



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Second Semester – 2019

Roll No.

Paper: Elementary Mathematics-I (Algebra)

Course Code: MATH-111 / MTH-12107 Part – I (Compulsory)

Time: 2 Hrs. 30 Min. Marks: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2. Short Questions.

(10x2=20)

1. Define complex number
2. Factorize $9a^2 + 16b^2$
3. Find the inverse of the relation and check whether it is a function or not by diagram
 $\{(1, 2), (2, 5), (3, 4), (2, 1), (5, 4)\}$
4. Define function with example.
5. If $A = \begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}$ show that $A^4 = I_2$
6. The sum of a positive number and its square is 380. Find the number.
7. By remainder theorem find remainder when $x^2 + 3x + 7$ is divided by $x + 1$.
8. If 5 and 8 are two arithmetic means between a and b . Find a & b .
9. If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in G.P then show that common ratio = $\pm \sqrt{\frac{a}{c}}$
10. Prove that $\sin^2\theta + \cos^2\theta = 1$

Q.3. Long Questions.

(3x10=30)

1. Solve by Cramer rule
 $2x - 3y + 4z = -12, \quad x - 2y + z = -5, \quad 3x + y + 2z = 1$
2. a). Solve: $4^{1+x} + 4^{1-x} = 10$
b). If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in A.P then show that common difference = $\frac{a-c}{2ac}$
3. a) Expand the following upto 4 times, taking the values of x such that the expansion is valid $(2 - 3x)^{-2}$
b). Prove that : $\sin^2\frac{\pi}{6} + \sin^2\frac{\pi}{3} + \sin^2\frac{\pi}{4} = 2$





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Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer cutting and overwriting is not allowed. (10x1=10)

1. Consider the sets $A = \{a, b, c, d, e\}$, $B = \{1, 2, 3, 4, 5\}$ Then $A - B$ is ----

- a) \emptyset
- b) B
- c) A
- d) None of these

2. If $\begin{pmatrix} a & -b \\ b & a \end{pmatrix}$ is invertible under matrix multiplication then its inverse is-----

- a) $\begin{pmatrix} a & -b \\ b & a \end{pmatrix}$
- b) $\frac{1}{a^2+b^2} \begin{pmatrix} a & -b \\ b & a \end{pmatrix}$
- c) $\frac{1}{a^2+b^2} \begin{pmatrix} a & b \\ -b & a \end{pmatrix}$
- d) $\frac{1}{a^2-b^2} \begin{pmatrix} a & -b \\ b & a \end{pmatrix}$

3. The product of cube root of unity is

- a) 1
- b) 2
- c) 3
- d) 0

4. For any two non-singular matrices A and B , $(AB)^{-1} = ?$

- a) $A^{-1}B^{-1}$
- b) $B^{-1}A^{-1}$
- c) AB
- d) BA

5. Every recurring non terminating decimal is a number.

- (a) Rational
- (b) Irrational
- (c) Real
- (d) None of these

P.T.O.

6. The conjugate of $-2 + 3i$ is

- a) $2 - 3i$
- b) $2 + 3i$
- c) $-2 + 3i$
- d) $-2 - 3i$

7. An infinite geometric series is convergent if

- a) $r > 1$
- b) $r < 1$
- c) $r = 1$
- d) Both b and c

8. Which of the following cannot be the term of a harmonic progression?

- a) 0
- b) 1
- c) 2
- d) 3

9. The middle term of the expansion $(1 + 2x)^6$

- a) 3rd term
- b) 4th term
- c) 5th term
- d) 2nd term

10. $1 + 2 + 3 + 4 + \dots + n = ?$

- a) n
- b) $\frac{n(n+1)}{2}$
- c) $\frac{n(n+1)(n+2)}{6}$
- d) n^2