Minor/Mid-Term Examination- ONLINE MODE
(Non - CBCS)
B.Tech CSE/IT 3rd SEM
(November, 2020)

Subject Code: BCS-201	Subject: Discrete Mathematics

Time: 1 Hour	Maximum Marks: 30

Note: Q. 1 is compulsory. Attempt any one question from the rest.

Q1		(5*3=15)

(a) Let P= $\{(x, y, z) \in R^3: x+2y-2z+17=0\}$ and L= $\{(2t+1, 3t-6, 4t+3): t \in R\}$. Show that L is a proper subset of P.

(b) Define R on Z as xRy if x-y is a multiple of 3. Show that this is an equivalence relation.

(c) prove by induction that
$$3+11+\ldots\ldots\ldots\ldots.+(8a-5)= 4a^2-a$$

Q2		(7.5+7.5=15)

(a) Show that the set F of all real numbers of the type $a + \sqrt{2}b$ where a and b are rational is a FIELD under addition and multiplication.

(b) Show that the set of all positive divisors of a positive integer N denoted by Dn is a complete, distributive lattice under the partial order defined as a≤b if a is a divisor of b. Also find the maximum and minimum element of this lattice.

Q3		(7.5+7.5=15)

(a) Show that the set S= $\{1,2,3\ldots\ldots\ldots10\}$ is a POSET with respect to the relation defined as mRn if n is a multiple of m. Draw its HASSE DIAGRAM. Find out the Upper bound, Lower Bound, Supremum and Infimum for the obtained structure (HASSE Diagram).

(b) In any Group prove that
    (i) $(a * b)^{-1} = b^{-1} * a^{-1}$
    (ii) identity element and inverse for an arbitrary element is always unique.

Declaration of the Paper Setter

I have followed these instructions during paper setting with best of my knowledge

a. No direct questions such as definitions, comparisons, diagrams etc has been given where the student can use the book/ online resources directly to answer the question and

b. Ensured that each and every question is verified through google and the same is not directly available and

c. Ensured that the paper covers entire syllabus, all the questions are un- ambiguous, as per the format and followed university norms for setting up the question paper.

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Declaration of the departmental Moderation Committee

The above paper is moderated and followed above guidelines
Name of the HoD:
Name of the Faculty1:
Name of the Faculty2: