**MCA (LE) IIIRD SEMESTER SESSIONAL EXAMINATION, OCTOBER 2017**

**SUBJECT NAME: DISCRETE MATHEMATICAL STRUCTURE**

**Duration: 1:30 hr. Max Marks: 50**

**Section A**

**(Short Answer Type) 5 questions of 10 marks each (any 3) 30**

1. If R={(a, b), (b, c), (c, a)}, Determine R+ and R\*.

2. Prove that fog=gof, if f(x) =$ e^{x}$ and g(x) =$ log\_{e}x$

3. Prove by Mathematical Induction 12 + 32 + 52 + ….. + (2n-1)2=$\frac{n\left(2n+1\right)(2n-1)}{3}$

4. Explain binary relation and equivalence relation with properties.

5. Define Pigeon-hole principle and counting principle with example

**Section B**

**(Long Answer Type) 2 questions of 20 marks each (any 1) 20**

1. Let Universal set U={ All the small letter alphabets}, A={a, e, i, o, u}, B={a, b, c, d, e}. Determine the following:

A∪B, B∪A, A∩B, B∩A, A-B, B-A, A’, B’ and AxB.

2. Relation R={(a, b):a, bϵI} and a-b is divisible by 3 is an equivalence relation then determine equivalence classes.

3. Prove by Mathematical Induction $\sum\_{k=1}^{n}\frac{1}{k(k+1)}$=$\frac{n}{(n+1)}$

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