Time: 03 Hours **Marks: 80**

Note: 1. Question 1 is compulsory

2. Answer any three out of the remaining five questions.

3. Assume any suitable data wherever required and justify the same.

Q1 a) Explain how big data problems are handled by Hadoop system. [5]

b) Mention four characteristics of big data and explain in detail. [5]

c) List and explain the core business drivers behind the NoSQL movement. [5]

d) Explain the concept of bloom filter with an example. [5]

Q2 a) What is graph store? Give an example where a graph store can be used to effectively solve a particular business problem. [10]

b) Write a map reduce pseudo code for word count problem. Illustrate with an example showing all the steps. [10]

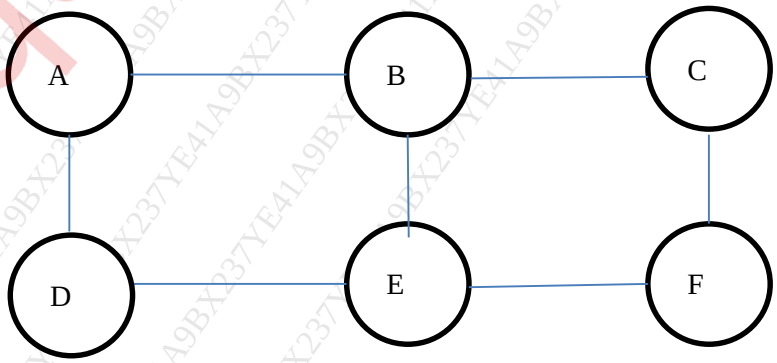
Q3 a) Suppose the stream is S = {4, 2, 5 ,9, 1, 6, 3, 7}. Let hash functions h(x) = 3x + 7mod 32 for some a and b, treat result as a 5-bit binary integer. Show how the Flajolet- Martin algorithm will estimate the number of distinct elements in this stream. [10]

b) Describe applications of data visualization. [10]

Q4 a) Explain selection and projection relational algebraic operation using MapReduce. [10]

b) Explain DGIM algorithm for counting ones in a stream with example. [10]

Q5 a) Determine communities for the given social network graph using Girvan- Newman algorithm. [10]



b) Consider the following data frame given below: [10]

course	id	class	marks
1	11	1	56
2	12	2	75
3	13	1	48
4	14	2	69
5	15	1	84
6	16	2	53

i. Create a subset of course less than 5 by using [ ] brackets and demonstrate the output.

ii. Create a subset where the course column is less than 4 or the class equals to 1 by using subset () function and demonstrate the output.

Q6 a) i. Write a script to create a dataset named data1 in R containing the following text. [10]

Text: 2, 3, 4, 5, 6.7, 7, 8.1, 9

ii. Explain the various functions provided by R to combine different sets of data.

b) Describe collaborative filtering in recommendation system. [10]
