FIRST QUARTERLY TEST AUGUST 2024

CLASS : I PUC **SUBJECT : MATHEMATICS (35)** **Max. Marks : 40**

TIME : 1 Hr. 30 Mins

PART-A

I Answer all the multiple choice questions: **7x1=7**

1) The interval for of $\{x : x \in R, 0 \leq x < 7\}$

A) [0, 7) B) [0, 7] C) (0, 7] D) (0, 7)

2) If $A = \{1, 2\}$, $B = \{3, 4\}$, then $A \times (B \cap \phi) =$

A) A B) B C) $A \cap B$ D) ϕ

3) The degree measure of $\frac{5\pi}{3}$ is

A) 150° B) 300° C) 240° D) 110°

4) The value of cos (15°) is

A) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ B) $\frac{1-\sqrt{3}}{2\sqrt{2}}$ C) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ D) $\frac{2\sqrt{2}}{\sqrt{3}+1}$

5) The value of sin (765°) is

A) 1 B) $1/\sqrt{2}$ C) $-1/\sqrt{2}$ D) $\sqrt{3}/2$

6) If $\cot x = -5/12$, x lies in second quadrant, then the value of secx is

A) $13/5$ B) $\frac{-13}{5}$ C) $5/13$ D) $-5/13$

7) The value of $1/i^4$ is

A) i B) $-i$ C) 1 D) 0

II Fill in the blanks by choosing the appropriate answer from those given in the bracket:

$[-11 \quad \sqrt{2} \quad 0 \quad 1]$ **3x1=3**

8) If $A = \phi$ then the number of subsets of A are _____.

9) A function f is defined by $f(x) = 2x - 5$ then the value of $f(-3)$ is _____.

10) The modulus of the complex number $(1 - i)$ is _____.

PART-B

IV Answer any THREE of the following : **3x2=6**

11) If $\left(\frac{x}{3}+1, y-\frac{2}{3}\right) = \left(5/3, 1/3\right)$. Find the values of x and y.

12) If the arcs of the same lengths in two circles subtend angles 65° and 110° at the centre. Find the ratio of their radii.

13) Find the value of $\sin\left(\frac{31\pi}{3}\right)$

(PTO)

14) Prove that $\cos\left(\pi/4 + x\right) + \cos\left(\pi/4 - x\right) = \sqrt{2}\cos x$

15) Find the multiplicative inverse of $(2-3i)$

PART-C

V Answer any THREE questions : **3x3=9**

16) If U = {1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {2, 4, 6, 8} and B = {2, 3, 5, 7} then show that $(A \cup B)' = A' \cap B'$.

17) Determine the domain and range of the relation R defined by
R = {(x, x + 5) : x∈ {0, 1, 2, 3, 4, 5}}

18) If f, g : R→R be defined, respectively by f(x) = x + 1 g(x) = 2x−3.

Find (f + g) (x), (f−g)(x) and $\left(f/g\right)(x)$

19) Prove that $\sin 3x = 3\sin x - 4\sin^3 x$.

20) Express the complex number $\left(1/3 + 3i\right)^3$ in the form of (a + ib).

PART D

VI Answer any THREE questions of the following : **3x5=15**

21) Define modulus function. Draw the graph of the function. Write the domain and the range of the function.

22) Define the signum function. Draw the graph of the function. Write the domain and the range of the function.

23) Prove that $\cos^2 x + \cos^2\left(x + \pi/3\right) + \cos^2\left(x - \pi/3\right) = 3/2$

24) Prove Geometrically cos (x + y) = cosx cosy − sinx siny.

25) Prove that $\dfrac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$.

*****