JAIN COLLEGE

463/465, 18th Main Road, SS Royal, 80 Feet Road, Rajarajeshwari Nagar,
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Date: 2019-2020 ***I PUC MOCK I*** ***SUBJECT: Basic Mathematics***

Timimgs Allowed: 3hr

Total Marks: 100

PART-A

I. Answer any TEN of the following: **10 X 1 = 10 Marks**

1. Define a prime number.
2. If A = { 1,2,3,4,5 }, B={1,2,3,4,5,6,7} find a relation from A to B defined by R = {(x, y) /x>y}
3. Simplify $(5)^{5^0} + (5^2)^0$.
4. Express $\log_9 81 = 2$ in the exponential form.
5. Find the sum to infinity of the sequence given by 3, 1, $\frac{1}{3}$, …….
6. Solve for x given that: (x+2) (x+3) = (x-2) (x-4) + 20.
7. Find the Simple Interest on Rs.650 for 14 weeks at 6 % p.a.
8. Define annuity.
9. Convert the decimal 0.06 to percentage.
10. Convert $\frac{5\pi^c}{12}$ into degree measure
11. Evaluate Sin $30^0 Cos 60^0 + Cos\ 30^0\ Sin\ 60^0$
12. Find the slope of the line joining the points (1,2) and (-1,-2)?

PART - B

II. Answer any TEN of the following: **10 X 2 = 20 Marks**

13. Find the sum of all positive divisors of 768.
14. Find the HCF of 104 and 130 by division method.
15. If f (x) = x and g (x) = x^3 + 1 find (i) fog (2) and (ii) gof (1)
16. If A = { 1, 2, 3, 4 , 5 } , B = { 3, 4 , 5, 6 , 7 } and U = { 1, 2, 3, 4, 5, 6, 7, 8, 9 } . Verify De Morgan's law.
17. Simplify $\left(\frac{9}{4}\right)^{-3/2}$.
18. Which element of the GP 5, 10, 20,…… is 80?
19. If $\alpha\ and\ \beta$ are the roots of the equation $2x^2$ - 10x + 5c = 0. Find the value of $\alpha^2 + \beta^2$.
20. Solve for x: 5x + 9 $>$ $7x + 3$, x ϵ R and represent the same on the number line.
21. What sum will amount to Rs.6525 at 10% p.a compounded annually for 13 years?
22. Prove that cos(570^0). sin (510^0) – sin(330^0).cos(390^0) = 0.
23. Prove that the points (1 , -1) , (5, 2) and (9 , 5) are collinear
24. Find the equation of the locus of a point which moves such that the square of its distance from (2, 3) is 3 units.
25. Derive the equation of the straight line in the slope point form.[m=slope, point=(x_1,y_1)]

Part - C

III. Answer any TEN of the following: **10 x 3 = 30 Marks.**

26. 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.
27. If A = { 1, 2, 3 } and R = { (1, 1) , (1, 2) , (2, 1) , (2, 2) , (3, 3) } Prove that R is an equivalence relation on A.
28. Prove that $\sqrt{5}$ is an irrational number.
29. Solve for x : $\log_2 x + \log_4 x = 3$
30. The sum of 3 numbers in AP is 15 and their product is 105. Find the numbers.
31. Find the present value of the annuity immediate for Rs.3000 for 5 years at 10% p.a.
32. Solve graphically: $3x + 2y \leq 6,\quad 4x - y \leq 6,\quad x, y \geq 0$

33. Find the circumcentre of the triangle with vertices A(-3,4), B(3,4) and C(-4,-3). Also find the circumradius and the area of circle.
34. Ritu's salary was increased by 10% and then again by 5%. If the present salary is Rs.9240 what was her previous salary.
35. Prove that $\frac{1}{1+CosA} + \frac{1}{1-CosA} = 2\ Cosec^2 A$
36. Show that the points A(2,2), B(6,3) and C(4,11) form a right angled triangle.
37. Find the equation of the locus of the point which moves such that it is equidistant from (4,2) and the x-axis.
38. If a train travels 15 Km/hr faster it would take 1 hour less to travel 180 km, find the original speed of the train

PART-D

IV. Answer any SIX of the following. 5 X 6 =30

39. In a survey of 100 persons it was found that 28 read magazine A, 30 read magazine B and 42 read magazine C, also 8 read A and B, 10 read A and C and 5 read B and C, while 3 read all the three magazines find
(a). How many read none of the three magazines. (b) how many read exactly one magazine.
(c) How many read magazine C
40. Evaluate tables, find the value of 0.7321 × 0.563.
41. The sum of three numbers which are in GP is 30 and their product is 216. Find the numbers.
42. Solve $x^3 - 10x^2 + 29x - 20 = 0$ using synthetic division method. Given that it has an integral root between -3 and 3
43. The population of a town is 80000. If it increases at the rate of 5% per annum, what will be its population after 3 years.
44. Find x if $xSin45^0Cos^260^0 = \frac{tan^260^0\ Cosec30^0}{Sec45^0\ Cot^230^0}$
45. Raju wants to invest a lump sum money in the bank so that he can get an annual income of Rs.15,000 every year for the next 10 years. If the bank offers 16% p.a. CI. What is the amount he should invest today.
46. A person spent 30 % of his wealth and thereafter Rs. 20,000 and further 10 % of the remainder. If Rs. 29250 is still remaining with him, what was his total wealth?
47. Prove that A(-3, 6), B (-2, 11) ,C (3, 12) and D (2, 7) are the vertices of a rhombus. Also find its area.
48. Find the reflection of the point P(2,1) in the line x+y=5.

PART E

V Answer any one of the following: 4 + 4 + 2 = 10 Marks

49 a) Find the equation of the straight line passing through the intersection of the line 2x+3y=5, 7x-y=6 is perpendicular to the line 3x+4y+1=0.

b) Find the sum of 7 + 77+ 777 + ……. to n terms.

c) Find the number of digits in 2^{64} .

50 a) A confectioner makes and sells biscuits. He sells one pack of biscuits at Rs. 80.00 .His cost of manufacturing is Rs. 40 per pack as variable cost and Rs. 3000 as fixed cost.

Find (i) Revenue function

(ii) Cost function

(iii) Profit function

(iv) If he limits his production to 100 packets , can he make some profit?

b) PT $\frac{tan\theta}{sec\theta-1} + \frac{tan\theta}{sec\theta+1}$ = 2 Cosecθ

c) If the HCF of two numbers is 42 and their product is 52920 Find their LCM.

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