ROLL NO.	

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 80 | Max Time: 120 Mins | Weightage: 40 %

ENDTERM FINAL EXAMINATION

I Semester AY 2017-18 | Course: **CSE 203 DISCRETE MATHEMATICS** | 21 DEC 2017

Instructions:

i. Write legibly

ii. Scientific and non-programmable calculators are permitted

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Part A

[4 Q x 5 M= 20 Marks]

1. How many bit strings of length eight either start with a 1 or end with the two bits 00?
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 five possible grades ,A,B,C, D, and F?
3. State Chinese Remainder theorem. Also find the inverse of 3 modulo 7.
4. Find the zero-one matrix of the transitive closure of the relation R where $M_R = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix}$

Part B

[3 Q x 10 M= 30 Marks]

5. 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 $a_2 = 15$.
6. Show that the relation R = $\{(a,b) |\ a \equiv b\ (mod\ m)\}$ is an equivalence relation on the set of integers, where $m > 1$ is any positive integer.
7. Define a Lattice and draw the Hasse diagram of lattice (P(A),⊆) where A ={a,b,c}.

Part C

Answer any two questions **[2 Q x 15 M= 30 Marks]**

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

(b) How many ways are there to pack six copies of the same book into four identical boxes, where a box can contain as many as six books?

9. Show that the poset (D_{30}, /) is a Boolean algebra, where D_{30} is the set of all positive divisors of 30 and / denotes divides.

10. Prove that D' Morgan's laws holds in distributive lattice.

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Max Marks: 40 Max Time: 60 Mins Weightage: 20 %

TEST 2

I Semester 2017-2018 Course: **CSE203 Discrete Mathematics** 25 OCT 2017

Instructions:

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

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Answer all the questions

Part A

(3Q x 4 M= 12 Marks)

1. Define one-one function and determine whether the function f(x) = x^2 from the set of integers to the set of integers is one-one.?
2. Let f,g be the functions from the set of integers to the set of integers defined by f(x) = 2x+3 and g(x) = 3x+2 .What is the composition of f and g? What is the composition of g and f?
3. State the division Algorithm. What are the quotient and reminder when **-11** is divisible by **3**?

Part B

(2 Q x 8 M= 16 Marks)

4. Show that the set of real numbers is an uncountable set.
5. Define primitive recursive function and prove that the addsum function f: N × N → N such that f (x,y) = x + y is primitive recursive. .

Part C

(1 Q x 12 M= 12 Marks)

6. Use mathematical induction to prove that (n^3- *n) is* divisible by 3 whenever n is a positive integer.

PRESIDENCY UNIVERSITY, BENGALURU
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Max Marks: 40 Max Time: 60 Mins Weightage: 20 %

TEST 1

I Semester 2017-2018 Course: **CSE203 Discrete Mathematics** 20 SEPT 2017

Instructions:

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

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Answer all the questions

Part A

(3Q x 4 M= 12 Marks)

1. Find the truth value of **(p→(q→r))** where **p, q,r** are propositions with truth values **F,T,T** respectively?
2. Obtain the **CNF** of **(p↔q).**
3. If **A = {1, 2, 3}**, **B = {a, b**}, then find **A×B.**

Part B

(2 Q x 8 M= 16 Marks)

4. By using truth table, show that **(p→q)** is logically equivalent to **(¬q → ¬p)**
5. Prove that $(A \cup B)^c = A^c \cap B^c$ by using set notations.

Part C

(1 Q x 12 M= 12 Marks)

6. Show that the premises "A student in the class has not read the book" and "Everyone in this class passed the first exam" imply the conclusion "Someone who passed the first exam has not read the book".