**II BE Computer Engineering**
**Class Test-II May 2021**
**CER4C1 Discrete Structures**

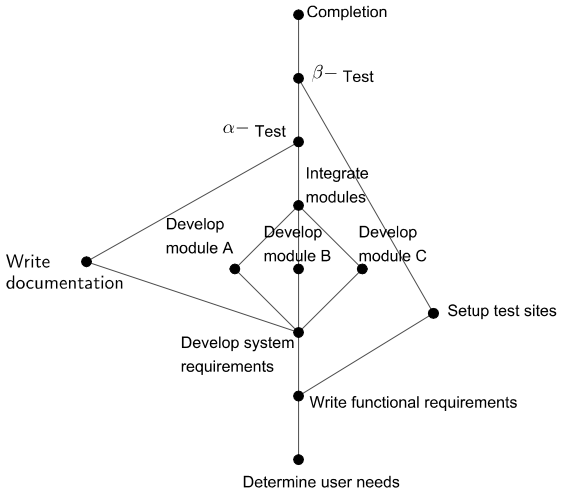
**Time-70 Mins.** **Maximum Marks [20]**
**Note-Attempt all the questions.**

Q.1 **(*a*)** Show how the given data

**125454, 625271, 372569, 845166, 714635,**
**207832, 143572, 482487, 132686, 172028.**

would be inserted in the order given in initially empty cells numbered from **0** to **12** using the hashing function $h(x) = x \pmod{13}$ where $x$ is the absolute value of the difference of the numbers formed by last three digits and the first three digits of the data. Use the usual collision resolution policy to resolve collision, if occurs. **[3]**

**(*b*)** Find an ordering of the tasks of a software project if the Hasse diagram for the tasks of the project is as shown- **[2]**




Q.2 **(*a*)** Show using strong induction that any integer greater than **1** is divisible by a prime number. **[3]**

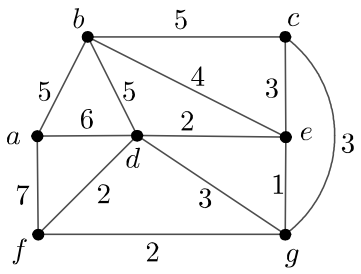
**(*b*)** **5** integers are chosen from **15** to **35** inclusively. How many disjoint non-empty subsets of the chosen integers can we find such that all give the same sum of elements? **[2]**

Q.3 Prove that the set $\boldsymbol{C}$ of complex numbers is a ring with respect to ordinary addition and multiplication. Also prove that it is a commutative. **[5]**

Q.4 **(*a*)** Use Huffman coding to encode the following symbols with the frequencies as follows- **[2]**

$\boldsymbol{A : 0.08 \quad B : 0.10 \quad C : 0.12 \quad D : 0.15 \quad E : 0.20 \quad F : 0.35}$

**(*b*)** Use Prim's algorithm to find a minimum spanning tree for the given weighted graph- **[3]**

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