

Sessional Examination 2021

BSc 1st Semester

Subject: Mathematics (H)

Paper MAT-HC-1026: Algebra

Marks: 30, Time 1 hour

Answer any six questions

5×6=30

1. State and prove De Moivre's theorem.
2. If $x + \frac{1}{x} = 2 \cos \theta$, then show that $x^n + \frac{1}{x^n} = 2 \cos n\theta$. 2+2
3. Express the following complex numbers in polar form:
(i) $2 + 2\sqrt{3}i$ and (ii) $-5 + 5i$. 3
4. Find all the 5th root of unity.
5. Prove that for any three sets A, B and C
(i) $A \cap (B - C) = A \cap B - A \cap C$.
(ii) $A \times (B \cap C) = (A \times B) \cap (A \times C)$.
6. If a function $f : A \rightarrow B$ is one one and onto then $f^{-1} : B \rightarrow A$ is also one one and onto.
7. If A be any $n \times n$ square matrix then prove that $A(\text{adj}A) = |A|I = (\text{adj}A)A$.
