



الاسم كاملا باللغة العربية

Mid-Term Exam (10/25) + Academic Assignments (15/25)

Mid-Term Exam of Discrete Math (BSD-103)

Module-A

Module-A

First Question (10 Marks)

- ① Use mathematical induction to show that $x^{2n} - y^{2n}$ is divisible by $(x + y)$ for $n = 1, 2, \dots$

- ② For the relation R on $X = \{1, 2, 3, 4\}$ defined by the rule $(x, y) \in R, x + 1 \leq y$.

① Find the relation R ② Give the graphical representation
 ③ Give the matrix representation of R ④ Identify that if R is reflexive, symmetric or transitive.

Second Question (15 Marks)

① Prove that if x^2 is even, then x is also even.

② Let $S_n = \{2k(n + 1)^2 \mid k = 1, 2, 3\}$, find $\bigcup_{n=1}^3 S_n$.

③ Simplify the following statement: $(p \wedge q) \vee (p \wedge \bar{q}) \vee (\bar{p} \wedge \bar{q})$ by using logical equivalence rules.