

Mid-West University
Examinations Management Office
End Semester Examination 2081

Bachelor level/ BIT/ 1st Semester

Time: 3 hours

Subject: Discrete Mathematics (BIT413)

Full Marks: 60

Pass Marks: 30

Candidates are required to give their answer in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Very short answer questions (Attempt all)

[8x2 = 16]

1. Define Tautology with suitable example.
2. Define domain and co-domain of a function.
3. An Office building contains 27 floors and has 37 offices on each floor. How many offices are there in the building?
4. State Binomial Theorem.
5. What do you mean by multi-graph?
6. Define Sample Space in Discrete Probability.
7. What do you mean by Reflexive Relation?
8. Define Degree of Vertex with suitable example.

Group B

Short answer questions (Attempt Any Five)

[5x4 = 20]

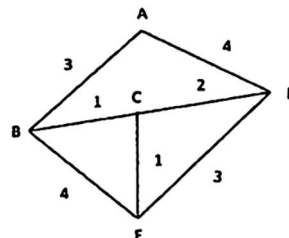
9. Use Mathematical induction to prove that $n^3 - n$ is divisible by 3 whenever n is a positive integer.
10. Show that : $\binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \dots + \binom{n}{n} = 2^n$.
11. Using direct proof prove that if n is an odd integer, then n^2 is an odd integer.
12. Use prime factorization method to find the gcd of 12 and 30.
13. Let $F(x, y): x=y+6$. Find the truth value of $F(1,5)$ and $F(6,0)$.
14. Find the coefficient of the term, containing y^8 in the binomial expansion of $(x+3y^2)^{17}$.

Group C

Long answer questions (Attempt Any Three)

[3x8 = 24]

15. What do you mean by recurrence relation? Solve the recurrence relation $a_n = 5a_{n-1} - 6a_{n-2}$ for $n \geq 2$, $a_0 = 1$ and $a_1 = 0$.
16. What is cryptography? Explain public key cryptography with example.
17. Determine by using Rules of Inference whether the argument is valid or not. If Ram is human, then Ram is mortal. Ram is Human. Therefore, Ram is mortal.
18. Define Minimum Spanning Tree. Show how Prim's algorithm can be used to find a minimum spanning tree for following Graph.



The End