theta = 5$ find $\cos \theta$
37. Show that the straight lines $2x-3y=7$, $3x-4y=13$, $8x-11y=33$ are concurrent. Also find the point of concurrence.
38. Find the distance between two parallel lines $3x+4y+5=0$ and $6x+8y+20=0$

Part- D

Answer any six questions

6x5=30

39. Find the sum of all integers between 60 and 400 which are divisible by 13
40. The age of father is 5 times that of his son .three years ago, the age of father was 8 times that of his son .find the present ages.
41. The daily cost of production C in rs and x unit of an assembly in $c(x)=12.5+6400$. If each unit is sold for rs 25 then find the minimum number of unit that should be produced and sold to ensure no loss. If the selling price is reduced by rs 2.5/unit .what would be the break-evenpoint.

42. If $\tan A + \sin A = m$ and $\tan A - \sin A = n$. S.T. $m^2 - n^2 = 4\sqrt{mn}$
43. The average weight of a group of boys and girls is 38 kg. The average weight of the boys is 42 kg and that of the girls is 33 kg. If the number of boys is 25 .find the number of girls.
44. Find the equation of the straight line passing through (-2,6) and the sum of the intercepts on the coordinate axes is 5
45. Find the reflection of the point p(2,1) in the line $x+y=5$
46. Derive the section formula for internal division
47. If $x = r \cos A \cos B$, $y = r \cos A \sin B$ and $z = r \sin A$ p.t, $x^2 + y^2 + z^2 = r^2$
48. The Difference between simple interest and compound interest on a certain sum of money invested for 3 years at 6% p.a. is 110.16 find the Sum.

Part-E

Answer any ONE question

1x10 =10

49. a) Find the sum to n terms of the series $9+99+999+9999+\dots$ n term (5M)
 b) Find the domain and range of the function $f(x) = \frac{x^2+2x+1}{x^2-8x-12}$, $x \in \mathbb{R}$. (5M)
50. a) if $\tan \theta + \sec \theta = \frac{5}{2}$ then find $\sin \theta$ (4M)
 b) Find the locus of a point equidistant from (2,0) and (-2,0) (4M)
 c) Find the number of digits in 3^{20} ? (2M)
