GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

ROLL NO:	

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 20 %   Max Marks: 40   Max Time: 1 hr.   Tuesday, 25^{th} September 2018

TEST - 1

Odd Semester 2018-2019   Course: **CSE 203 Discrete Mathematics**   III Sem CSE

Instructions:

i. Write legibly
ii. Scientific and non-programmable calculators are permitted

---

Answer all the questions

Part A

(3 Q x 4 M = 12 Marks)

1. Show that **(¬p→ (p → q))** is a tautology, where **p, q, r** are propositions?
2. Obtain the **DNF** of **(¬ p ↔ ¬ q).**
3. If **A = {p, q, r}**, **B = {a, b}**, then find **A×B and B×A.**

Part B

(2 Q x 8 M = 16 Marks)

4. Show that **¬(p** V (¬ **p** ∧ **q)**) is logically equivalent to **(¬q ∧ ¬p)**
5. Define a bijection and determine whether the function f(x) = x^2 from the set of integers to the set of integers is a bijection.

Part C

(1 Q x 12 M = 12 Marks)

6. Show that the premises "If a triangle has two equal sides, then it is isosceles"
"If a triangle is isosceles, then it has two equal angles."
"A certain triangle ABC does not have two equal angles" imply the conclusion "A certain triangle ABC does not have two equal sides".

ROLL NO:

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

TEST 2

Odd Semester: 2018-19
Course Code: CSE 203
Course Name: Discrete Mathematics
Branch & Sem: CSE & III Sem

Date: 28 November 2018
Time: 1 Hour
Max Marks: 40
Weightage: 20%

Instructions:

(i) ***Write legibly***

(ii) ***Scientific and non-programmable calculators are permitted***

Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3x4=12)

1. Show that the open interval (0, 1) is uncountable.
2. Explain in detail that how many functions are there from a set with m elements to a set with n elements?
3. How many bit strings of length four do not have two consecutive *1*s?

Part B

Answer **all** the Questions. **Each** question carries **eight** marks. (2x8=16)

4. Define principle of mathematical induction and Use mathematical induction to prove that $(n^3 - n)$ *is* divisible by 3 whenever n is a positive integer.

5. Define primitive recursive function. Also prove that the Multy-Prod function f: N × N → N such that f (x,y) = x y is primitive recursive.

Part C

Answer the Question. Question carries **twelve** marks. (1x12=12)

6. State Chinese remainder theorem and find all solutions to the system of congruences $x \equiv 2 \ (mod\ 3)$, $x \equiv 3 \ (mod\ 5)$ and $x \equiv 2 \ (mod\ 7)$.

Roll No.

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Odd Semester: 2018-19 | **Date**: 29 December 2018

Course Code: CSE 203 | **Time**: 2 Hours

Course Name: Discrete Mathematics | **Max Marks**: 80

Programme & Sem: CSE & V Sem | **Weightage**: 40%

Instructions:

(i) Write legibly

(ii) Scientific and non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. How many bit strings of length 12 contain (i) exactly three 1s (ii) atmost four 1s?
2. State the generalized Pigeonhole principle. Also find the minimum number of students required in a class to be sure that at least six will receive the same grade, if there are six possible grades O, A, B, C, D, and F?
3. Define an Equivalence relation and verify whether the relation R={(1,1),(1,2),(2,1),(2,2),(3,3)} in A={1,2,3} is an equivalence relation?
4. Find the reflexive closure and symmetric closure of the relation R = {(a, a), (a, c), (b, c)} in A = {a, b, c}.

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. (3Qx10M=30)

5. How many permutations of the letters ABCDEFG contains

   (i) the string *BCD*

   (ii) the strings *BA* and *GF*

   (iii) the strings *ABC* and *DE*

   (iv) the strings *ABC* and *CDE*

   (v) the string *CBA* and *BED.*

6. Define a recurrence relation and find the solution to the recurrence relation $a_n = 6\,a_{n-1} - 11\,a_{n-2} + 6\,a_{n-3}$ with the initial conditions $a_0 = 2$, $a_1 = 5$, and $a_2 = 15$.

7. Define a lattice and draw the Hasse diagram for the poset (A, /) where

A= {2, 4, 5, 10, 12, 20, 25} and '/ 'denotes 'divides'.

Part C

Answer **any two** Questions. **Each** question carries **fifteen** marks. (2Qx15M=30)

8. (a) How many solutions does the equation $x_1 + x_2 + x_3 + x_4 = 11$ have, where x_1, x_2, x_3, x_4 are non-negative integers?

   (b) How many ways are there to put four different employees in to three indistinguishable offices, when each office can contain any number of employees?

9. Define a Boolean algebra. Prove that (P(X), ⊆) is a Boolean algebra where X = {a, b, c}.

10. Prove that in any Boolean algebra, if a ∧ x = a ∧ y, a ∨ x = a ∨ y then x = y.