JAIN COLLEGE

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

Bangalore - 560 098

Date: ***II PUC*** ***SUBJECT: BASIC MATHS***

MOCK – II

Timings Allowed: 3 Hrs 15 Minutes ***Total Marks: 100***

PART - A

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

1. Define diagonal matrix with example.
2. Find the value of nP_2
3. Write symbolically " if I work hard then I get a grade".
4. Find the fourth proportional to 2, 4 and 12.
5. Define learning curve.
6. Write the transformation formula of SinC+SinD
7. Find the centre of the circle $x^2 + y^2 - 2x + 4y + 5 = 0$
8. Evaluate $\lim_{x\to 0} \frac{x^2+5x+1}{x^2+3x+2}$
9. If $y = 3\ \bar{x} + logx\ find\ \frac{dy}{dx}$.
10. Evaluate $\frac{1}{2x+3}dx$

PART-B

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

11. If $A = \begin{matrix} 2 & 2 \\ 4 & 1 \end{matrix}$ $B = \begin{matrix} 1 & 2 \\ 3 & 4 \end{matrix}$ $find\ \ AB$.
12. Find the value n if $nP_5 = 20nP_3$
13. A card is drawn from a pack of 52 cards. What is the probability that it is a queen?
14. Find the converse and inverse of " if it rains then the weather is cool".
15. What must be added to each term in the ratio 5:6 so that it becomes 8:9?
16. TD on bill was Rs. 100 and BG was Rs. 10 what is the face value of the bill.
17. Prove that Sin2A= 2SinACosA
18. Prove that $tan\ 45 + A\ = \frac{1+tanA}{1-tanA}$
19. Find the ends of latus rectum of the parabola $y^2 = 16x$
20. Evaluate $\lim_{\theta\to 0} \frac{1-Cos2\theta}{\theta^2}$
21. If $x = at^2\ \ and\ y = 2at\ find\ \frac{dy}{dx}$.
22. If total revenue R(x)= $x^2 + 2x + 5$ find average revenue and marginal revenue

23. Evaluate $\frac{2x-3}{x^2-3x+5}$dx
24. Evaluate $\int_1^2 logx\ dx$

PART-C

III.Answer any TEN questions: **10X3=30**

25. If $A = \begin{matrix} 2 & 3 \\ 4 & 5 \end{matrix}$ $B = \begin{matrix} 1 & 2 \\ 3 & 4 \end{matrix}$ $show\ that\ \ AB\ ' = B'A'$
26. Solve if $\begin{matrix} x+2 & 3 & 4 \\ 3 & x+3 & 4 \\ 2 & 3 & x+4 \end{matrix} = 0$
27. From a class of 12 boys and 10 girls, 10 students are to be chosen for a competition including at least 4 boys and at least 4 girls. The 2 girls won the prize last year should be included in how many ways can the selections be made.
28. The probability that a doctor gets job in army is $\frac{1}{2}$ and the probability that he will not get job in navy is$\frac{2}{5}$ If the probability of getting at least one job is $\frac{3}{4}$ what is the probability that he will get both jobs.
29. 500 workers can finish a work in 8 days how many workers will finish the same work in 5 days.
30. A banker pays Rs. 4520 on a bill of Rs. 5000, 146 days before the legally due date. Find the rate of discount charged by the banker.
31. What is the market value of 6% stock it earns an interest of 4.5% after deducing the income tax of 4%.
32. Mr. Mukesh buys a tape recorder for Rs.10, 260 including sales tax. If the list price of the tape recorder is Rs. 9500. Find the rate of the sales tax charged.
33. Write the characteristics of the parabola $x^2 = -16y$
34. Differentiate $Sin^3x\ with\ respect\ to\ \ Cos^3x$
35. The height of a cone is 60cm and it is constant. The radius of the base is increasing at the rate of 0.50cm/sec. Find the rate of increase of the volume of the cone when the radius is 10cm.
36. Find the minimum value of $x^2 + \frac{250}{x}$
37. Evaluate $\int \frac{x}{x-1\ \ x-2}\, dx$
38. Evaluate $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} Sec^2xdx$

PART-D

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

39. Find the coefficient of $\frac{1}{x^{17}}$ in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$
40. Resolve into partial fractions $\frac{x}{x+1\ \ x+2\ \ x+3}$
41. Define logically equivalence and verify that $\sim\ p \to q\ \ \cong p\text{^}\sim q$

42. Walking 4kmph a student reaches his college 5 minute late and if he walks at 5kmph, he reaches $2\frac{1}{2}$ minutes early. What is the distance from his house to the college?
43. An engineering company has 80% learning effect and spends 500 hours for the prototype estimate the labour cost of producing 7 engines of new order if the labour cost is Rs. 40 per hour.
44. Solve the following LPP graphically Maximise z= 5x+3y subject to the constraints $3x + 5y \leq 15$ $5x + 2y \leq 10$ $x \geq 0$ $y \geq 0$
45. Prove that Sin3A=$3SinA - 4Sin^3A$
46. Solve the following by Cramer's rule.

$$x + y + z = 7, \quad 2x + 3y + 2z = 17, \quad 4x + 9y + z = 37$$

47. If $y^2 + 2y = x^2$ *show that* $y_2 = \frac{1}{1+y^3}$
48. Find the area bounded by the curve $y^2 = 5x$ *and* $y = x$

PART-E

V. Answer any ONE question. **1X10=10**

49. a. Show that the points (0,0) (1,1), (5,-5) and (6,-4) are concyclic.
b. The angles of the elevation of the summit of a hill from the top and bottom of a tower are 30 and 60 respectively. If the height of the tower is h, show that height of the hill is $\frac{3h}{2}$

50. a. Prove that $\lim_{x\to a} \frac{x^n - a^n}{x-a} = na^{n-1}$ where n is a rational number.

b. If the total cost function is $C = 9Q - 3Q^2 + \frac{Q^3}{3}$ find the level of output at which average cost in minimized.

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