| Mathematics | (C) | L.K.No.1534 | Paper Code No. 6195 |
|---|---|---|---|
| Paper I | ( Objective Type ) | Ist – A – Exam – 2024 | Session (2022 – 24) & (2023 – 25) |
| Time : | 30 Minutes | Inter ( Part - I ) | Marks : 20 |

Note : Four choices A , B , C ,D to each question are given. Which choice is correct fill that circle in front of that Question No. on the Objective Bubble Sheet. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

| | |
|---|---|
| Q.No.1 (1) | If $A \subseteq B$ and $A - B = \emptyset$ , then $n(A - B) =$ ..... : (A) 0 (B) n(A) (C) n(B) (D) n(A) – n(B) |
| (2) | The Property $\forall\ a \in R$ , $a = a$ is called : (A) Symmetric (B) Transitive (C) Reflexive (D) Commutative |
| (3) | Modulus of $5 - 3i$ is : (A) $\sqrt{4}$ (B) $\sqrt{16}$ (C) $\sqrt{25}$ (D) $\sqrt{34}$ |
| (4) | If p is a logical statement then $p \wedge \sim p$ is always : (A) Absurdity (B) Contigency (C) Tautology (D) Conditional |
| (5) | If $A = \begin{bmatrix} 1 & 1 \\ 1 & x \end{bmatrix}$ , and $\lvert A \rvert = 4$ , then x = .... : (A) 2 (B) 3 (C) 4 (D) 5 |
| (6) | A matrix of order m x 1 is called : (A) Row Matrix (B) Column Matrix (C) Diagonal Matrix (D) Null Matrix |
| (7) | Set containing elements of A or B is denoted by : (A) $A \cap B$ (B) $A \subseteq B$ (C) $A \cup B$ (D) $B \subseteq A$ |
| (8) | Roots of the equation $x^2 - 5x + 6 = 0$ are ..... : (A) 2 , – 3 (B) –2 , – 3 (C) 2 , 3 (D) – 2 , 3 |
| (9) | The Arithmetic Mean between $\sqrt{2}$ and $3\sqrt{2}$ is : (A) $2\sqrt{2}$ (B) $3\sqrt{2}$ (C) $4\sqrt{2}$ (D) $\sqrt{2}$ |
| (10) | $\frac{x}{2x+3}$ is ..... : (A) Proper Fraction (B) Improper Fraction (C) Identity Fraction (D) Mixed Fraction |
| (11) | Degree of Constant Polynomial is : (A) n (B) 2 (C) 1 (D) 0 |
| (12) | $\sum_{K=1}^{n} K =$ ..... (A) $\frac{n^2(n+1)^2}{4}$ (B) $\frac{n(n+1)}{2}$ (C) $\frac{n(n+1)(n+2)}{6}$ (D) $\frac{n(n-1)}{2}$ |
| (13) | Solution of $\cot\theta = \frac{1}{\sqrt{3}}$ in quad III is ..... : (A) $\frac{5\pi}{3}$ (B) $\frac{7\pi}{6}$ (C) $\frac{4\pi}{3}$ (D) $\frac{7\pi}{3}$ |
| (14) | Numbers of terms in the expansion of $(a + x)^{2n+1}$ are : (A) 2n + 2 (B) 2n +1 (C) 2n (D) n + 1 |
| (15) | Probability of an impossible event is ..... : (A) 1 (B) 0 . 5 (C) 0 . 25 (D) 0 |
| (16) | $\tan(\alpha - 90^\circ)$ = .... : (A) $\cot\alpha$ (B) $-\cot\alpha$ (C) $\tan\alpha$ (D) $-\tan\alpha$ |
| (17) | The Value of $\sin^{-1}(\cos\frac{\pi}{6})$ is equal to : (A) $\pi/2$ (B) $3\pi/2$ (C) $\pi/6$ (D) $\pi/3$ |
| (18) | $\sec\left(\frac{\alpha}{2}\right)$ = ..... : (A) $\sqrt{\frac{s(s-a)}{bc}}$ (B) $\sqrt{\frac{bc}{s(s-a)}}$ (C) $\frac{s}{\Delta}$ (D) $\frac{\Delta}{s-b}$ |
| (19) | Period of Cot 3x is ..... : (A) $\pi$ (B) $\frac{2\pi}{3}$ (C) $\frac{\pi}{2}$ (D) $\frac{\pi}{3}$ |
| (20) | If $\sin x = \frac{\sqrt{3}}{2}$ and $x \in [0, 2\pi]$ , then x is : (A) $\frac{5\pi}{3}, \frac{4\pi}{3}$ (B) $\frac{\pi}{4}, \frac{3\pi}{4}$ (C) $\frac{\pi}{3}, \frac{2\pi}{3}$ (D) $\frac{\pi}{6}, \frac{5\pi}{6}$ |

| Roll No. | 1534 - ) .6006 Inter ( Part - I ) | Session (2022 -24) & (2023 - 25) |
|---|---|---|
| Mathematics ( Subjective ) | Ist - A - Exam - 2024 | Time 2 : 30 Hours Marks : 80 |

Note: It is compulsory to attempt any (8 - 8) Parts each from Q.No. 2 and Q.No.3 while attempt any (9) Parts from Q.No.4. Attempt any (3) Questions from Part - II .Write same Question No. and its Part No. as given in the Question Paper.

## Bahawalpur Board-2024

Part - I



25 x 2 = 50

| | | | | |
|---|---|---|---|---|
| Q.No.2 | (i) | Show that $\forall z \in C$ , $z\bar{z} = \lvert z \rvert^2$ | | |
| | (ii) | Show that $\forall z_1, z_2 \in C$ , $\overline{z_1 z_2} = \bar{z}_1 \bar{z}_2$ | | |
| | (iii) | Define Polar form of a Complex Number . | | |
| | (iv) | Prove that $\bar{z} = z$ iff z is real . | | |
| | (v) | Write down the Power set of $\{a, \{b, c\}\}$ | | |
| | (vi) | Show that $(p \wedge q) \rightarrow p$ is a tautology . | | |
| | (vii) | Solve the system of linear equations : $4x_1 + 3x_2 = 5$ , $3x_1 - x_2 = 7$ | (viii) | Write any two Properties of Determinant . |
| | (ix) | Define Hermitian Matrix . | (x) | Solve the equation by Completing Square $x^2 + 4x - 1085 = 0$ |
| | (xi) | Solve the equation by using quadratic formula , $16x^2 + 8x + 1 = 0$ | (xii) | Prove that : $(-1 + \sqrt{-3})^4 + (-1 - \sqrt{-3})^4 = -16$ |
| Q.No.3 | (i) | Define Conditional equation and give example . | | |
| | (ii) | Resolve $\frac{1}{x^2 - 1}$ into Partial Fraction . | | |
| | (iii) | If $a_{n-2} = 3n - 11$ , find the nth term of the Sequence . | | |
| | (iv) | Find A.M between $3\sqrt{5}$ and $5\sqrt{5}$ | | |
| | (v) | If $S_n = n(2n - 1)$ , then find the series . | | |
| | (vi) | With usual notation , show that $G^2 = AH$ | | |
| | (vii) | Write $n(n-1)(n-2) \ldots (n-r+1)$ in the factorial form. | (viii) | What is the Fundamental Principle of Counting? |
| | (ix) | Two Coins are tossed twice each. Find the Probability that the head appears on the first toss and the same faces appear in the two tosses. | (x) | Calculate $(0.97)^3$ by means of Binomial Theorem. |
| | (xi) | Find the term involving $x^4$ in the expression of $(3 - 2x)^7$ | (xii) | Expand upto 4 terms , taking the values of $x$ such that the expansion in case is valid for $(1 - x)^{\frac{1}{2}}$ |
| Q.No.4 | (i) | Convert $\frac{9\pi}{5}$ into the measure of Sexagesimal System . | | |
| | (ii) | If $\tan\theta = \frac{8}{15}$ and $\theta \in$ III then find $\sin\theta$ and $\cos\theta$. | | |
| | (iii) | If $\alpha, \beta, \gamma$ be the angles of a triangle , then prove $\tan(\alpha + \beta) + \tan\gamma = 0$ | | |

| | | |
|---|---|---|
| | (iv) | Find the Value of $\tan(105^\circ)$. |
| | (v) | Write Triple angle identity for $\cos 3\alpha$. |
| | (vi) | Find the Period of $\tan\theta$. |
| | (vii) | Find the Period of $\sin\left(\frac{x}{3}\right)$. |
| | (viii) | Draw the graph of $y = 2\cos x, x \in [0, 2\pi]$ |
| | (ix) | Solve the right triangle ABC in which $\gamma = 90^\circ$, $\alpha = 37^\circ 20'$, $a = 243$ |
| | (x) | Define Angle of Depression. |
| | (xi) | By using Law of Cosine find the value of C if $a = \sqrt{3} - 1$, $b = \sqrt{3} + 1$, $\gamma = 60^\circ$ |
| | (xii) | Find the value of $\cos(\sin^{-1}(\frac{1}{\sqrt{2}}))$ |
| | (xiii) | Solve the equation $1 + \cos x = 0$ |

**Part - II**  **3 x 10 = 30**

| | | | |
|---|---|---|---|
| Q.No.5 | (a) | Show that $\begin{vmatrix} a+l & a & a \\ a & a+l & a \\ a & a & a+l \end{vmatrix} = l^2(3a + l)$ | (5) |
| | (b) | Solve the Equation : $\sqrt{5x^2 + 7x + 2} - \sqrt{4x^2 + 7x + 18} = x - 4$ | (5) |
| Q.No.6 | (a) | Resolve $\frac{x^2+1}{x^3+1}$ into Partial Fractions. | (5) |
| | (b) | If the numbers 1, 4 and 3 are Subtracted from three Consecutive terms of an A.P, the resulting numbers are in G.P. Find the numbers if their Sum is 21. | (5) |
| Q.No.7 | (a) | Find the values of n and r When ${}^nC_r = 35$, and ${}^nP_r = 210$ | (5) |
| | (b) | Use Binomial Theorem to show that $1 + \frac{1}{4} + \frac{1.3}{4.8} + \frac{1.3.5}{4.8.12} + \ldots\ldots = \sqrt{2}$ | (5) |
| Q.No.8 | (a) | Prove that $\sin^6\theta - \cos^6\theta = (\sin^2\theta - \cos^2\theta)(1 - 3\sin^2\theta\cos^2\theta)$ | (5) |
| | (b) | Prove that : $\sin^{-1}\frac{1}{\sqrt{5}} + \cot^{-1}3 = \frac{\pi}{4}$ | (5) |
| Q.No.9 | (a) | Reduce $\sin^4\theta$ to an expression involving only function of multiples of $\theta$, raised to the first power. | (5) |
| | (b) | The Sides of a triangle are $x^2 + x + 1$, $2x + 1$ and $x^2 - 1$. Prove that the greatest angle of the triangle is $120^\circ$. | (5) |

09-05-2024

| Mathematics | (C) | L.K.No.1014 | Paper Code No. 6195 |
|---|---|---|---|
| Paper I | ( Objective Type ) | Ist – A – Exam – 2023 | Session (2020 – 22) to (2022 – 24) |
| Time : | 30 Minutes | Inter ( Part - I ) | Marks : 20 |

Note : Four possible choices A , B , C ,D to each question are given. Which choice is correct fill that circle in front of that Question No. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.



**Q.No.1**

**(1)** If $A = \begin{bmatrix} -2 & 1 \\ 3 & 5 \end{bmatrix}$ then $A - A^t$ is :

(A) $\begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 0 & 4 \\ 4 & 10 \end{bmatrix}$ (C) $\begin{bmatrix} 0 & -2 \\ 2 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} -2 & 0 \\ 0 & 2 \end{bmatrix}$

**(2)** Venn Diagrams are useful only in case of :
(A) Concrete Sets (B) Abstract Sets (C) Subsets (D) Universal Sets

**(3)** If $Z = 2 - 3i$, then $|Z|^2 =$ (A) $\sqrt{5}$ (B) 5 (C) $\sqrt{13}$ (D) 13

**(4)** If A is a Square Matrix of Order 3 , then $|KA| =$ : (A) $3|A|$ (B) $9|A|$ (C) $K|A|$ (D) $K^3|A|$

**(5)** An equation in which two Algebraic Expressions are equal for particular values of the variable is called : (A) An Equation (B) Conditional Equation (C) Identity (D) Both A and B

**(6)** If for a Quadratic Equation $ax^2 + bx + c = 0$, $b^2 - 4ac = 0$, then roots of the equation will be : (A) Rational (B) Irrational (C) Equal (D) Unequal

**(7)** The Sum of the Roots of the Equation $5x^2 - x - 2 = 0$ is : (A) $\frac{-2}{5}$ (B) $\frac{2}{5}$ (C) $\frac{-1}{5}$ (D) $\frac{1}{5}$

**(8)** If $a_n = (-1)^n(2n-3)$, then $5^{th}$ term of the sequence is : (A) $-7$ (B) 7 (C) 49 (D) $-49$

**(9)** A Coin is tossed four times, then the Probability of getting no head is :
(A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D) $\frac{1}{2}$

**(10)** The Number of 4 Digit Numbers that can be formed out of digits 1 , 2 , 3 , 4 , 5 , 6 when no digit is repeated is : (A) 15 (B) 36 (C) 360 (D) 720

**(11)** H.M. between $\frac{1}{a}$ and $\frac{1}{b}$ is : (A) $\frac{2ab}{a+b}$ (B) $\frac{a+b}{2ab}$ (C) $\frac{2}{a+b}$ (D) $\frac{a+b}{2}$

**(12)** $1 + 3 + 5 + \text{------} + (2n+5) = (n+3)^2$ is true for :
(A) $n \geq -1$ (B) $n \geq -2$ (C) $n \geq 1$ (D) $n \geq 2$

**(13)** $\text{Cos}(2x + 30^\circ) \cdot \text{Cos}(2x - 30^\circ) =$ : (A) $\frac{-1}{2}[\text{Sin}4x - \text{Sin}60^\circ]$ (B) $\frac{-1}{2}[\text{Sin}4x + \text{Sin}60^\circ]$
(C) $\frac{1}{2}[\text{Cos}4x + \text{Cos}60^\circ]$ (D) $\frac{1}{2}[\text{Cos}4x - \text{Cos}60^\circ]$

**(14)** Which of the following is a pair of Coterminal Angles :
(A) $30^\circ, -330^\circ$ (B) $50^\circ, -330^\circ$ (C) $30^\circ, 760^\circ$ (D) $60^\circ, 1480^\circ$

**(15)** The Coefficients of the terms equidistant from beginning and end of the expansion of $(a+x)^n$ ; $n \in N$ are equal as :
(A) $\binom{n}{r} = \binom{n}{n-r}$ (B) $\binom{n}{r} = \binom{n}{n+r}$ (C) $\binom{n}{r+1} = \binom{n}{r}$ (D) $\binom{n}{r} = \binom{n-1}{r-1}$

**(16)** Range of $y = 3\text{Sin}2x$ is : (A) $[-1, 1]$ (B) $[-3, 3]$ (C) $[-5, 5]$ (D) $[-6, 6]$

**(17)** $\text{Sin}^{-1}\left(\frac{1}{\sqrt{2}}\right) =$ ------- : (A) 0 (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{3}$

**(18)** $\frac{abc}{R} =$ : (A) 4 rs (B) $4\Delta$ (C) $\frac{4}{\Delta r}$ (D) $\frac{\Delta r}{4}$

**(19)** Area of a Triangle ABC is equal to :
(A) $\frac{1}{2}bc\,\text{Sin}\alpha$ (B) $\frac{1}{2}ab\,\text{Sin}\alpha$ (C) $\frac{1}{2}bc\,\text{Cos}\alpha$ (D) $\frac{1}{2}ac\,\text{Sin}\gamma$

**(20)** Reference Angle of $\text{Cos}x = \frac{-1}{2}$ is : (A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{2}$ (D) $\frac{\pi}{3}$

| Roll No. | 1014 - 27000 | Inter ( Part – I ) | Session (2020 – 22) to (2022 – 24) |
|---|---|---|---|
| Mathematics ( Subjective ) | Ist – A – Exam – 2023 | | Time 2 : 30 Hours Marks : 80 |

**Note:** It is compulsory to attempt any (8 – 8) Parts each from Q.No. 2 and Q.No.3 while attempt any (9) Parts from Q.No.4. Attempt any (3) Questions from Part – II .Write same Question No. and its Part No. as given in the Question Paper.

**Part - I** — 25 x 2 = 50

| | | | | |
|---|---|---|---|---|
| Q.No.2 | (i) | Prove that : $\frac{a}{b} = \frac{c}{d} \Leftrightarrow ad = bc$ | | |
| | (ii) | Show that $\forall\ Z \in C$ $Z^2 + \bar{Z}^2$ is a real number. | | |
| | (iii) | Show A – B and B – A by Venn Diagram , when A and B are Overlapping Sets. | | |
| | (iv) | Verify the Commutative Property of Union and Intersection for the sets $A = \{1, 2, 3, 4, 5\}$ , $B = \{4, 6, 8, 10\}$ | | |
| | (v) | Construct Truth Table for the Statement $(p \rightarrow \sim p) \vee (p \rightarrow q)$ | | |
| | (vi) | If $A = \begin{bmatrix} 2 & -1 \\ 3 & 1 \end{bmatrix}$ verify that $(A^{-1})^t = (A^t)^{-1}$ | | |
| | (vii) | Find value of 'x' if : $\begin{vmatrix} 1 & 2 & 1 \\ 2 & x & 2 \\ 3 & 6 & x \end{vmatrix} = 0$ | (viii) | Solve the Matrix Equation $2X - 3A = B$ if $A = \begin{bmatrix} 1 & -1 & 2 \\ -2 & 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 & 0 \\ 4 & 2 & 1 \end{bmatrix}$ |
| | (ix) | Reduce to Quadratic Form $(x+1)(x+2)(x+3)(x+4) = 24$ | (x) | Show that : $x^3 - y^3 = (x-y)(x-wy)(x-w^2y)$ |
| | (xi) | Show that the roots of the equation $(b-c)x^2 + (c-a)x + (a-b) = 0$ ; $a, b, c \in Q$ will be real. | (xii) | If the roots of the equation $x^2 - px + q = 0$ differ by unity , prove that $P^2 = 4q + 1$ |
| Q.No.3 | (i) | Define Proper Rational Fraction. | | |
| | (ii) | Write the first four terms of the sequence if $a_n - a_{n-1} = n + 2$ , $a_1 = 2$ | | |
| | (iii) | If 5 , 8 are two A.Ms between 'a' and 'b', find 'a' and 'b' | | |
| | (iv) | Sum the Series $-8 - 3\frac{1}{2} + 1 +$ -------- $+ a_{11}$ | | |
| | (v) | Find the $11^{th}$ term of the Sequence $1 + i$ , $2$ , $2(1 - i)$, -------- | | |
| | (vi) | Insert three G.Ms. between 2 and 32 | | |
| | (vii) | Find the number of the Diagonals of a 6 – sided figure. | (viii) | Show that : ${}^{16}C_{11} + {}^{16}C_{10} = {}^{17}C_{11}$ |
| | (ix) | Two Dice are thrown. What is the Probability that the sum of the number of dots appearing on them is 4 or 6 ? | (x) | If $S_n = n(2n-1)$ , then find the Series. |
| | (xi) | Expand upto four terms $(1+x)^{\frac{-1}{3}}$ | (xii) | If 'x' is so small that its square and higher powers can be neglected then show that $\frac{1-x}{\sqrt{1+x}} \approx 1 - \frac{3}{2}x$ |
| Q.No.4 | (i) | A Railway Train is running on a Circular Track of Radius 500 meters at the rate of 30 Km per hour. Through what angle will it turn in 10 Sec ? | | |
| | (ii) | Verify $\cos 2\theta = Cos^2\theta - Sin^2\theta$ when $\theta = 30^\circ, 45^\circ$ | | |
| | (iii) | Find the period of Sec 9x. | | |

| Mathematics | (B) | L.K.No. 1112 | Paper Code No. 6193 |
|---|---|---|---|
| Paper I | ( Objective Type ) | Inter – A – 2021 | Session (2017 – 19) to (2020 – 22) |
| Time : | 30 Minutes | Inter ( Part - I ) | Marks : 20 |

Note : Four possible choices A , B , C , D to each question are given. Which choice is correct fill that circle in front of that Question No. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

| | |
|---|---|
| Q.No.1 (1) | If $\text{Cos } x = \frac{-\sqrt{3}}{2}$ , then its Reference Angle is : (A) $\frac{\pi}{3}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{6}$ (D) $\frac{-\pi}{6}$ |
| (2) | $\text{Cos}(\text{Sec}^{-1}(1)) =$ : (A) 1 (B) 0 (C) $30^\circ$ (D) 2 |
| (3) | $\sqrt{\frac{s(s-a)}{bc}} =$ : (A) $\text{Sin}\frac{\alpha}{2}$ (B) $\text{Sin}\frac{\beta}{2}$ (C) $\text{Cos}\frac{\beta}{2}$ (D) $\text{Cos}\frac{\alpha}{2}$ |
| (4) | If ABC be any Triangle and $\gamma = 90^\circ$, then : (A) $a^2 + b^2 = c^2$ (B) $a^2 + c^2 = b^2$ (C) $b^2 + c^2 = a^2$ (D) $a^2 + b^2 + c^2 = 0$ |
| (5) | Period of $\text{Sin}\frac{x}{5}$ is : (A) $2\pi$ (B) $\frac{\pi}{5}$ (C) $10\pi$ (D) $5\pi$ |
| (6) | $2\,\text{Sin}12^\circ\,\text{Sin}46^\circ =$ : (A) $\text{Cos}34^\circ\,\text{Cos}58^\circ$ (B) $\text{Sin}34^\circ + \text{Sin}58^\circ$ (C) $\text{Sin}34^\circ - \text{Sin}58^\circ$ (D) $\text{Cos}34^\circ - \text{Cos}58^\circ$ |
| (7) | $\frac{3\pi}{2}$ Radians equals to : (A) $120^\circ$ (B) $150^\circ$ (C) $270^\circ$ (D) $190^\circ$ |
| (8) | The Vertex of an angle in standard form is at : (A) (0,0) (B) (1,0) (C) (0,1) (D) (1,1) |
| (9) | In the Expansion of $(a+b)^7$ , the 2nd term is : (A) $a^7$ (B) $7a^6b$ (C) $7ab^6$ (D) $7b^6$ |
| (10) | ${}^nP_n =$ ----- : (A) n! (B) (n+1)! (C) 1 (D) (n-1)! |
| (11) | Harmonic Mean between x and y is : (A) $\frac{2(x+y)}{xy}$ (B) $\frac{2xy}{x+y}$ (C) $\frac{x+y}{2xy}$ (D) $\frac{x+y}{2}$ |
| (12) | The nth term of the sequence $\frac{1}{3}, \frac{2}{5}, \frac{3}{7}, \frac{4}{9}$ ------- is : (A) $\frac{n}{2n-1}$ (B) $\frac{n}{2n+1}$ (C) $\frac{n}{3n-1}$ (D) $\frac{n}{3n+1}$ |
| (13) | The next two terms of the sequence 1, 3, 7, 15, 31 ------ are : (A) 112, 288 (B) 122, 144 (C) 102, 188 (D) 63, 127 |
| (14) | Partial Fractions of $\frac{1}{x(x+1)}$ are = --------- : (A) $\frac{1}{x-1} + \frac{1}{x+1}$ (B) $\frac{1}{x-1} - \frac{1}{x+1}$ (C) $\frac{1}{x} + \frac{1}{x+1}$ (D) $\frac{1}{x} - \frac{1}{x+1}$ |
| (15) | If $\alpha, \beta$ are the roots of the equation $x^2 - 4x + 5 = 0$ , then $\alpha\beta$ is equal to : (A) 2 (B) 4 (C) 5 (D) −4 |
| (16) | $(a+b)x = ax + bx$ is called : (A) Identity (B) Equation (C) Conditional (D) Fraction |
| (17) | If $A = \begin{vmatrix} 1 & -2 & 3 \\ -2 & 3 & 1 \\ 4 & -3 & 2 \end{vmatrix}$ , then $A_{33}$ equals : (A) −1 (B) 1 (C) 7 (D) −7 |
| (18) | $\begin{bmatrix} K & 0 \\ 0 & K \end{bmatrix}$ is : (A) Zero Matrix (B) Non – Diagonal Matrix (C) Identity Matrix (D) Scalar Matrix |
| (19) | If $A \subseteq B$ and $B \subseteq A$ , then : (A) $A = \emptyset$ (B) $A = B$ (C) $B = \emptyset$ (D) $A \cap B = \emptyset$ |
| (20) | The Multiplicative Inverse of Complex Number (0,1) is : (A) (0,−1) (B) (0,1) (C) (−1,0) (D) (0,0) |

| Roll No. | 1112 - 20000 | Session (2017 – 19)to(2020 – 22) | Inter (Part – I) |
|---|---|---|---|
| Mathematics (Subjective) | Inter – A – 2021 | Time 2 : 30 Hours Marks : 80 | |

Note: It is compulsory to attempt any (8 – 8) Parts each from Q.No. 2 and Q.No.3 while attempt any (9) Parts from Q.No.4. Attempt any (3) Questions from Part – II .Write same Question No. and its Part No. as given in the Question Paper.

**Part - I** — **25 x 2 = 50**

| | | | | |
|---|---|---|---|---|
| Q.No.2 | (i) | Find the Sum and Product of the Complex Numbers $(8, 9)$ and $(5, -6)$. | | |
| | (ii) | Separate into Real and Imaginary Parts $\frac{2-7i}{4+5i}$ and write as Simple Complex Number. | | |
| | (iii) | For all Complex Numbers $Z$, show that $Z^2 + \bar{Z}^2$ is a real number. | | |
| | (iv) | Convert the theorem $(A \cap B)' = A' \cup B'$ into logical form and prove by constructing the Truth Table. | | |
| | (v) | If G is a group under the operation $*$ and $a, b \in G$, then solve the equation $a * x = b$ | | |
| | (vi) | Write the Descriptive Form and Tabular Form of the Set $\{ x \mid x \in 0 \wedge 3 < x < 12 \}$ | | |
| | (vii) | If $A = \begin{bmatrix} 1 & 2 \\ a & b \end{bmatrix}$ and $A^2 = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ find the values of a and b. | | |
| | (viii) | Find the Co-factors $A_{12}$ and $A_{22}$ if $A = \begin{bmatrix} 1 & -2 & 3 \\ -2 & 3 & 1 \\ 4 & -3 & 2 \end{bmatrix}$ | | |
| | (ix) | Find the value of $x$ if $\begin{vmatrix} 3 & 1 & x \\ -1 & 3 & 4 \\ x & 1 & 0 \end{vmatrix} = -30$ | (x) | If $\alpha, \beta$ are the roots of $5x^2 - x - 2 = 0$ then form an equation whose roots are $\frac{3}{\alpha}$ and $\frac{3}{\beta}$ |
| | (xi) | Find Three Cube Roots of Unity. | (xii) | Solve the Equation $2x^4 - 32 = 0$ |
| Q.No.3 | (i) | Write $\frac{3x^2 - 4x - 5}{(x-2)(x^2+7x+10)}$ in form of Partial Fraction without finding the constants. | | |
| | (ii) | Write $\frac{x^2}{(x-2)(x-1)^2}$ in form of Partial Fractions without finding the constants. | | |
| | (iii) | Calculate $(2.02)^4$ by means of Binomial Theorem. | | |
| | (iv) | A die is rolled. What is the Probability that dots on the Top are greater than '4' ? | | |
| | (v) | Use Binomial Theorem to expand $(\frac{x}{2} - \frac{2}{x^3})^6$ | | |
| | (vi) | Expand $(4 - 3x)^{\frac{1}{2}}$ upto three terms taking the values of 'x" such that Expansion is valid. | | |
| | (vii) | Find $a_8$ of the sequence $1, -3, 5, -7, 9, -11, \ldots\ldots$ | (viii) | Sum the Series $\frac{3}{\sqrt{2}} + 2\sqrt{2} + \frac{5}{\sqrt{2}} + \ldots\ldots + a_{13}$ |
| | (ix) | Find two G.M.'s between 2 and 16. | (x) | Which term of the A.P. $5, 2, -1 \ldots\ldots$ is $-85$ ? |
| | (xi) | Evaluate $20P_3$ | (xii) | If ${}^nC_8 = {}^nC_{12}$ find 'n' |
| Q.No.4 | (i) | What is the circular measure of the angle between the hands of a watch at 4 O' Clock ? | | |
| | (ii) | Verify $\cos 2\theta = 2\cos^2\theta - 1$, when $\theta = 30^\circ, 45^\circ$ | | |
| | (iii) | Prove that $\cos^4\theta - \sin^4\theta = \cos^2\theta - \sin^2\theta$ for all $\theta \in R$ | | |
| | (iv) | Find the value of $\cos 105^\circ$ | | |







P.T.O.

| Mathematics | (B) | L.R.No. 1117 | Paper Code No. 6193 |
|---|---|---|---|
| Paper I | (Objective Type) | Inter-A-2019 | Session (2015-17) to (2018-20) |
| Time : | 30 Minutes | Inter (Part-I) | |
| Marks : | 20 | | |

Note : Four possible choices A, B, C, D to each question are given. Which choice is correct fill that circle in front of that Question No. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

No.1) The reference angle for $\text{Tan}\theta = \sqrt{3}$ is : (A) $\frac{\pi}{6}$ (B) $\frac{-\pi}{6}$ (C) $\frac{\pi}{3}$ (D) $\frac{-\pi}{3}$

2) $\text{Sin}(\text{Tan}^{-1}0^\circ) =$ : (A) $-1$ (B) $1$ (C) $0$ (D) $\infty$

3) Radius of e-circle opposite to vertex "A" of $\Delta ABC$ is : (A) $\frac{\Delta}{s}$ (B) $\frac{\Delta}{s-a}$ (C) $\frac{\Delta}{s-b}$ (D) $\frac{\Delta}{s-c}$

4) The angle above the Horizontal Line is called an angle of : (A) Depression (B) Elevation (C) Allied (D) Quadrental

5) Period of $\csc\theta$ is : (A) $\pi$ (B) $-\pi$ (C) $2\pi$ (D) $-2\pi$

6) $\text{Cos}(\theta - 180^\circ) =$ : (A) $\text{Sin}\theta$ (B) $-\text{Cos}\theta$ (C) $\text{Cos}\theta$ (D) $-\text{Sin}\theta$

7) $\frac{9\pi}{5}\,rad$ in degree measure is : (A) $321^\circ$ (B) $322^\circ$ (C) $323^\circ$ (D) $324^\circ$

8) Total number of terms in expansion of $\left(\frac{x}{2} - \frac{2}{x^2}\right)^{16}$ are : (A) 17 (B) 16 (C) 15 (D) 14

9) The Statement $4^k > 3^k + 4$ is true for : (A) $K < 2$ (B) $K \leq 2$ (C) $K \neq 2$ (D) $K \geq 2$

10) A die is thrown, what is the probability to get 3 dots : (A) $\frac{1}{3}$ (B) $\frac{1}{6}$ (C) $\frac{2}{3}$ (D) $\frac{5}{6}$

11) $\frac{8!}{7!} =$ (A) $7!$ (B) $7$ (C) $8$ (D) $8!$

12) If H is H.M. between "a" and "b" then H = : (A) $\frac{2ab}{a+b}$ (B) $\frac{a+b}{2ab}$ (C) $\frac{a+b}{2}$ (D) $\pm\sqrt{ab}$

13) If $a_n = \frac{(-1)^{n+1}}{2^n}$, then $a_5$ = : (A) $\frac{1}{8}$ (B) $\frac{1}{16}$ (C) $\frac{1}{32}$ (D) $\frac{1}{64}$

14) In $\frac{P(x)}{Q(x)}$, if degree of $P(x) \geq$ degree of $Q(x)$, then fraction is : (A) Proper (B) Improper (C) Irrational (D) Identity

15) When $x^3 - 2x^2 + 3x + 3$ is divided by $x - 3$, the remainder is : (A) $-21$ (B) $21$ (C) $-51$ (D) $51$

16) An equation which remains unchanged when $x$ is replaced by $\frac{1}{x}$ is : (A) Exponential (B) Radical (C) Reducible (D) Reciprocal

17) If Order of $X = 3 \times 2$ and that of $A = 2 \times 2$ then order of $XA$ = (A) $3 \times 2$ (B) $2 \times 3$ (C) $2 \times 2$ (D) $3 \times 3$

18) The matrix $[\,a\ \ b\ \ c\ \ d\,]$ is : (A) Square (B) Unit (C) Null (D) Row

19) If $A = \{a, \{a, b\}\}$, then number of elements in P(A) is : (A) 2 (B) 3 (C) 4 (D) 8

20) The property used in $(a+1) + \frac{3}{4} = a + (1 + \frac{3}{4})$ is : (A) Closure (B) Associative (C) Commutative (D) Additive

| Roll No. | 1117 - 30000 | Session (2015 -17 ) to (2018 - 20) | Inter ( Part - I ) |
|---|---|---|---|
| Mathematics (Subjective) | Inter - A -2019 | Time 2 : 30 Hours Marks : 80 | |

Note : It is compulsory to attempt any (8 - 8) Parts each from Q.No. 2 and Q.No.3 while attempt any (9) Parts from Q.No.4. Attempt any (3) Questions from Part - II .Write same Question No. and its Part No. as given in the Question Paper.

**Part - I**  **25 x 2 = 50**

| | | | | |
|---|---|---|---|---|
| Q.2 | (i) | If $Z_1$ and $Z_2$ are complex numbers then show that $\overline{Z_1 Z_2} = \overline{Z_1}\,\overline{Z_2}$ | | |
| | (ii) | If $A = \begin{bmatrix} 2 & 3 & -2 \\ -1 & 1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -3 & 1 \\ 5 & 4 & -1 \end{bmatrix}$ then solve the equation $3x - 2A = B$ for X. | | |
| | (iii) | Separate into Real and Imaginary Parts $\frac{2-7i}{4+5i}$ | (iv) | If A and B are Overlapping Sets then draw the Venn Diagram of A - B |
| | (v) | Find the Multiplicative Inverse of $-3 - 5i$ | (vi) | Find Four $4^{th}$ Roots of 81 |
| | (vii) | Define Intersection of two sets and give an example. | (viii) | Without expansion show that : $\begin{vmatrix} 2 & 3 & -1 \\ 1 & 1 & 0 \\ 2 & -3 & 5 \end{vmatrix} = 0$ |
| | (ix) | Define Identity Matrix and give an example. | (x) | Show that the roots of $px^2 - (p-q)x - q = 0$ are rational. |
| | (xi) | If $\alpha, \beta$ are the roots of $x^2 - px - p - c = 0$ then prove that $(1+\alpha)(1+\beta) = 1 - c$ | (xii) | Define Monoid. |
| Q.3 | (i) | For the Identity $\frac{1}{(x-1)(2x-1)(3x-1)} = \frac{A}{x-1} + \frac{B}{2x-1} + \frac{C}{3x-1}$ calculate the value of A | | |
| | (ii) | Find the indicated term of the sequence : 2, 6, 11, 17, ------ $a_7$ | | |
| | (iii) | Write the first four terms of the A.P. If $a_1 = 5$ and other three consecutive terms are 23, 26, 29 | | |
| | (iv) | Find the $12^{th}$ term of the Geometric Sequence : $1 + i, 2i, -2 + 2i$, ------ | | |
| | (v) | The A.M. between two numbers a and b is 5 and their positive G.M. is 4, find the values of a and b. | | |
| | (vi) | If 5 is the Harmonic Mean between 2 and b, find b. | | |
| | (vii) | How many words can be formed from the letters of the word " OBJECT " using all letters without repeating any letter? | | |
| | (viii) | Prove that $\frac{8 \times 10^n - 2}{6}$ is an integer for n = 1 and n = 2. | | |
| | (ix) | Find $6^{th}$ term in the expansion of $(x^2 - \frac{3}{2x})^{10}$ | | |
| | (x) | Expand $\sqrt{99}$ by using Binomial Expansion to find its value upto three places of decimals. | | |
| | (xi) | Define Improper Rational Fraction. | | |
| | (xii) | Resolve $\frac{1}{x^2 - 1}$ into Partial Fractions. | | |
| Q.4 | (i) | Define Degree Measure. | (ii) | Solve $\sin x = \frac{1}{2}$ |
| | (iii) | Find the solutions in $[0, 2\pi]$ $\cot\theta = \frac{1}{\sqrt{3}}$ | (iv) | Prove $\frac{\sin 8x + \sin 2x}{\cos 8x + \cos 2x} = \tan 5x$ |
| | (v) | Prove that $\cos(\sin^{-1} x) = \sqrt{1 - x^2}$ | (vi) | Find the period of $\cot\frac{x}{2}$ |
| | (vii) | If $\sin\theta = -\frac{1}{2}$, terminal arm of $\theta$ is not in III Quadrant, find $\tan\theta$. | | |
| | (viii) | The area of a $\Delta ABC$ is 2437. If a = 79 and c = 97, find the angle $\beta$. | | |
| | (ix) | Prove that $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$ | | |
| | (x) | Prove that $(\sec\theta - \tan\theta)^2 = \frac{1-\sin\theta}{1+\sin\theta}$ | | |
| | (xi) | Prove $\sin(\alpha+\beta).\sin(\alpha-\beta) = \sin^2\alpha - \sin^2\beta$ | | |
| | (xii) | If $\beta = 52^\circ$, $\gamma = 89^\circ 35'$, a = 89.35 find the side b of a $\Delta ABC$ | | |
| | (xiii) | Prove $\sqrt{\frac{1+\sin\alpha}{1-\sin\alpha}} = \frac{\sin\frac{\alpha}{2} + \cos\frac{\alpha}{2}}{\sin\frac{\alpha}{2} - \cos\frac{\alpha}{2}}$ | | |

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# Bahawalpur Board-2019

No.1117 pakcity.org Part - II

| | | | |
|---|---|---|---|
| 5 | (a) | Convert $(A \cup B) \cup C = A \cup (B \cup C)$ to logical form and prove by constructing truth table. | (5) |
| | (b) | Sum to n terms, the series : $3 + 33 + 333 +$ ---------- | (5) |
| 6 | (a) | Solve the equations if possible by Cramer's Rule.<br>$2x_1 - x_2 + x_3 = 8$<br>$x_1 + 2x_2 + 2x_3 = 6$<br>$x_1 - 2x_2 - x_3 = 1$ | (5) |
| | (b) | Find the Probability that sum of dots appearing in two successive throws of two dice is every time 7. | (5) |
| 7 | (a) | Find the values of "a" and "b" if "-2" and "2" are the roots of polynomial $x^3 - 4x^2 + ax + b$ | (5) |
| | (b) | Find the Coefficient of term involving $x^{-1}$ in the expansion of $(\frac{3}{2}x - \frac{1}{3x})^{11}$ | (5) |
| 8 | (a) | Show that the area of a sector of a circular region of radius "r" is $\frac{1}{2}r^2\theta$, where $\theta$ is the circular measure of the central angle of the sector. | (5) |
| | (b) | Prove that $\frac{Cos8^o - Sin8^o}{Cos8^o + Sin8^o} = \tan 37^o$ | (5) |
| 9 | (a) | Show that $\frac{1}{2rR} = \frac{1}{ab} + \frac{1}{bc} + \frac{1}{ca}$ | (5) |
| | (b) | Prove that $\text{Sin}^{-1}\frac{5}{13} + \text{Sin}^{-1}\frac{7}{25} = \text{Cos}^{-1}\frac{253}{325}$ | (5) |

Mathematics | D | L.K.No - 817 | Paper Code No. 6197

Paper I ( Objective Type ) | Inter - A - 2018

Time Allowed : 30 Minutes | Inter ( Part - I)

Maximum Marks : 20 | Session ( 2014 - 16 ) to ( 2017 - 19 )

pakcity.org

# Bahawalpur Board-2018

Note : Four possible choices A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q. (1)

(1) What is the Multiplicative Inverse of $1 - 2i$ : (A) $\frac{1+2i}{5}$ (B) $\frac{1-2i}{5}$ (C) $\frac{1+2i}{\sqrt{5}}$ (D) $\frac{1-2i}{\sqrt{5}}$

(2) A Square Matrix A is Skew - Symmetric if $(A)^t$ = : (A) A (B) - A (C) $\bar{A}$ (D) $-A^t$

(3) If A is a Matrix of Order 4 x 3, then number of elements in each column of A is : (A) 2 (B) 3 (C) 4 (D) 5

(4) How many inverse elements correspond to each element of a group : (A) At least one (B) Only One (C) Two (D) At least two

(5) The Roots of the Equation $x^2 + x + 2 = 0$ are : (A) Real, Equal (B) Real, Unequal (C) Equal (D) Imaginary

(6) The Sum $\sum_{K=1}^{n} 1$ = : (A) 1 (B) n (C) $n^2$ (D) $n^3$

(7) Partial Fractions of $\frac{x+4}{(x-1)(x^2+2)}$ will be :
(A) $\frac{A}{x-1} + \frac{Bx+C}{x^2+2}$ (B) $\frac{A}{x-1} + \frac{B}{x^2+2}$ (C) $\frac{Ax}{x-1} + \frac{Bx+C}{x^2+2}$ (D) $\frac{A}{x-1} + \frac{Bx}{x^2+2}$

(8) If $3^x + 2^{2x} = 5^x$, then the value of x is : (A) 0 (B) 1 (C) 2 (D) 3

(9) The Geometric Means between - 2i and 8i are : (A) $\pm 4$ (B) $\pm 2$ (C) $\pm 3i$ (D) $\pm 4i$

(10) If $n \notin z^+$ and $|x| < 1$, then the Expansion $1 + nx + \frac{n(n-1)}{2!}x^2 + \text{——}$ is :
(A) Arithmetic Series (B) Geometric Series (C) Harmonic Series (D) Binomial Series

(11) The Non - Occurrence of an Event E is denoted by $\bar{E}$ and $P(\bar{E})$ is given by :
(A) $P(\bar{E}) = 1$ (B) $1 - P(E)$ (C) $1 - P(\bar{E})$ (D) $P(E) - 1$

(12) If P(E) is the Probability of an Event E, then :
(A) $0 < P(E) < 1$ (B) $0 > P(E) > 1$ (C) $0 \leq P(E) \leq 1$ (D) $0 \geqslant P(E) \geqslant 1$

(13) The 2nd term in the expansion $(1 + 2x)^{\frac{-1}{3}}$ is : (A) $\frac{-2}{3}x$ (B) $\frac{2}{3}x$ (C) $-6x$ (D) $\frac{x}{3}$

(14) Period of Sec 10 x is : (A) $\frac{\pi}{2}$ (B) $\pi$ (C) $\frac{\pi}{5}$ (D) $2\pi$

(15) $\text{Cos}\left(\theta + \frac{3\pi}{2}\right)$ is equal to : (A) $-\text{Sin}\theta$ (B) $\text{Sin}\theta$ (C) $-\text{Cos}\theta$ (D) $\text{Cos}\theta$

(16) An Angle in the Standard Position whose terminal arm lies on the x - axis or on the y - axis is called :
(A) Obtuse Angle (B) Acute Angle (C) Right Angle (D) Quadrantal Angle

(17) Radius of Escribed Circle opposite to Vertex C of the Triangle is :
(A) $\frac{\Delta}{s}$ (B) $\frac{\Delta}{s-a}$ (C) $\frac{\Delta}{s-b}$ (D) $\frac{\Delta}{s-c}$

(18) If $\text{Sin}\,x = \frac{\sqrt{3}}{2}$ and $x \in [0, 2\pi]$ then x is :
(A) $\frac{5\pi}{3}, \frac{4\pi}{3}$ (B) $\frac{\pi}{4}, \frac{3\pi}{4}$ (C) $\frac{\pi}{3}, \frac{2\pi}{3}$ (D) $\frac{\pi}{6}, \frac{5\pi}{6}$

(19) $2\tan^{-1} A =$ (A) $\tan^{-1}\frac{2A}{1+A^2}$ (B) $\tan^{-1}\frac{2A}{1-A^2}$ (C) $\tan^{-1}\frac{1-A^2}{2A}$ (D) $\tan^{-1}\frac{1+A}{2A}$

(20) In any Triangle ABC, with usual notation $\tan\frac{\gamma}{2}$ =
(A) $\sqrt{\frac{(s-a)(s-b)}{s(s-c)}}$ (B) $\sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$ (C) $\sqrt{\frac{(s-c)(s-a)}{s(s-b)}}$ (D) $\sqrt{\frac{s(s-a)}{bc}}$

| Roll No. | 817 - 27000 | |
|---|---|---|
| Mathematics (Subjective) | Inter-A-2018 | Inter ( Part - I ) |
| Time : 2 : 30 Hours | Session (2014 - 16) to (2017 - 19) | Total Marks : 80 |

Note : It is compulsory to attempt ( 8 – 8 ) parts each from Q.No.2 and 3 while attempt any 9 parts from Q. No.4 . Attempt any (03) questions from Part II. Write same Question No. and its Part No. as given in the question paper.

## Bahawalpur Board-2018

**Part - I** 25 x 2 = 50

Q.No.2 (i) Simplify and justify each step $\frac{4 + 16x}{4}$ by using its properties.

(ii) Separate into Real and Imaginary Parts $\frac{i}{1 + i}$

(iii) Find the Inverse of a relation $\{ (x,y) \mid y = 2x + 3 , x \in \mathbb{R} \}$

(iv) If $A = \begin{bmatrix} 1 & -1 \\ a & b \end{bmatrix}$ and $A^2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find "a" and "b"

(v) Show that $\forall z \in C$, $z^2 + (\bar{z})^2$ is a Real Number.

(vi) If $A = \begin{bmatrix} i & 1 + i \\ 1 & -i \end{bmatrix}$, show that $A + (\bar{A})^T$ is Hermitian.

(vii) Find x , if $\begin{vmatrix} 1 & 2 & 1 \\ 2 & x & 2 \\ 3 & 6 & x \end{vmatrix} = 0$ (viii) Solve $x^3 + x^2 + x + 1 = 0$

(ix) Write two proper subsets of $\{0,1\}$ (x) Construct the truth Table of $P \longrightarrow (p \vee q)$

(xi) When $x^4 + 2x^3 + Kx^2 + 3$ is divided by $x - 2$, the remainder is 1, find the value of K.

(xii) If $\alpha, \beta$ are the roots of $x^2 - px - p - c = 0$, prove that $(1 + \alpha)(1 + \beta) = 1 - c$

Q.No.3 (i) Define Proper Rational Fraction. (ii) Define Harmonic Progression.

(iii) If $a_{n-2} = 3n - 11$, then find nth term of A.P.

(iv) How many terms of the given series $-7 + (-5) + (-3) + \cdots$ amount to 65 ?

(v) Find Vulgar Fraction Equivalent to $1 \cdot \dot{3}\dot{4}$

(vi) Write values of : (i) $\sum_{K=1}^{n} K$ and (ii) $\sum_{K=1}^{n} K^3$

(vii) Find the value of " n " if ${}^{n}P_4 : {}^{n-1}P_3 = 9 : 1$

(viii) Find the number of Diagonals of 6-Sided Figure.

(ix) By using Mathematical Induction show that

$$1 + \frac{1}{2} + \frac{1}{4} + \cdots\cdots + \frac{1}{2^{n-1}} = 2\left(1 - \frac{1}{2^n}\right)$$ is true for n = 1 and n = 2

(x) Find 6th term in the Expansion of $\left(x^2 - \frac{3}{2x}\right)^{10}$

(xi) Using Binomial Theorem, find the value of $\frac{1}{\sqrt[5]{252}}$ to three places of Decimals.

(xii) Let $S = \{1,2,3,\cdots 9\}$ ; Event $A = \{2,4,6,8\}$ ; Event $B = \{1,3,5\}$; Find $P(A \cup B)$

Q.No.4 (i) Find the Radius of the Circle in which the arms of a Central Angle of Measure 1 radian cut off an Arc of length 35 cm.

(ii) Show that $\cos(\alpha + \beta)\cos(\alpha - \beta) = \cos^2\alpha - \sin^2\beta$

(iii) A ladder leaning against a vertical wall makes an angle of $24^\circ$ with the wall. Its foot is 5 m from the wall. Find its length.

(iv) If $\alpha, \beta, \delta$ are the angles of a Triangle ABC, then prove that $\cos\left(\frac{\alpha + \beta}{2}\right) = \sin\frac{\delta}{2}$

(v) Evaluate $\frac{\tan\frac{\pi}{3} - \tan\frac{\pi}{6}}{1 + \tan\frac{\pi}{3}\tan\frac{\pi}{6}}$ (vi) With Usual Notations show that $\frac{1}{r} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3}$

(vii) Write any two laws of Tangents (viii) Define Period of a Trigonometric Function.

(ix) Prove that $\frac{2\tan\theta}{1 + \tan^2\theta} = 2\sin\theta\cos\theta$ (x) Prove that $\frac{\sin 8x + \sin 2x}{\cos 8x + \cos 2x} = \tan 5x$

P.T.O.

(xi) Evaluate without using Calculator $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

(xii) Solve the Equation $\cos x = -\frac{1}{2}$

(xiii) Find the Solution of $\text{Cot}\,\theta = \frac{1}{\sqrt{3}}$ which lies in $[\,0, 2\pi\,]$



## Part - II

Q.No.5 (a) Let A , B , C are any non - empty sets, then show that (5)

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C).$$

(b) Define Rank of a Matrix and find Rank of given Matrix : (5)

$$\begin{bmatrix} 1 & -1 & 2 & -3 \\ 2 & 0 & 7 & -7 \\ 3 & 1 & 12 & -11 \end{bmatrix}$$

Q.No.6 (a) Use Synthetic Division to find the values of p and q if $x + 1$ and $x - 2$ are the factors of the Polynomial $x^3 + px^2 + qx + 6$ (5)

(b) Resolve $\frac{2x^4}{(x-3)(x+2)^2}$ into Partial Fractions. (5)

Q.No.7 (a) Find " n " so that $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ may be the Arithmatic Mean ( A.M.) between " a " and " b " (5)

(b) Prove by Mathematical Induction that for all positive integral values of " n " (5)

$$\frac{1}{3} + \frac{1}{3^2} + \text{---------} + \frac{1}{3^n} = \frac{1}{2}\left[1 - \frac{1}{3^n}\right]$$

Q.No.8 (a) Prove that : (i) $(\text{Sec}\,\theta + \tan\theta)(\text{Sec}\,\theta - \tan\theta) = 1$

(ii) $(\cos^2\theta - \sin^2\theta) = \frac{1 - \tan^2\theta}{1 + \tan^2\theta}$ (5)

(b) Show that ( without using calculator ) $\cos 20^\circ \cos 40^\circ \cos 80^\circ = \frac{1}{8}$ (5)

Q.No.9 (a) Show that $r_3 = 4R \cos\frac{\alpha}{2} \cos\frac{\beta}{2} \sin\frac{\gamma}{2}$ with usual notations of $\triangle ABC$ (5)

(b) Prove that $\tan^{-1}\left(\frac{3}{4}\right) + \tan^{-1}\left(\frac{3}{5}\right) - \tan^{-1}\left(\frac{8}{19}\right) = \frac{\pi}{4}$ (5)