



SRI BHAGAWAN MAHAVEER JAIN COLLEGE

Vishweshwarapuram, Bangalore.

Mock Examination – January 2020

Course: I PUC

Subject: Basic Maths

Max. Marks: 100

Duration: 3:15

Instructions:

- 1) The question paper consists of five parts A, B, C, D and E.
- 2) 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.
- 3) Write the question numbers properly as indicated in the question paper.

PART-A

I Answer any Ten questions

10 x 1 = 10

- 1 Write the imaginary part of $\frac{1+i}{1-i\sqrt{3}}$.
- 2 If $A = \{2, 3\}$, $B = \{5, 6\}$ find $B \times A$.
- 3 If $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = x^2$ find the value of $\frac{f(2) - f(1)}{2 - 1}$.
- 4 Simplify $\left(x^{\frac{1}{2}} + y^{\frac{1}{2}}\right)\left(x^{\frac{1}{2}} - y^{\frac{1}{2}}\right)$.
- 5 Find the value of $\log_{\sqrt{5}} x = 6$.
- 6 Find the 10th term of G.P 0.1, 0.3, 0.9.....
- 7 Solve $\frac{x}{3} > \frac{x}{2} + 1$.
- 8 Convert 36% to ratio.
- 9 Define annuity.
- 10 Express $22\frac{1}{2}^\circ$ in radians.
- 11 The average age of 12 boys is 8 years. Another boy 21 years joins the group. Find the average of the new group.
- 12 Find x-intercept of the line $\sqrt{3}x + y + 2 = 0$.

PART-B

II Answer any Ten questions:

10 x 2 = 20

- 13 Find the number which when divide by 16, 20 and 40 leaves the same remainder 4.
- 14 If $A = \{4, 6, 8\}$ and $B = \{3, 5\}$ find $A \times B$ and $B \times A$.

- 15 Find the number of divisors of 825.
- 16 Prove that $\frac{1}{1+x^{p-q}} + \frac{1}{1+x^{q-p}} = 1$.
- 17 Insert 3 G.M's between -4 and -64.
- 18 The sum of two consecutive numbers is 151. Find the numbers.
- 19 In what time will ₹35000 amount to ₹45,500 at 7.5% p.a.
- 20 Solve $3x - 7 < 5 + x$ and $11 - 5x \leq 1$
- 21 Two boys went up a hill at a speed of 20 kmph and both of them came tumbling down the same distance at a speed of 30 kmph. Find the average speed.
- 22 After revaluation a student marks was changed from 80 to 92. Find the percentage increase in marks.
- 23 Find the value of $\sin^3 60^\circ \cot 30^\circ - 2 \sec^2 45^\circ + 3 \cot 30^\circ \tan^2 60^\circ$.
- 24 Prove that $\sec^6 A - \tan^6 A = 1 + 3 \tan^2 A \sec^2 A$.
- 25 If the line $x - y + 2 = 0$ cuts the x and y axis at P and Q respectively, find the area of the triangle OPQ.

PART-C

III Answer any Ten Questions:

10 x 3 = 30

- 26 In a group of 65 people, 40 like cricket, 10 like hockey and cricket both. How many like Cricket and not hockey? How many like hockey?
- 27 A relation R on a collection of set of integers defined by $R = \{ (x, y) / x - y \text{ is a multiple of } 3 \}$
Show that R is an equivalence relation on Z.
- 28 Prove $\sqrt{7}$ is an irrational number.
- 29 If $a^{\frac{1}{3}} + b^{\frac{2}{3}} + c = 0$ then show that $(a + b^2 + c^3)^3 = 27 ab^2 c^3$.
- 30 The first term of G.P exceeds the second term by $\frac{1}{2}$ and the sum to infinity is 2. Find the G.P.
- 31 Solve the linear inequality graphically $2x + y \geq 8$, $x + y \leq 10$.
- 32 In what time ₹800 will amount to ₹882 at 10% p.a. interest compounded half yearly.
- 33 The average age of A and B is 45 years, the average of B and C is 50 years and the average age of C and A is 35 years. Find the age of A, B and C.
- 34 Prove that (4, 3) is the centre of the circle which passes through the points (1, 7) (7, -1) and (0, -8)
- 35 A person refused to sell his book for ₹726 because there was a loss of 12%. If he sold the book at a profit of 5%. Find the selling price.
- 36 Simplify : $\frac{\cos(270^\circ - A) \tan(90^\circ - A) \sin(180^\circ + A)}{\sin(270^\circ + A) \cos(180^\circ + A) \sin(360^\circ + A)}$.
- 37 Find the equation of straight line whose x and y intercept are equal and passes through (2, -3).

38 Find the quotient and the remainder obtained by dividing $3x^3 - 4x^2 + 2x + 1$ by $x - 3$.

PART-D

IV Answer any Six questions.

6 x 5 = 30

39 In a college $\left(\frac{2}{5}\right)^{th}$ of the student play basket ball and $\left(\frac{3}{4}\right)^{th}$ play volley ball. If 50 students play none of these two games and 125 play both, use venn diagram to find the number of students in the college.

40 Evaluate using log tables. $\frac{(0.5634)^2 \times 0.0635}{(2.563)^2}$.

41 Find the sum of all integers between 100 and 300 which are divisible by 7.

42 If α and β are the roots of the equation $2x^2 - 5x + 7 = 0$. Find the values of

(i) $\alpha^2 + \beta^2$ (ii) $\alpha + \beta + \alpha\beta$ (iii) $\frac{1}{\alpha} + \frac{1}{\beta}$ (iv) $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$.

43 What is the present value of ₹2000 receivable for 20 years, if the annuity is deferred for 10 years if the interest rate is 10%.

44 Find the equation of straight line given $a - b = 1$ and $ab = 6$ where a and b are x intercept and y intercept respectively.

45 a) Prove that $(\sin A + \operatorname{Cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$ 3M

b) Prove that $\frac{1}{1 + \sin^2 A} + \frac{1}{1 + \operatorname{Cosec}^2 A} = 1$ 2M

46 A sum triples itself in 4 years under compound interest at a certain rate of interest. Find the time it would take to become 9 times itself.

47 Find the circumcentre of the triangle whose vertices are (4, 4) (-3, 3) and (6, 0) also find circum radius.

48 a) Four percent more is gained by selling a table for ₹180 than by selling for ₹175.

Find the cost price of the table. 3M

b) A person bought a cycle for ₹3,000. For what price should he sell it to gain 10%? 2M

PART-E

V Answer any One question:

10 x 1 = 10

49 a) Find the image of the point (2, 3) on the line $3x + 5y + 4 = 0$ 4M

b) Prove that $(1 + \cot A - \operatorname{Cosec} A)(1 + \tan A + \sec A) = 2$ 4M

c) Find the number zeros between the decimal point and the first significant figure in $(0.7)^{55}$. 2M

- 50 a) Find the sum to n terms of the G.P $0.3 + 0.33 + 0.333 + \dots$ **4M**
- b) The total daily cost in Rupees of producing 'x' chairs is given by $y = 2.5x + 300$ **4M**
- (i) If each chair sold for ₹4 What is the BEP?
- (ii) If the selling price is increased to ₹5 per chair. What is the new BEP?
- (iii) Find the fixed and variable cost.
- c) If $f(x) = x$ and $g(x) = x^3 + 1$ find the $f \circ g(2)$ and $g \circ f(-1)$. **2M**
