

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SECOND SEMESTER EXAMINATION, AUGUST 2021

FIRST YEAR [BATCH 2020-23]

COMPUTER SCIENCE (GENERAL)

Date : 14/08/2021

Time : 11.00 am - 1.00 pm

Paper : II

Full Marks : 50

Group - A

Answer **any one** question of the following :

[1×5]

1. Write down the advantages of DBMS over traditional file system.
2. Compare and contrast between network model and hierarchical model.

Answer **any two** questions of the following :

[2×10]

3. a) Briefly discuss about Lossless and Lossy join decomposition in the context of DBMS.
b) Consider the relation R(ABCDEFGHIIJ) and Functional dependency set $F = \{AB \rightarrow C, B \rightarrow F, D \rightarrow IJ, A \rightarrow DE, F \rightarrow GH\}$ decomposed into $D2 = R_1(ABCDE), R_2(BFGH), R_3(DIJ)$.
Check whether the decomposition D is preserving dependency or not? [(2.5+2.5)+5]
4. a) Describe cardinality ratio in DBMS?
b) Discuss the term
 - i) Natural Join and
 - ii) Division Operation in Relational algebra[5+(2.5+2.5)]
5. a) What do you mean by transitivity dependency and multivalued dependency?
b) Consider a relation R(A, B, C, D, E) with FDs $AB \rightarrow C, AC \rightarrow B, BC \rightarrow A, D \rightarrow E$.
Determine all the keys of relation R. Is the relation R in BCNF? If it is not in BCNF then normalize it into BCNF. [(2.5+2.5)+5]
6. a) Consider the Relation R(PQRSTU) and Functional Dependency set $F = \{P \rightarrow Q, Q \rightarrow R, R \rightarrow S, T \rightarrow U\}$ decomposed into $D = R_1(PQ), R_2(QRS), R_3(STU)$.
Find whether D is Lossless or Lossy?
b) For a relation schema $R = (A, B, C, D, E)$, consider the following set of functional dependencies;
 $F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$
Using the functional dependencies compute the canonical cover F_c . (5+5)

Group - B

Answer **any one** question of the following :

[1×5]

7. a) What is physical topology in networking?
b) What is the difference between half-duplex and full-duplex transmission modes?
c) What is the difference between physical addressing and logical addressing? (1+2+2)
8. a) What is the difference between connection-oriented and connectionless network service?
b) What is the difference between virtual circuit and datagram? (2+3)

Answer **any two** questions of the following :

[2×10]

9. a) Why do we need a DNS system when we can directly use an IP address?
b) What is the advantage of a hierarchical name space over a flat name space?
c) What do you mean by “Message Integrity” and “Message Nonrepudiation”?
d) What is “Cryptography”?
e) State the disadvantages of Mesh topology? [1.5+2+(1.5+1.5)+1.5+2]
10. a) Find the netid and hostid of 132.57.8.6.
b) Find the class of IP address 208.35.54.12.
c) Which class address is used for multicast communication?
d) What are the restrictions applied on the uses of classless addressing?
e) Which layers in TCP/IP suite are used for datagram switching and virtual-circuit network?
f) What do you mean by “Service-point addressing”? (1+1+1+3+2+2)
11. a) What are the different types of routing table in network service? State their characteristics.
b) State the difference between subnetting and super-netting with suitable example.
c) What is CIDR?
d) State the task of NAT?
e) What do you mean by unicast address? (3+3+1+2+1)
12. a) What are the different phases of mail transfer?
b) State the working principle of MTA in SMTP.
c) “FTP differs from Client/Server architecture” – Justify it.
d) What is URL?
e) State the differences between SMTP and HTTP. (1.5+3+2.5+1+2)

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