

Con. 3104-10.

AN-2914

(3 Hours)

[Total Marks : 100

## Mobile Computing

N.B.: (1) Question No. 1 is compulsory.

(2) Attempt any four from remaining six.

(3) Support your answer with diagrams.

(4) Figures to the right indicate full marks.

(5) All questions carry equal marks.

1. (a) Draw the block diagram of FHSS transmitter and receiver. Differentiate between slow hopping and fast hopping. 10
- (b) Why routing in ad-hoc network is complicate? What are the challenges? 10
2. (a) Explain Bluetooth protocol stack with neat diagram. 10
- (b) Explain HIPERLAN 2 basic structure and handover scenario. 10
3. (a) Explain IP packet delivery to/from mobile host. 10
- (b) Explain system Architecture of GSM. 10
4. (a) Write in detail about Indirect TCP including its merits & demerits over S-TCP & M-TCP. 10
- (b) Explain DECT system architecture reference model and protocol architecture. 10
5. (a) Explain power management in IEEE 802.11. 10
- (b) Explain WATM reference model with several access scenarios. 10
6. (a) Explain Digital Video Broadcasting and Audio broadcasting. 10
- (b) Explain IP-in-IP encapsulation and minimal encapsulation along with differences. 10
7. write short notes on any **two** of the following: 20
  - a) IPv4 Vs. IPv6
  - b) CDMA
  - c) WAP protocol stack.

(3 Hours)

[ Total Marks : 100

- N.B.** (1) Question No. 1 is **compulsory**.  
(2) Attempt any **four** out of remaining **six** questions.  
(3) **All** questions carry **equal** marks.

1. (a) Define the term MIS. Define role of MIS in a business organization. 10  
(b) Explain evaluation and maintenance of MIS. 10
  2. (a) Explain in detail classification of MIS. 10  
(b) Explain the decision making process using Simon's model. 10
  3. (a) Write a note on detailed system design. Give all the steps involved in detail system design. 10  
(b) What do you mean by CRM ? What is the need for CRM ? Explain the working and advantages of CRM. 10
  4. (a) Discuss MIS application in service industry with an example. 10  
(b) Explain the model of Information System Planning with a block diagram. 10
  5. (a) What are the different attributes that affect the quality of information. 10  
(b) Explain with the help of a block diagram how MIS can provide support to the management process. 10
  6. (a) What is an ERP ? What are the hidden costs involved in ERP ? What are the major implementation issues in ERP ? 10  
(b) Explain how DSS can be useful in the service industry with an example. 10
  7. Write short notes on any **two** of the following :— 20
    - (a) Procurement Management System
    - (b) Benefits of I. T. to MIS
    - (c) Expert Systems.
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I.P.

Con. 3450-10.

AN-2912

(3 Hours)

[Total Marks : 100]

Image processing

- N.B. :** (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** questions from remaining **six** questions.  
 (3) Assume **suitable** additional data if **required**, state and justify the assumptions made.

1. (a) Poorly illuminated images are difficult ones to be segmented, explain. **4**  
 (b) Write the physical significance of orthogonality. What is the difference between orthogonality and orthonormality? Give an example of orthogonal representation. **4**  
 (c) State whether following statement is **True** or **False** and justify the same : **4**  
 (i) Homomorphic filter does brightness range compression and contrast enhancement simultaneously.  
 (ii) The entropy of an image is maximized by histogram equalization.  
 (d) How many unique Huffman codes are there for a three symbol source? **4**  
 Construct them.

2. (a) Gray level histogram of an image is given below. Perform histogram equalisation **10**  
 and draw original and new equalised histogram.

<b>Grey level rk</b>	0	1	2	3	4	5	6	7
<b>No. of Pixels nk</b>	410	690	1340	2510	3010	1490	550	0

- (b) Apply slant transform and DCT transform on the given image and compare the result. **10**

$$F(x, y) = \begin{matrix} 4 & 4 & 4 & 2 \\ 1 & 2 & 2 & 1 \\ 4 & 8 & 8 & 4 \\ 1 & 1 & 1 & 1 \end{matrix}$$

3. (a) Generate the Huffman code for the following sentence **10**  
 'CSK WILL WIN'  
 Calculate entropy of the source, average length of the code generated and efficiency of code.

- (b) (i) The compass gradient operators of size 3x3 are designed to measure gradient of edge oriented in eight directions : E, NE, N, NW, W, SW, S and SE. Give the form of these eight operators. Specify the gradient direction of each mask also. **7**  
 (ii) Segment the given image using split and merge technique. Choose appropriate threshold value :— **3**

3 5 3 8  
 7 72 13 80  
 71 70 6 7  
 69 10 1 10

[ TURN OVER

- 4. (a) Explain Homomorphic filtering in detail. 5
- (b) Write short note on Image compression standards. 5
- (c) Consider an 8 Pixel line of grey scale data {10, 11, 15, 13, 15, 57, 54, 51} 10  
 which has been uniformly quantized with 6 bit accuracy. Construct its 3 bit IGS code. Compute the rms error for the decoded IGS code.
  
- 5. (a) What are LoG and DoG ? How do you compute them ? How are they used ? 10
- (b) (i) Define the unitary transformation used to compute forward and inverse 6  
 2D DFT.  
       (ii) Write short note on Fourier Descriptors. 4
  
- 6. (a) Given a 3x3 mask for – 10  
       (i) Low pass filter       (ii) High pass filter.  
 Using these masks operate on following 5x5 image find output images of size 5x5

8	10	17	25	28
12	14	23	30	20
16	19	26	20	17
20	29	24	18	16
29	24	20	17	12

- (b) (i) Explain the basic difference between transform coding based on discrete 5  
 Fourier transform and discrete cosine transform.  
       (ii) Explain in short any four properties of 2D DFT. 5
  
- 7. (a) Explain with example the boundary extraction (4 point and 8 point connected 10  
 boundary) using morphological operators.  
 (b) Explain what is meant by 'Zooming of a digital image.' Does it increase the 4  
 information content of a image ?  
 (c) Explain the relevance of segmentation in following areas : 6  
       (i) Satellite images  
       (ii) Biological images  
       (iii) Robotics.

8    5    4    5  
 05   17   17   1  
 1    6   07   17  
 05   1   07   10

Con. 3109-10.

c.s &amp; m.

AN-2908

(3 Hours)

[ Total Marks : 100

*Computer Simulation & Modelling*

N.B. : (1) Question No. 1 is compulsory.

(2) Attempt any four questions out of the remaining six questions.

1. (a) Define the following :- 10
- |                    |                |
|--------------------|----------------|
| (i) Clock          | (vi) Event     |
| (ii) Event notice  | (vii) System   |
| (iii) Delay        | (viii) Model   |
| (iv) Bootstrapping | (ix) Entity    |
| (v) List           | (x) Attribute. |
- (b) Give the input parameters, simulation variable, and output statistics for the 10 queuing system. Calculate the output statistics for the queuing system whose interarrival and service times for ten arrivals are given below :-
- |                     |                     |
|---------------------|---------------------|
| Interarrival time : | 8 6 1 8 3 8 7 2 3   |
| Service time :      | 4 1 4 3 2 4 5 4 5 3 |
2. (a) (i) The time intervals between dial-up connections to an Internet service provider are exponentially distributed with a mean of 15 seconds. Find the probability that the third dial-up connection occurs after 30 seconds. 5
- (ii) Determine the variance of the triangular distribution. 5
- (b) Explain the world views for developing a model. 10
3. (a) Describe useful statistical models employing discrete and continuous distributions. 10
- (b) (i) Explain the concept of Network of Queues. 5
- (ii) Explain the two properties of a Poisson process. 5
4. (a) (i) Explain the concept of Network of Queues. 5
- (ii) Explain the two properties of a Poisson process. 5
- (b) Which problems are characteristic of pseudo random numbers ? Why ? 10  
How are random numbers generated ?

[ TURN OVER

5. (a) Explain and give the algorithms to generate the AR(1) and EAR(1) time series models. **10**
- (b) Records pertaining to the monthly number of job-related injuries at an underground coal mine were being studied by a federal agency. the values for the past 100 months were as follows :- **10**

Injuries per month	Frequency of observations
0	35
1	40
2	13
3	6
4	4
5	1
6	1

- (i) Apply the chi-square test to these data test the hypothesis that the underlying distribution is Poisson.
- (ii) Apply the chi-square test to these data test the hypothesis that the underlying distribution is Poisson with mean 1.0.

Use a level of significance of  $\alpha = 0.05$  and  $(\chi_{0.05,2})^2 = 5.99$ ,  $(\chi_{0.05,3})^2 = 7.81$ .

6. (a) What do you understand by calibration and validation of models ? How can one increase the face validity of a model and validate the model assumptions ? **10**
- (b) Explain the following with examples :- **10**
- (i) Terminating simulation
  - (ii) Non-terminating simulation.

7. Write short notes on any two :-

- (a) Advantages and Disadvantages of Simulation
- (b) Inverse Transform Technique
- (c) Features of Simulation Software
- (d) Metamodeling.

**20**

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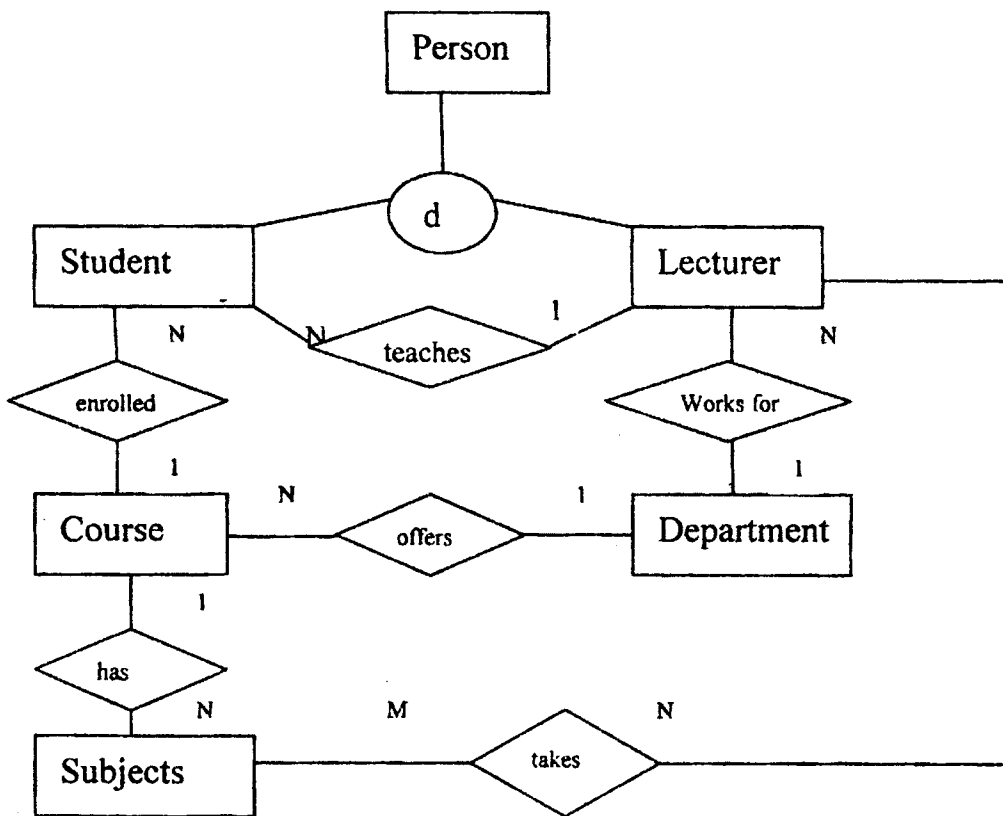
TURN OVER

Advanced Database Systems (3 Hours)

[Total Marks : 100

- N.B. : (1) Question No. 1 is compulsory.  
 (2) Attempt any four question from Question Nos. 2 to 7.

- 1 (a) What are the enhancements that distinguish the EER Model from the ER Model? What are the constraints on Specialization and Generalization? 10  
 (b) The entity type PERSON has three subtypes: ENGINEER, ARCHITECT, SECRETARY. Draw a separate EER Diagram segment for each of the following situations 10
1. At a given time, a person must be exactly one of these subtypes.
  2. A person may or may not be one of these subtypes. However a person who is one of these subtypes cannot at the same time be one of these other subtypes.
  3. A person may or may not be one of these subtypes. On the other hand a person may be any two or even three of these subtype at the same time.
  4. At a given time, a person must be at least one of these subtypes.
- 2 (a) Write an ODL Schema for the given EERD:- 12



- (b) i) Retrieve the names of all students who completed a particular course. 08  
 ii) Retrieve the names of all lecturers in a computer engineering department.  
 iii) Retrieve the names and the subjects taught by each lecturer.  
 iv) Retrieve the number of students enrolled in a specific year say 2005.

- 3 (a) Explain SQL3 features with examples. 10
- (b) Compare and contrast relational and object relational data models. 10
- 4 (a) What are the different approaches to storing XML documents? 10
- (b) What is the difference between structured, semistructured and unstructured data? What do you understand by the term self-describing data? 10
- 5 (a) Explain with examples the different types of data fragmentations 12
- (b) What problems are encountered in maintaining the concurrency control and recovery in a distributed DBMS environment? 8
- 6 (a) What are the differences between valid time, transaction time, bitemporal relations. 10
- (b) Explain in brief the design and implementation issues for mobile databases 10
- 7 Write short notes(Any four):- 20
- (a) X-Path
- (b) Complex Objects
- (c) Type constructors in OODBMS
- (d) Persistence
- (e) Superclass/Subclass.

