

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIFTH SEMESTER EXAMINATION, DECEMBER 2015

THIRD YEAR [BATCH 2013-16]

COMPUTER SCIENCE [Hons]

Date : 14/12/2015

Time : 11 am – 3 pm

Paper : V

Full Marks : 100

[Use a separate Answer Book for each Group]

Group - A

Answer any four questions

1. a) Design an E-R diagram for an university registration system. You must take consideration of students enrolled, course name, course duration, examination, faculty in each course, result in each course. Result statistics should be modelled as derived attributes. [7]
b) Give the difference between traditional file management system and database system. [3]
2. a) Consider the following relation schemes :
 $R(A,B) \text{ \& } T(B,C)$.
Now express the 'Left-outer join' operation using basic relational algebra operations. [4]
b) Consider the following expression :
 $\{t \mid \text{Not (Employee (t))}\}$
Is this a safe expression? Justify your answer. [2]
c) Explain the drawbacks of Hierarchical model. Show how Network model overcomes these drawbacks? [2+2]
3. a) Consider a relation schema $R(A, B, C, D, E, H)$ on which the following functional dependences hold : $\{A \rightarrow B, BC \rightarrow D, E \rightarrow C, D \rightarrow A\}$. What are the candidate keys of R ? [3]
b) Write an algorithm to calculate the minimal cover of a set of functional dependencies F that holds on the relational schema R . [5]
c) What do you mean by dangling tuple? When does it occur? [2]
4. a) What is "Referential Integrity"? Explain with example? [3]
b) Explain the statement "BCNF is stronger than 3NF" with example. [4]
c) Critically comment on the statement "SQL is relationally complete". [3]
5. a) Suppose that a file is ordered by its key field Eid which has length of 4 bytes. A primary index on Eid to be constructed. Assume that the block size (B) is of 572 bytes, the block pointer (P) is of 6 bytes and record pointer (R) is of 7 bytes. The file contains 30,000 records and each record size of 50 bytes.
i) Calculate the number of levels needed if a multilevel index is made. [6]
ii) What will be the number of records in the highest level? [1]
b) Explain the concept of 'design by analysis' procedure using suitable illustration. [3]
6. a) Consider the following relation schema : $R(A, B, C, D, E, F, G, H)$ along with following dependencies $F = \{A \rightarrow B; B \rightarrow C; C \rightarrow D, E; F \rightarrow G, H\}$. Normalize the above relation into highest normal form. [7]
b) Explain the concept of extendible hashing in brief. [3]

Group - B

Answer any one question :

[1×5]

7. Explain different arithmetic operation (Instruction) available in 8085 microprocessor with example.
8. Write short note on Foldback Memory.

Answer **any three** questions :

[3×10]

9. a) Give the difference between I/O mapped I/O and Memory mapped I/O. [5]
b) Write an ALP to find the sorted list of a series of numbers. [5]
10. a) Explain difference between a Load and Store instruction with example of 8085 instruction. [5]
b) Explain different addressing modes present in 8085 with example. [5]
11. a) Explain handshaking mode of data transfer in 8255. [4]
b) Compare DMA interrupt with other hardware interrupts. [4]
c) What is meant by priority of interrupts? [2]
12. a) Discuss interrupt driven mode of data transfer with a flow chart. [5]
b) Draw and explain the timing diagram of LDA. [4]
c) What are W and Z registers? [1]
13. a) Explain the operation of instruction queue residing in BIU of 8086. [4]
b) Describe flags of 8086. [4]
c) What is the role of $\overline{MN}/\overline{MX}$? [2]

Group - C

Answer **any one** question :

[1×5]

14. a) What is function point metric? [2]
b) Why is function point important? [3]
15. What are the disadvantages of waterfall model over other models? [5]

Answer **any two** questions :

[2×10]

16. a) Explain the difference between “Bath Tub Curve” and “Software life Curve”. [3]
b) Explain the term “Software Crisis”. [3]
c) Give some examples of Software Project where we can use “Waterfall model”, “Prototype model”, “Spiral Model” and “Iterative Enhancement Model” and why? [4]
17. a) Write a short note on “Data Dictionary”. [5]
b) List only five desirable characteristics of a good software requirements specification document. [2]
c) What do you mean by the terms cohesion and coupling in the context of software design? How are these concepts useful in arriving at a good design of a system? [2+1]
18. a) What are the three different types of project estimation techniques? [3]
b) Describe about the Expert Judgement Technique, with its short comings. [3]
c) What do you mean by software reuse? [2]
d) What are the different types of system testing? [2]
19. a) Draw the structure chart for the RMS calculating software, where the software would read three integral numbers from user in the range of –100 and 100 and would determine the root mean square of three input numbers and display it. [3]
b) What are the different system views that can be modelled using UML? [4]
c) Draw the control flow graph of the function to compute the greatest common divisor of two numbers. Also find the basis paths. [2+1]

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