Duration: 3hrs **[Max Marks:80]**

N.B.: (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

			Marks
Q1.		Attempt **any four**	
	a.	What is a block header? How are blocks linked in blockchain?	5
	b.	Enumerate the interoperability and scalability issues in Hyperledger fabric.	5
	c.	Explain Simplified Payment Verification Nodes. What is the Privacy solution for SPV nodes?	5
	d.	List the different advantages and disadvantages of ICO.	5
	e.	What is nonce in blockchain and how does it work?	5
Q2.	a.	What is a Blockchain fork? Differentiate between soft fork and hard fork.	10
	b.	Describe the various projects covered under Hyperledger umbrella projects.	10
Q3.	a.	Discuss the different challenges addressed by blockchain in the Energy sector.	10
	b.	Differentiate between Bitcoin blockchain and Ethereum Blockchain.	10
Q4	a.	Explain bitcoin mining with the help of a neat diagram.	10
	b.	Explain different List and explain the parts of EVM memory.	10
Q5.	a.	What is an ERC20 token? Explain the steps to create ERC20 tokens.	10
	b.	With the help of a suitable diagram explain the life-cycle of a smart contract in Ethereum.	10
Q6		Write short notes on **(any 4)**	20
	a.	Key features of blockchain	
	b.	EOA and contracts address	
	c.	UTXO in Bitcoin	
	d.	Stock Trading Offering	
	e.	Channels in Hyperledger Fabric	

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[3 hours] **[80 Mks]**

NB : 1) Question 1 is compulsory.
2) Attempt any three questions from the remaining questions.
3) Assume suitable data wherever applicable.

1 Solve any four out of following 20

(a) Explain what characteristics of social media makes it suitable for Big Data.

(b) Explain the collaborative filtering based recommendation system.

(c) What are three Vs of Big Data? Give two examples of big data case studies. Indicate which Vs are satisfied by these case studies.

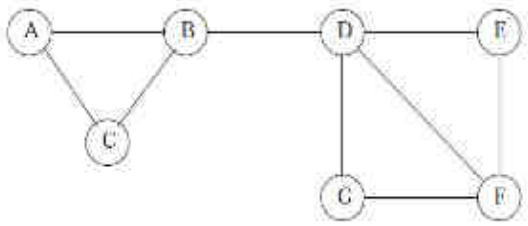
(d) Explain CAP theorem and explain how NoSQL systems guarantees BASE property.

2 (a) Explain the distributed storage system of Hadoop with the help of a neat diagram.. 10

(b) Discuss Matrix-Matrix Multiplication. Perform Matrix Multiplication with 1-step Map Reduce method. 10

$$\begin{matrix} 1 & 2 \\ 3 & 4 \end{matrix} \quad * \quad \begin{matrix} 5 & 6 \\ 2 & 3 \end{matrix}$$

3 (a) For the graph given below use Clique percolation and find all communities 10



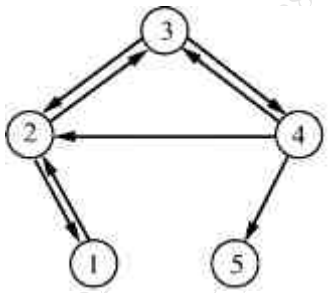
(b) Give two applications for counting the number of 1's in a long stream of binary values. Using a stream of binary digits, illustrate how DGIM will find the number of 1's. 10

4 (a) Explain Grouping and Aggregation algorithm using MapReduce. Support your answer with a suitable example. 10

(b) Explain the types of NoSQL data stores and their typical usage. 10

5 (a) Explain clearly with diagrams the PCY method of finding frequent itemsets (pairs) in a large data set. 10

(b) Recall HITS algorithm. Generate Hub and Authority score after 2 iterations for the graph given here. 10



6 (a) Suppose a data stream consists of integers 1,3,5,4,6,1,5,9,3,2. Let the hash function used be: 10

i) h(x)= x+1 mod 16

ii) h(x)= 2x+3 mod 16

iii) h(x) = 3x + 1 mod 16

Show how the Flajolet-Martin algorithm will estimate the number of distinct elements in the stream.

(b) Explain CURE algorithm, clearly stating its advantages over traditional clustering algorithm. 10

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[Time: 3 **Hours]** **[Marks:80]**

N.B: 1. **Questions No. 1 is Compulsory.**
2. **Attempt any three out of remaining Questions.**
3. **Figures to the right Indicate full marks.**

Q.1 Attempt any Four write short notes on **20**

a) Significance of Environment

b) Global Warming

c) Scope of Environment Management

d) EMS certification

e) Forest Act

f) Eco-system and its types

Q.2 a) Discuss on environmental issues related to Indian context. **10**

b) Discuss on Air [P & CP] Act **10**

Q.3 a) Explain limiting factor and food chain as related to ecosystem. **10**

b) Write a note on each. Ozone layer depletion & Acid rain. **10**

Q.4 a) Discuss on corporate environment responsibity. **10**

b) What is sustainable development? What are the parameter effecting it? **10**

Q.5 a) What is ISO-14000? How does adoption of ISO-14000 practices benefits industries as well Environment. **10**

b) Discuss the functions of government as planning and regulatory agency. **10**

Q.6 a) Discuss the Atomic and Biomedical hazards as related to Global environmental concern. **10**

b) Discuss on Total Quality environmental management. **10**

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