



JAIN COLLEGE

463/465, 18th Main Road, SS Royal, 80 Feet Road, Rajarajeshwari Nagar,

Bangalore - 560 098

Date: December 2017

SUBJECT: Basic Maths

II PUC

MOCK -II

Timings Allowed: 3Hrs 15Mins

Total Marks: 100

PART-A

I.ANSWER ALL THE QUESTIONS:-

1x10=10

1. Find x if $\begin{vmatrix} 8 & x \\ -2 & 1 \end{vmatrix} = 0$
2. Find the number of permutation of the letter of the word "MATHS".
3. Negate "If he is CLEVER then he is happy".
4. If a: b=12:14 and b: c=13:15 then find a: c.
5. What rate of interest is realized by investing in 17.5% p.a at 6?
6. Find the value of $\sin 15^\circ$
7. Find equation of circle with center at (8, 1) and radius 10 units.
8. Evaluate $\lim_{x \rightarrow 0} \frac{3x^2 - 4x + 5}{2x^2 + 5x - 1}$
9. Differentiate w.r.t x. $e^x \log \sqrt{x}$
10. Evaluate $\int \frac{x}{x^2 + 1} dx$

PART-B

II.ANSWER ANY TEN QUESTIONS:-

2x10=20

11. If two rows or columns of a determinant are interchanged prove that value of the determinant is changes by a sign.
12. There are 12 points in a plane of which 8 are collinear. Find the number of straight lines can be formed.
13. If $P(A) = 0.7, P(B) = 0.4$ and $P(A \cap B) = 0.3$ find value of $P(A/B)$.
14. Write the converse and inverse of "if two integers are equal then their squares are equal".
15. If 5 men take 18 days to complete a work how many men are required to complete the work in 10 days.

16. Find banker's discount on a bill of Rs4150 due 9 months hence at 15% pa.
17. Find the value of $4 \cos^3 10 - 3 \cos 10$
18. Show that $\frac{1+\cos 2A+\sin 2A}{1-\cos 2A+\sin 2A} = \cot A$
19. Find the equation of the circle two of the diameter are $x+y=6$ and $x+2y=4$ and its radius is 5 units.
20. $F(x) = \begin{cases} \frac{x^2-9}{x-3} & \text{if } x \neq 3 \\ k & \text{if } x = 3 \end{cases}$ is continuous at $x=3$, find value of k
21. If $x=e^{2t}$ and $y=\log(2t+1)$ find $\frac{dy}{dx}$
22. Find a point on the parabola $y^2=8x$ at which ordinate increases at twice the rate of the abscissa
23. Evaluate $\int \frac{e^x+e^{-x}}{e^x-e^{-x}} dx$

24. Evaluate $\int_1^2 8x\sqrt{5x-x^2} dx$

PART-C

III. Answer any ten questions:-

3x10=30

25. Solve using Cramer's rule
 $4x+5=7, 3y+4z=5, 3z+5x=2$
26. Using properties of determinants show that $\begin{vmatrix} x & p & q \\ p & x & q \\ p & q & x \end{vmatrix} = (x-p)(x-q)(x+p+q)$
27. In how many ways can 8 students and 4 teachers be seated in a row such that no two teachers are together.
28. A box has 12 white and 10 red and 8 green marbles. 2 marbles are randomly drawn from the box.
 Find the probabilities that
 a) both are of the same colour
 b) both are of the different colour .
29. If Rs. 150 maintains a family of 4 persons for 30 days. How long Rs. 600 maintain a family of 6 persons.
30. The bankers discount and their discount on a sum of money due 3 months hence are Rs 154.50 and Rs 150 respectively. Find the sum of money and rate of interest.
31. What is the quoted value of 12% stock if it earns an interest of 8% after deducting the income tax of 8%.
32. Veena buys 100 shares of Karnataka bank at Rs 108 per share. She pays Rs 10,130.3 to her broker. What is the total brokerage she paid and calculated the percentage rate of brokerage.
33. Find the equation of parabola with vertex is origin passing through the point P (3,-4) and symmetric about y axis.
34. If $x=e^t(\cos t + \sin t), y=e^t(\cos t - \sin t)$ show that $\frac{dy}{dx} = -\tan t$.
35. The side of an equilateral triangle is increasing at the rate $\sqrt{3}$ cm/sec .find rate at which its area is increasing when its side is 2 meters.
36. Integrate $\frac{2x}{2x+3}$

37. Evaluate $\int \frac{\sin 2x}{1+\cos^2 x}$

38. Find the maxima and minima of the function $f(x)=3x^3-9x^2-27x+30$.

PART-D

IV. Answer any six questions :-

5x6=30

39. Find the coefficient of x^{11} in expansion of $(2x-8)^{15}$

40. Resolve into partial fractions $\frac{x+1}{x(x+2)(x+4)}$

41. Prove that $[p \vee (p \wedge r)] \leftrightarrow [(p \vee q) \wedge (p \vee r)]$ is a tautology.

42. Two taps can fill a cistern separately in 20 minutes and 40 minutes respectively and a drain pipe can drain off 30 litres per minute. If all the three pipes are opened, the cistern fill in 72 minute. What is the capacity of the cistern

43. A company requires 100 hours to produce first 10 units at Rs. 15 per hour. The learning curve effect is 80%. Find the total labour cost to produce a total of 160 units.

44. Solve LPP using graphical method.

Manimize $z=x-7y+190$ subject to, $x + y \leq 8$, $x \leq 5$, $y \leq 5$, $x + y \geq 4$, $x \geq 0$, $y \geq 0$.

45. The angles of elevation of the top of a tower from the bare and the top of a building are 60° and 30° . The building is 20 meter high. Find the height of the tower.

46. Find k, if the lines $4x-y+k=0$ touches the circle $x^2-y^2+4x-8y+3=0$.

47. If $e^{x+y}=xy$ show that $\frac{dy}{dx} = \frac{y(1-x)}{x(y-1)}$

48. Find the area of the region between the parabolas $y^2=4ax$ and $x^2 = 4ay$.

PART-E

V. ANSWER ANY ONE QUESTION:-

1x10=10

49.(a) A company sold 40 metal chairs, 20 wooden chairs and 10 plastic chairs in April and 60,70,80 respectively in May. The selling price of a metal chair is Rs.150, that of a wooden chair is Rs.500 and plastic chair is Rs. 300. Find the total revenue in April and May using matrix method.

(b) Find the value of $(0.98)^3$ using binomial theorem up to 5 places of decimals.

50.(a) prove that $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$ and hence reduce that $\lim_{\theta \rightarrow 0} \frac{\tan \theta}{\theta} = 1$ (θ in radian).

(b) Arjun wants to invest at most Rs 12,000 in bonds A and B. According to the rule, he has to invest at least Rs 2000 in bond A and at least Rs 400 in bond B. If the rates of interest on bond A and bond B are 8% and 10% per annum formulate the product as L.P.P and solve it graphically for maximize income.
