DBMS

1. Define : DBMS
2. Write down four characteristics of the Database approach.
3. What do you mean by DA and DBA ? How they differ ? What are the major functions performed by DBA ?
4. Write a note on : End user of DBMS.
5. What are the advantages of DBMS ? What are its disadvantages ?
6. How DBMS differs from traditional file processing system ?
7. What is the difference between controlled and uncontrolled redundancy? Illustrate with example.
8. What do you mean by data model ? What are conceptual data model, physical data model & representational data model?
9. Define schema & instance with example. What is meta data & data dictionary?
10. Describe three schema architecture / ANSI-SPARC architecture of DBMS.
11. What do you mean by data independence ? Explain Physical and logical data-independence with examples.
12. Define : DDL, SDL, VDL, DML, procedural & non-procedural DML, host language, sub language with examples.
13. What are the components of DBMS ?
14. Differentiate between Relational, Hierarchical and Network model.
15. What do you mean by object-relational model.
16. Differentiate between single user & multiuser DBMS, Homogeneous & Heterogeneous DBMS, general purpose and special purpose DBMS.
17. What is mean by OLTP ?
18. What do you mean by distributed database ?
19. Define : relation, domain, attributes, tuples, degree, cardinality.
20. Why tuples in a relation are not ordered ?
21. Why duplicate tuples are not allowed in a relation ?
22. What do you mean by database constraint ? What do you mean by domain constraint ?
23. Define : primary key, candidate key, super key, alternate key, foreign key with examples.
24. What do you mean by entity intrigrity and referential integrity ?
25. What do you mean by trigger ? How can it be used to enforce integrity?
26. Why do we designate one of the candidate key as primary key ?

27. Describe the fundamental relational-algebric operations with example.
28. Describe Intersection, Natural-Join, Division operations with example. Show that these operations are not fundamental operations.
29. Differentiate between equi-Join & natural join with example.
30. Describe theta join, left outer, right outer and full outer join with examples.
31. What is union compatibility?
32. In what sense does relational algebra differ from relational calculus and in what sense are they similar?
33. How tuple relational calculus differ from domain relational calculus?
34. What is Embaded SQL?
35. SQL is DDL or DML? Explain with examples.
36. Show that SQL is relationally complete.
37. Why do we normalize database?
38. What do you mean by normalization?
39. Discuss insertion, deletion and update anomaly with examples.
40. Discuss the problem of spurious tuples and how we may prevent it?
41. What is functional dependency?
42. Is it possible to derive functional dependency from a given instance?
43. What is meant by closure of a set of functional dependency? Illustrate with example. How the closure can be determined?
44. When two sets of functional dependencies are equivalent? How can we determine their equivalence?
45. What is minimal set of functional dependency? Does every set of dependency have minimal equivalent state? Is it always unique?
46. What does the term unnormalized relation refer to? What are the steps of normalization?
47. Define 1NF. What are its disadvantages? How these disadvantages can be removed using 2NF?
48. Define 2NF. What are its disadvantages? How these can be removed using 3NF?
49. Define 3NF. What are its disadvantages? How these can be removed using BCNF?
50. Define BCNF. How it differs from 3NF? "BCNF is stronger than 3NF"— justify.
51. Discuss the NULL value and dangling tuple problems.
52. What is MVD?
53. What do you mean by dependency preservation property of a decomposition? Why is it important?

55. Write the inference rules for functional dependency (reflexive, transitive, augmentation, decomposition, union/additive, pseudotransitive rule) and prove them.

56. What is trivial & non trivial dependency?

57. Write Armstrong's inference rule.

58. How lossless Join decomposition can be tested?

59. How dependency preservation can be tested?

60. How primary key / candidate key of a relation be determined?

61. Suppose that we decompose the schema R (A, B, C, D, E) into R1 (A, B, C) and R2 (A, D, E). Is this lossless decomposition if $\{A \to BC, CD \to E, B \to D, E \to A\}$ are the FDs? Is R1 (A, B, C) and R2 (C, D, E) decomposition is loss less?

62. List all FDs satisfied by the relation:

A	B	C
a_1	b_1	c_1
a_1	b_1	c_2
a_2	b_1	c_1
a_2	b_1	c_3.

63. Compute the closure of the following set F of FDs. List the candidate keys.

$F = \{A \to BC, CD \to E, B \to D, E \to A\}$

64. Consider a relation R (A, B, C, D, E) with FDs $\{AB \to C, CD \to E, DE \to B\}$ Is AB is Candidate Key? If not, is ABD? Explain.

65. Consider the following two sets of FDs: $F = \{A \to C, AC \to D, E \to AD, E \to H\}$ and $G = \{A \to CD, E \to AH\}$. Check whether they are equivalent.

66. Consider the relation $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the set of FDs $F = \{AB \to C, A \to DE, B \to F, F \to GH, D \to IJ\}$. What is Candidate key of R? Decompose R upto 3NF. If the FDs are $F = \{AB \to C, BD \to EF, AD \to GH, A \to I, H \to J\}$, then decompose R upto 3NF.

67. Consider the relation Book (title, Author, type, price, author_affiliation, publisher) with FDs $F = \{$ title → publisher, type; type → price; Author → author_affiliation $\}$. Normalize upto 3NF.

68. Consider the relation R (supplier_id, supplier_name, city, PIN, product_id, product_name, color, weight, quantity, project_id, project_name) with FDs $F = \{$ supplier_id → supplier name, city; city → PIN; product_id → product_name, color, weight; project_id → project_name; supplier_id, product_id, project_id → quantity $\}$. Decompose upto 3NF.

69. How minimal set of FD can be determined? Is {A → D, E → H} minimal? If not find minimal set. Is G = {A → CD, E → AH} minimal? If not find minimal set.

70. Define: Entity & Entity set.

71. What are the difference between simple and composite, single valued and multivalued attribute, stored versus derived attribute.

72. What is Derived attribute? What is complex attribute?

73. What are the different interpretation of NULL values?

74. Discuss different mapping cardinalities with examples.

75. What do you mean by participation constraint and existence dependency?

76. Discuss concept of weak entity with examples.

77. Write short note on: specialization and generalization. How they differ?

78. Discuss the concept of aggregation with two examples.

79. Explain the differences between entity, entity type and entity set.

80. What do you mean by fixed length record? What are its disadvantages? How can these be removed using variable length record? What are the different techniques for implementing variable length record?

81. Explain Heap file organization with advantages & disadvantages.

82. Explain sequential file / sorted / ordered files with its merits & demerits.

83. Explain multitable clustering file organization with its advantages and disadvantages.

84. Explain internal and external hash file organization.

85. What do you mean by primary, secondary and cluster indexing.

86. Explain concept of sparse and dense index with examples. State their relative advantages & disadvantages.

87. What do you mean by multilevel indexing? What is hash indexing.

88. Differentiate between static and dynamic hashing?

89. Differentiate between ordered indexing and hash indexing.

90. What is the difference between a file organization and an access method?

91. Why can we have one primary index but several secondary indexes?

92. What is inverted file? What is index sequential file.

93. How can hashing be used to construct an index? What is the difference between logical and physical index.

94. Discuss on: Authorization, Authentication, Digital signature, non-repudiation, privacy, encryption, privilage, Database threats, integrity, availability, confidentiality.

95. What do you mean by database security.