



SRI BHAGAWAN MAHAVEER JAIN COLLEGE

Vishweshwarapuram, Bangalore 560004

Mock Examination Question Paper-2 (January 2019)

Course:	II PUC
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Subject:	Basic Mathematics
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Max. Marks:	100
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Duration:	3:15 hrs.
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Instructions:-

- (i) The question paper has 5 parts A, B, C, D and E. Answer all the parts.
- (ii) 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.
- (iii) Write the question number properly as indicated in the question paper.

PART-A

I. Answer all TEN questions.

10x1=10

1. If $A = \begin{bmatrix} 2 & 5 & -1 \\ 3 & 0 & -2 \end{bmatrix}$ find AA^1
2. If A and B are mutually exhaustive events, then find $P(A \cup B) = ?$
3. Negate $\sim [p \rightarrow (\sim q \vee r)]$
4. Find the sub duplicate ratio of 9:49
5. Define L.P.P
6. Find the value of $\sin 75^\circ$
7. If $x^2 + y^2 - 4x - 8y + k = 0$, represents a point circle, find the value of K
8. Evaluate: $\lim_{x \rightarrow 0} \left[\frac{2^x - 1}{3x} \right]$
9. If $y = \log \sqrt{x} + \frac{1}{(\sqrt{\pi})^{3/2}} + \cos(\cos a)$ find $\frac{dy}{dx}$
10. Evaluate: $\int_0^{\pi/2} \sin x \cdot dx$

PART-B

II. Answer any TEN questions.

10x2=20

11. Without actual expansion prove that $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ y+z & z+x & x+y \end{vmatrix} = 0$
12. Find the number of ways in which 15 staff members can be seated around a circular table for a meeting if the vice-principal and dean have to be on either side of the principal.
13. If the letters of the word RAMLEELA are arranged in random. What is the probability that begins with REEL.
14. Write the converse and Inverse of the proposition "If the review of the movie is good then I book my ticket"
15. A mixture contains milk and water in the ratio 6:1, on adding 5 liters of water the ratio of milk and water becomes 7:2, find the quantity of milk in the original mixture.

16. A banker pays ₹4520 on bill of ₹5000, 146 days before the legally due date. Find the rate of discount charged by the banker.
17. If a client buys shares worth ₹1, 25,000 and sells shares worth ₹75,000 through a broker assuming that the buying side brokerage is 0.5% the selling side brokerage is 0.25%. Find the total brokerage paid to the brokers.
18. Find the angle of elevation of the sun when the length of the shadow of a pole is $\sqrt{3}$ times the height of the pole.
19. Find the equation of latus rectum and ends of latus rectum of the parabola $x^2 = -16y$.
20. Evaluate $\lim_{x \rightarrow 0} \frac{ax + x \cos x}{b \sin x}$
21. Differentiate $\sin \sqrt{x}$ w.r.t $\sqrt{\sin x}$
22. A particle is thrown vertically upwards of distance 's' feet in 't' sec, where $S = 5 + 12t - t^2$. Find the greatest height reached by the particle.
23. Evaluate $\int \cos^2 x \cdot dx$
24. Evaluate $\int x^3 \cdot \log x \cdot dx$

PART-C

III. Answer any TEN questions.

10x3=30

25. Find A and B if $2A+B = \begin{bmatrix} 3 & -1 \\ -2 & 5 \end{bmatrix}$ $A-2B = \begin{bmatrix} 4 & 2 \\ -1 & 5 \end{bmatrix}$
26. From a class of 9 boys and 7 girls 12 students are to be chosen for a competition which includes atleast 6 boys and atleast 4 girls. In how many ways can this be done if a particular boy is always chosen.
27. There are 20 boys and 40 girls in a class. Half of the boys and half of the girls have brown eyes. Find the probability that a student chosen at random is a boy or a student with brown eyes.
28. 4 men or 12 boys can do a piece of work in 5 days by working 8 hours per day. In how many days 2 men and 4 boys can do the same piece of work working 12 hours a day.
29. A bill for ₹14,600 drawn at 3 months after date was discounted on 11/11/99 for ₹14,320. If the discount rate is 20% p.a on what date was the bill discounted?
30. A man sells ₹25,000, 13.5% stock when the shares were selling at a premium of 20. He invests the proceeds partly in 15% stock at 75 and party in 16% stock at 128. Find how much he has invested in each stock if his income increases by ₹1875.
31. Pranav purchases an article for ₹5400 which include 10% rebate on the marked price and 20% sales tax on the remaining price. Find the marked price of the article.
32. Prove that $\cos 3A = 4\cos^3 A - 3\cos A$.
33. Find the equation of the chord of the circle $x^2 + y^2 - 2x + 4y - 17 = 0$ bisected at (-1,2)
34. Discuss the continuity of $f(x) = \begin{cases} 3x^2 + 1 & \text{if } x < 1 \\ 4 & \text{if } x = 1 \\ 2x + 2 & \text{if } x > 1 \end{cases}$ at $x = 1$
35. If $\sin y = x \sin(a + y)$ Prove that $\frac{dy}{dx} = \frac{\sin^2(a + y)}{\sin a}$
36. If $y = (\tan x)^{(\tan x) - \infty}$ show that $\frac{dy}{dx} = \frac{2y^2 \operatorname{cosec} 2x}{1 - y \log \tan x}$
37. Sand is being poured at the rate of $10\text{mt}^3/\text{sec}$ into a conical pile. If the height of the pile twice the radius of the base, at what rate is the height of the pile is increasing when the sand in the pile is 8mt high.
38. Evaluate $\int \operatorname{cosec}^4 x \cdot \cot x \cdot dx$

PART-D**IV. Answer any SIX questions.****6x5=30**

39. Find the term independent of 'x' in the expansion of $\left(\frac{3x^2}{2} - \frac{1}{3x}\right)^9$
40. Resolve into partial fractions $\frac{x^2 - 2}{x^2 + x - 12}$
41. Check the proposition for logical equivalence $p \rightarrow (q \wedge r)$ and $(p \rightarrow q) \wedge (p \rightarrow r)$
42. Divide 17,640 into P, Q, R and S such that Q gets $\frac{2^{\text{th}}}{13}$ of P, R gets $\frac{5^{\text{th}}}{8}$ of Q and S gets $\frac{2^{\text{th}}}{13}$ of the sum of Q and R.
43. The production manager of a company obtained the following equation for the learning effect $y = 1400x^{-0.3}$. This function is based on the company's experience for assembling the first 50 units of the product. The company was asked to bid a new order of 100 additional units and the labour cost for producing an additional 100 units at the rate of ₹120 per hour.
44. Solve the L.P.P graphically Z minimize $= 5x + 4y$
Subject to constraints $200x + 100y \geq 4000$
 $x + 2y \geq 50$
 $40x + 40y \geq 1400$
 $x, y \geq 0$
45. If $A + B + C = 180$, prove that $\sin 4A + \sin 4B + \sin 4C = -4 \sin 2A \sin 2B \sin 2C$
46. Find the equation of circle passing through (2,3) having its centre on y-axis and radius 5 units.
47. If $y = a \cos(\log x) + b \sin(\log x)$ show that $x^2 y_2 + xy_1 + y = 0$
48. Find the area enclosed between the parabolas $y^2 = x$ and the line $x + y = 2$

PART-E**V. Answer any ONE question.****1x10=10**

49. (a) If 'n' is a rational number and 'a' is non-zero real number, then prove that

$$\lim_{x \rightarrow a} \left[\frac{x^n - a^n}{x - a} \right] = n.a^{n-1}$$
 (6)
- (b) The cost 'C' of a manufacturing an article is given by $C = 5 + \frac{48}{q} + 3q^2$ where 'q' is the number of articles. Find the number of articles produced at the minimum cost and also find the minimum cost (4)
50. (a) Salesman Pratheek has the following record of sales during 3 months of July, August and September for three products A, B, C which have different rates of commission.

Month	Sales in units			Total commission
	A	B	C	
July	100	100	100	700
August	200	300	200	1700
September	400	900	100	3700

- using matrix method, find out the rates of commission on items A, B and C received by Pratheek. (6)
- (b) Evaluate $(0.98)^5$ using binomial theorem (4)