SECTION-A

Answer all questions. Each question carries one Mark. **(5 × 1 = 5)**

Note: Write the answers in orderly at one place

1. *If* $(1+i)^{100}=2^{49}(x+iy)$, then $x^2+y^2=$
   A) 0 B) 2 C) 4 D) 16
2. *Which of the following statements is /are correct ?*
   I) If $Z=1+i\sqrt{3}$, then $|ArgZ| + |Arg\bar{Z}| = \frac{2\pi}{3}$
   II) $1, \omega, \omega^2$ *are cube roots of unity then* $(1+\omega-\omega^2)^5 + (1-\omega+\omega^2)^5 = -32$
   A) *Only I* B) *Only II*
   C) *Both I & II* D) *Neither I nor II*
3. *If* $a = cis\alpha, b = cis\beta$ *then* $\frac{1}{2}\left(ab + \frac{1}{ab}\right) =$
   A) $sin(\alpha+\beta)$ B) $cos(\alpha+\beta)$
   C) $2cos(\alpha-\beta)$ D) $sin(\alpha-\beta)$
4. *If* α, β *are the roots of equation* $x^2 - 4x + 5$, then the quadratic equation whose roots are $\alpha^2+\beta$ *and* $\alpha+\beta^2$ is
   A) $x^2 - 5x + 17$ B) $x^2 - 10x - 34$
   C) $x^2 - 10x + 17$ D) $x^2 - 10x + 34$
5. *Which of the following is True ?*
   A) Multiplicative Inverse of (3,4) is $(\frac{3}{25}, \frac{4}{25})$
   B) The value of $(1+i)^{16} = 256$
   C) If $3 < x < 4$, then the value of $x^2 - 7x + 12$ *is* positive
   D) The minimum value of $x^2 - 8x + 17 \; \forall \; x \in R$ *is* 2.

SECTION-B

Answer any two of the following questions. **(2 × 5 = 10)**

6. a) If $x + iy = \frac{3}{2+cos\theta+isin\theta}$, *then show that* $x^2 + y^2 = 4x - 3$ **3M**

   b) If $Z = x + iy$ and the point P represents Z in the Argand Plane and $Arg\left(\frac{Z-1}{Z+1}\right) = \frac{\pi}{4}$, then find the Locus of P. **2M**
7. If $cos\alpha + cos\beta + cos\gamma = 0 = sin\alpha + sin\beta + sin\gamma$, then prove that
   $cos^2\alpha + cos^2\beta + cos^2\gamma = \frac{3}{2} = sin^2\alpha + sin^2\beta + sin^2\gamma$ **5M**
8. a) Solve $2x^4 + x^3 - 11x^2 + x + 2 = 0$ **3M**

   b) If x is real, then Prove that $\frac{x}{x^2-5x+9}$ lies between $\frac{-1}{11}$ *and* 1. **2M**

End of the Question paper