

CBCS SCHEME

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18SFC/LNI/SCE/SCS/SCN/SSE/SIT/SAM11

First Semester M.Tech. Degree Examination, Dec.2018/Jan.2019 Mathematical Foundation of Computer Science

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Perform one iteration of the Bairstow method to extract a quadratic factor of the form $x^2 + px + q$ from the equation $x^3 + x^2 - x + 2 = 0$. Use initial approximations $P_0 = -0.9$ and $q_0 = 0.9$. (10 Marks)
- b. Using Jacobi method, find all the eigen values and the corresponding eigen vectors of

$$A = \begin{pmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{pmatrix} \quad (10 \text{ Marks})$$

OR

- 2 a. Find all the roots of the polynomial $x^4 - x^3 + 3x^2 + x - 4 = 0$ using Graeffe's root squaring method. (10 Marks)
- b. Transform $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & -1 \\ 3 & -1 & 1 \end{pmatrix}$ to tridiagonal form by Given's method. (10 Marks)

Module-2

- 3 a. Psychological tests of intelligence and of engineering ability were applied to 10 students. Here is a record of ungrouped data showing intelligence ratio (IR) and engineering ratio (ER). Calculate the co-efficient of correlation. (10 Marks)

Student	A	B	C	D	E	F	G	H	I	J
IR	105	104	102	101	100	99	98	96	93	92
ER	101	103	100	98	95	96	104	92	97	94

- b. Fit a second degree parabola $y = a + bx + cx^2$ to the following data. (10 Marks)

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

OR

- 4 a. The two regression equations of the variables x and y are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.5x$. Find i) Mean of x's ii) Mean of y's iii) the correlation coefficient between x and y. (10 Marks)
- b. Fit curve of the form $y = ax^b$ to the given data. (10 Marks)

x	350	400	500	600
y	61	26	7	26

Module-3

- 5 a. Explain i) Discrete random variable ii) Continuous random variable. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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- b. Five dice were thrown 96 times and the numbers 1, 2 or 3 appearing on the face of the dice follows the frequency distribution as below :

No. of dice showing 1, 2 or 3	5	4	2	1	0	3
Frequency	7	19	24	8	3	35

Test the hypothesis that the data follows a binomial distribution. Given that $X_{0.05}^2 = 11.07$ for 5 df. (10 Marks)

OR

- 6 a. The probability density function of a variate X is

X	0	1	2	3	4	5	6
P(x)	K	3K	5K	7K	9K	11K	13K

Find K, $P(X < 4)$, $P(X \geq 5)$, $P(3 < X \leq 6)$. (10 Marks)

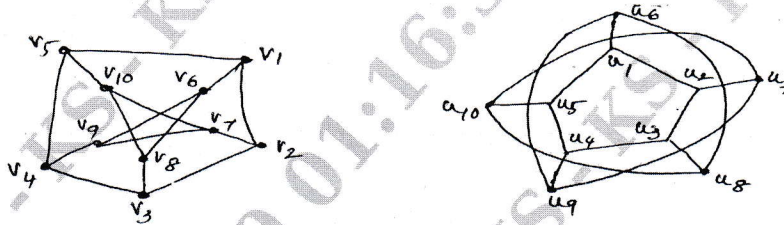
- b. A certain stimulus administered to each of the 12 patients resulted in the following change in blood pressure 5, 2, 8, -1, 3, 0, 6, -2, 1, 5, 0, 4. Can it be concluded that the stimulus will increase the blood pressure? Given that $t_{0.5}$ for 11 df is 2.201. (10 Marks)

Module-4

- 7 a. Define i) Hamilton cycle ii) Hamilton graph iii) Hamilton path. (10 Marks)
 b. Prove that the vertices of every connected simple planar graph can be properly coloured with five colours. (10 Marks)

OR

- 8 a. Find the number of non negative integer solutions of the equation $x_1 + x_2 + x_3 + x_4 = 25$. (10 Marks)
 b. Verify whether the following two graphs are isometric or not. (10 Marks)



Module-5

- 9 a. Verify the vectors $\alpha_1 = (1, 0, -1)$, $\alpha_2 = (1, 2, 1)$ and $\alpha_3 = (0, -3, 2)$ are linearly independent. Also find whether these vectors forms a basis for R^3 ? (10 Marks)
 b. The vectors $\alpha_1 = (1, 2)$, $\alpha_2 = (3, 4)$ are linearly independent and form a basis for R^2 . If a transformation exists from R^2 into R^3 such that $T\alpha_1 = (3, 2, 1)$ and $T\alpha_2 = (6, 5, 4)$, then show that it is linear. (10 Marks)

OR

- 10 a. Let F be a subfield of the complex numbers. Consider the matrix

$$P = \begin{pmatrix} -1 & 4 & 5 \\ 0 & 2 & -3 \\ 0 & 0 & 8 \end{pmatrix}. \text{ Clearly the columns of P, the vectors } \alpha_1^1 = (-1, 0, 0), \alpha_2^1 = (4, 2, 0),$$

$\alpha_3^1 = (5, -3, 8)$ form a basis B of F^3 . Express the coordinates x_1^1, x_2^1, x_3^1 of the vector in the basis B $\alpha = (x_1^1, x_2^1, x_3^1)$ in terms of x_1, x_2, x_3 . Also express $(3, 2, 8)$ in terms of $\alpha_1^1, \alpha_2^1, \alpha_3^1$. (10 Marks)

- b. Find the basis for the eigen space of the linear transformation $T : R^2 \rightarrow R^2$ defined by $T(x, y) = (x + y, y)$. (08 Marks)

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18SCS12

First Semester M.Tech. Degree Examination, Dec.2018/Jan.2019 Advances in Operating Systems

Time: 3 hrs.

Max. Marks: 100

*Note: Answer FIVE full questions, choosing
ONE full question from each module.*

Module-1

- 1 a. List the operating system typical services and explain evolution of operating system. (10 Marks)
- b. With a neat diagram explain the architecture of window vista. (10 Marks)

OR

- 2 a. What is process? Explain two state process and five-state process model. (08 Marks)
- b. Explain security issues in design of operating system. (07 Marks)
- c. Explain the UNIX SVR4 process management. (05 Marks)

Module-2

- 3 a. Explain the key benefits of threads derive from the performance implications. (05 Marks)
- b. Explain the categorization of thread implementation with advantages and disadvantages. (08 Marks)
- c. Explain the benefits of a microkernel organization. (07 Marks)

OR

- 4 a. Write typical memory management formats. (05 Marks)
- b. Explain the operating system policies for virtual memory. (10 Marks)
- c. Explain Linux/UNIX memory management. (05 Marks)

Module-3

- 5 a. Explain design issues of scheduling on a multi processor. (05 Marks)
- b. Explain the proposals for multi processor thread scheduling and processor assignment. (08 Marks)
- c. Explain the unique requirements of the real – time operating systems. (07 Marks)

OR

- 6 a. Explain the popular classes of real-time scheduling algorithms. (08 Marks)
- b. Explain the Linux scheduling. (05 Marks)
- c. Write the comparison of windows/Linux scheduling. (07 Marks)

Module-4

- 7 a. Discuss some of the key characteristics of an embedded operating system. (10 Marks)
- b. What is eCOS? Explain the various eCOS components with help of layered structure architecture. (10 Marks)

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OR

- 8 a. With a neat diagram explain the components of Tiny OS. (10 Marks)
b. List and explain the key categories of malicious software. (10 Marks)

Module-5

- 9 a. Explain the different mechanisms by which a user process can perform IPC using the kernel. (10 Marks)
b. With a neat diagram explain the process and resource management organization in Linux. (10 Marks)

OR

- 10 a. Explain with figure how traps, interrupts and exceptions are handled by the windows NT/2000 organization. (10 Marks)
b. Explain the windows NT trap modules with a block diagram. (10 Marks)

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18SCS13

First Semester M.Tech. Degree Examination, Dec.2018/Jan.2019

Advances in Database Management System

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the schema based constraints in the Relational Model. (10 Marks)
b. Discuss the different types of update operation on a relation. Show an example for the violation of integrity constraints in each of the three types of update operations. (10 Marks)

OR

- 2 a. i) Explain OID and its properties. (02 Marks)
ii) What are types constructors? How can it be used to create a complex object structure? (08 Marks)
b. With an example demonstrate how object behaviour can be specified via class operations. (10 Marks)

Module-2

- 3 a. List and explain the built – in interfaces for collection objects as specified by ODMG object model. (12 Marks)
b. Explain Object Query Language (OQL) proposed by ODMG. (08 Marks)

OR

- 4 a. Explain the steps for mapping an EER schema to an ODB schema. (10 Marks)
b. Explain graphical notations and object database schema for part of UNIVERSITY database. (10 Marks)

Module-3

- 5 a. Explain the various architectures for Parallel Database Systems. Give the motivation for data distribution. (10 Marks)
b. Explain with a neat figure Dataflow network of operations for Parallel Join. (10 Marks)

OR

- 6 a. Explain Fragmentation and Replication in distributed databases. (10 Marks)
b. Explain the Two – Phase Commit Protocol with Presumed Abort. (10 Marks)

Module-4

- 7 a. Explain Multidimensional data model and database design with example. (10 Marks)
b. Explain the architecture of Data warehousing, with a neat diagram. (10 Marks)

OR

- 8 a. Explain the algorithm for finding frequent item sets. (10 Marks)
b. What is a Decision Tree? Explain Decision Tree Induction Schema. (10 Marks)

Module-5

- 9 a. What are Temporal Databases? Explain its types with an example. (10 Marks)
b. Explain the generalized model for Active Databases. Give the syntax for specifying triggers in Oracle system. (10 Marks)

OR

- 10 a. Describe infrastructure based mobile platform, with a neat diagram. (10 Marks)
b. Explain characteristics of Data in GIS. (10 Marks)

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18SCS/SCN14

First Semester M.Tech. Degree Examination, Dec.2018/Jan.2019 Internet of Things

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the characteristics of an object. Discuss classification of objects with a diagram. (10 Marks)
b. Explain IPV6 role in IOT. (10 Marks)

OR

- 2 a. Discuss basic elements of M2M application. (10 Marks)
b. Discuss any four applications of automotives. (10 Marks)

Module-2

- 3 a. Discuss identification of IOT objects and services. (10 Marks)
b. Explain structural aspects of IOT. (10 Marks)

OR

- 4 a. Explain IPV6 routing protocol for RPL ROLL. (10 Marks)
b. List out main features of COAP. Explain the request/response model used by COAP. (10 Marks)

Module-3

- 5 List and explain IEEE 802.15.4 frame formats. (20 Marks)

OR

- 6 a. Draw IPV6 packet format and also explain fields in the IPV6 base header. (10 Marks)
b. Describe QOS capabilities in IPV6. (10 Marks)

Module-4

- 7 a. Explain the smart lighting IOT systems. (10 Marks)
b. Describe smart parking IOT systems. (10 Marks)

OR

- 8 a. Explain the forest fire detection system. (10 Marks)
b. Explain the air pollution monitoring system. (10 Marks)

Module-5

- 9 a. How do you set up Hadoop cluster? (10 Marks)
b. Write a note on Hadoop yarn. (10 Marks)

OR

- 10 a. Write a note on Apache spark. (10 Marks)
b. Describe Apache storm for real time data analysis. (10 Marks)

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18RMI17

First Semester M.Tech. Degree Examination, Dec.2018/Jan.2019

Research Methodology and IPR

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define research. Discuss the objectives of research. (08 Marks)
b. Explain the basic types of research. (12 Marks)

OR

- 2 Describe the various steps involved in scientific research. (20 Marks)

Module-2

- 3 Describe the techniques involved in defining a research problem. (20 Marks)

OR

- 4 a. What is research problem? Explain the need and importance of defining a research problem. (12 Marks)
b. Write a note on review of literature. (08 Marks)

Module-3

- 5 a. What is meant by research design? Briefly explain the important concepts relating to research design. (12 Marks)
b. List the important types of experimental design. (08 Marks)

OR

- 6 a. Discuss the steps involved in developing a sampling design. (08 Marks)
b. List the types of sampling design and explain any two types of sampling design. (12 Marks)

Module-4

- 7 a. Describe the various methods of collecting primary data. (10 Marks)
b. Explain the factors that needs to be considered while selecting an appropriate method for data collection. (10 Marks)

OR

- 8 a. Explain the important steps involved in techniques of interpretation. (08 Marks)
b. Explain the different steps in writing report. (12 Marks)

Module-5

- 9 a. What is meant by intellectual property? Why does intellectual property needs to be promoted and protected? (12 Marks)
b. What are the objectives and purposes behind plant varieties protection law? (08 Marks)

OR

- 10 Write short notes on the following :

- a. Patent
b. Geographical indication
c. Copy right
d. Trade mark

(20 Marks)

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18SCS151

First Semester M.Tech. Degree Examination, Dec.2018/Jan.2019 Advances in Computer Networks

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Why is layering needed in network systems? Explain any 2 (two) features Layering provides. (10 Marks)
- b. With an example discuss protocol graph. (10 Marks)

OR

- 2 a. Illustrate four different scenarios that result from stop and wait protocol. (10 Marks)
- b. Calculate the total time required to transfer a 1.5MB file in the following cases, assuming a RTT of 80ms, a packet size of 1kB data, and an initial $2 \times \text{RTT}$ of "handshaking" before data in sent.
- i) The bandwidth is 10Mbps, and data packets can be sent continuously
 - ii) Bandwidth is 10Mbps, but after we finish sending each data packet we must wait one RTT before sending the next.
 - iii) The link allows infinitely fast transmit, but limits bandwidth such that only 20 packets can be sent per RTT. (10 Marks)

Module-2

- 3 a. List the characteristics of connectionless (datagram's) network layer. (08 Marks)
- b. Define virtual circuit switching. List the entries of a VC table on a single switch. (12 Marks)

OR

- 4 a. Given the extended LAN shown in the Fig Q4(a) below indicate which ports are not selected by the spanning tree. (10 Marks)

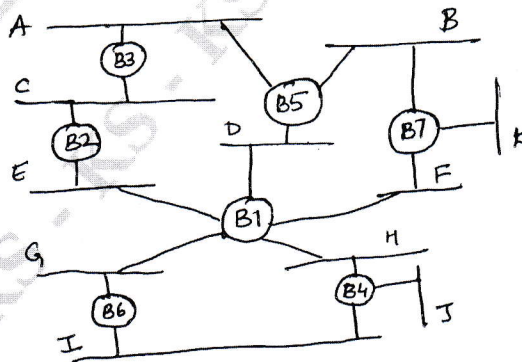


Fig Q4(a)

- b. What is subnetting? Explain classless Inter - Domain Routing. (10 Marks)

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Module-3

- 5 a. For the network given below give global distance vector tables when
- Each node knows only the distances to its immediate neighbors.
 - Each node has reported the information it had in the preceding step to its immediate neighbors.
 - Step (ii) happens a second time.

(10 Marks)

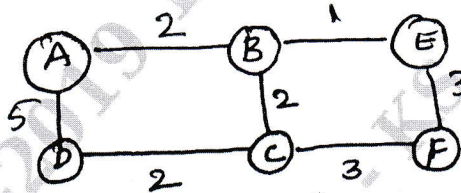


Fig Q5(a)

- b. With a neat diagram, explain IPV6 packet header. (10 Marks)

OR

- 6 a. Explain Interdomain Routing (BGP). (10 Marks)
- b. Give an example of an arrangement of routers grouped into autonomous systems so that the path with the fewest hops from point A to another point B crosses the same autonomous system twice. Explain what BGP would do with this situation. (10 Marks)

Module-4

- 7 a. Discuss TCP header format with a neat diagram. (10 Marks)
- b. Draw a timeline of three way handshake algorithm used by TCP and explain the same. (10 Marks)

OR

- 8 a. Explain Nagle's Algorithm. (12 Marks)
- b. Suppose a congestion control scheme results in a collection of competing flows that achieve the following through put rates ; 200 KBps, 160 KBps, 110KBps, 95 KBps and 150 KBps
- Calculate the fairness index for this scheme
 - Add a flow with through put rate 1000 KBps to above and recalculate fairness index.

(08 Marks)

Module-5

- 9 a. Explain the intuition behind setting $\text{MaxThreshold} = 2 \times \text{Min Threshold}$ in RED gateways. Explain in RED why max threshold is actually less than the actual size of the available buffer pool. (10 Marks)
- b. Define congestion avoidance. Discuss DEC Bit congestion avoidance mechanism. (10 Marks)

OR

- 10 a. With a neat state transition diagram explain IMAP. (10 Marks)
- b. Write note on any two:
- Electronic Mail
 - WWW
 - Name servers.

(10 Marks)
