

T .Y .B .Sc. (I.T.) {SEM –VI}
Internet Technologies (Paper – I)
{ May – 2016 }

QP Code : 26880

(3 Hours)

[Total Marks : 100

- N. B.: (1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labeled diagrams wherever necessary.
(6) Use of Non-programmable calculators is allowed.

1. **Attempt any two of the following:** 10
a. Explain the algorithm used to form shortest path tree with suitable example.
b. What are the services provided by UDP?
c. How does DHCP allocate address dynamically?
d. Explain the format of SNMP PDU format.
2. **Attempt any three of the following:**
a. Describe the functions of the physical layer in the OSI model.
b. State and explain five points of comparison between IPv4 and IPv6.
c. Explain the different kinds of classes along with their network mask for IPv4 addresses
d. State and explain Fragmentation module of IP Package.
e. Explain the transition strategies from IPv4 to IPv6
f. Write a note on Classless addressing.
3. **Attempt any three of the following:** 15
a. Write a note on proxy ARP.
b. What is inefficiency in mobile IP? Give solution for it
c. Explain Timers in RIP.
d. What are the three phases that a mobile host should go through to communicate with the remote host?
e. Explain the source quench message and time exceeded message in ICMPv4.
f. List types of OSPF packets. Explain Hello packet in detail
4. **Attempt any three of the following:** 15
a. Explain Stop-and-wait Protocol and Go-Back-N Protocol in the transport layer.
b. Explain the features of Stream Control Transmission Protocol.
c. Explain Half close in TCP.
d. Explain control block module of UDP with algorithm.
e. A TCP connection is in the ESTABLISHED state. The following events occur one after another:
a. A FIN segment is received.
b. The application sends a “close” message.
What is the state of the connection after each event? What is the action after each Event?
f. Draw and explain state transition diagram of SCTP.
5. **Attempt any three of the following:** 15
a. What are the types of records used in Domain Name System?
b. Explain recursive and iterative resolution in DNS.
c. What data structures FTP uses to transfer a file across data connection?

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- d. What are the types of TFTP messages? What is the purpose of each one?
 - e. Explain the packet format of SSH.
 - f. How do you establish connection in TFTP?
6. **Attempt *any three* of the following:** 15
- a. Explain the format of the response message of HTTP.
 - b. What is the difference between persistent and non-persistent connection of TCP?
 - c. Write a note on POP3.
 - d. What is the concept of SMI in SNMP?
 - e. How to access MIB variables?
 - f. How do you download a compressed audio/video using web server with metafile?
7. **Attempt *any three* of the following:** 15
- a. Write a TCP program to find whether number sent by client is prime or not.
 - b. Write a UDP server code to find factorial of a number
 - c. Explain DatagramPacket class.
 - d. Write a note on TCP programming.
 - e. Write a TCP program to find whether string is palindrome or not.
 - f. Write a UDP server code to find reverse of a string.

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T.Y.B.Sc. (I.T.) {SEM – VI}
Digital Signals and System (Paper – II)
{ May – 2016 }

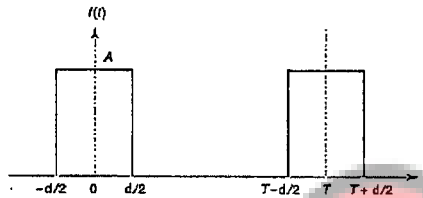
QP Code : 26877

(3 Hours)

[Total Marks : 100

- N. B.: (1) All questions are compulsory.
 (2) Make suitable assumptions wherever necessary and state the assumptions made.
 (3) Answers to the same question must be written together.
 (4) Numbers to the right indicate marks.
 (5) Draw neat labeled diagrams wherever necessary.
 (6) Use of Non-programmable calculators is allowed.

1. Attempt any two of the following: 10
- What are the advantages of digital filters? Explain.
 - Check whether the system given by $F[x(n)] = e^{x(n)}$ is linear or not.
 - How are signals classified? Explain.
 - Deduce the Fourier series for the waveform of a positive going rectangular pulse train shown



2. Attempt any three of the following:
- Determine the Fourier transform of Signum function and plot the amplitude and phase spectra.
 - State any ten properties of unit impulse function $\delta(t)$.
 - What is meant by sampling? State sampling theorem.
 - Write a note on Dirichlet's conditions.
 - With neat labelled block diagram explain how analog signal gets converted into digital signals.
 - Find the Fourier transform for the signal described as

$$f(t) = \begin{cases} 1 & -2 \leq t \leq -1 \\ 2 & -1 \leq t \leq 1 \\ 1 & 1 \leq t \leq 2 \end{cases}$$

3. Attempt any three of the following: 15
- Find the Laplace transform of $\sin at$ and $\sin bt$.
 - Obtain Laplace transform for step and Impulse Responses of a Series R-L Circuit.
 - Discuss final value theorem in Laplace transform domain.
 - Find the laplace transform of
 - $e^{-t} \sin 4t$
 - $e^{2t} + 2te^{-2t} - t^2$
 - Find inverse laplace transform of $F_2(s) = \frac{3e^{-\frac{s}{3}}}{s^2(s^2+2)}$
 - Explain the significance of pole-zero diagram in circuit analysis? How can the time domain response be determined from pole-zero plot?

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4. **Attempt any three of the following:** 15
- What is the condition for z-Transform to exist? Explain.
 - Determine the Z-Transform and the region of convergence of $x(n) = \begin{cases} 2^n & n \geq 0 \\ 0 & n < 0 \end{cases}$
 - Determine the convolution of the two sequences $x(n) = \{2, 1, 0, 0, 5\}$ and $h(n) = \{2, 2, 1, 1\}$
 - Compare the properties of two-sided z-transform with those of one-sided z-Transform
 - Using convolution find $x(n)$ if $X(z)$ is given by:

$$X(z) = \frac{1}{\left(1 - \frac{1}{2}z^{-1}\right)\left(1 + \frac{1}{4}z^{-1}\right)}$$
 - Find $x(n)$ if $X(z) = \frac{z+3}{z^7(z-\frac{1}{2})}$
5. **Attempt any three of the following:** 15
- What is convolution in Linear Time Invariant System? What are the properties of convolution?
 - Check whether the following systems are BIBO stable or not
 - $y(n) = ax(n+1) + bx(n-1)$
 - $y(n) = ax(n).x(n-1)$
 - The output $y(n)$ for an Linear Time Invariant system to the input $x(n)$ is $y(n) = x(n) - 2x(n-1) + x(n-2)$. Compute the magnitude and phase of the frequency response of the system for $|\omega| \geq \pi$
 - Compute the response of the system $y(n) = 0.7y(n-1) - 0.12y(n-2) + x(n-1) + x(n-2)$ to the input $x(n) = nu(n)$
 - What is frequency response? What are the properties of frequency response?
 - Obtain Frequency Response for $y(n) = x(n) + 10y(n-1)$ with initial condition $y(-1) = 0$.
6. **Attempt any three of the following:** 15
- Determine DFT of the sequence $x(n) = \begin{cases} \frac{1}{4} & 0 \leq n \leq 2 \\ 0 & \text{Otherwise} \end{cases}$
 - Define Discrete Time Fourier Transform (DTFT) and Inverse Discrete Time Fourier Transform (IDTFT). Explain the difference between Discrete Fourier Transform (DFT) and Discrete Time Fourier Transform (DTFT).
 - Consider two periodic sequences $x(n)$ and $y(n)$ with period M and N respectively. The sequence $w(n)$ is defined as $w(n) = x(n) + y(n)$. Show that $w(n)$ is periodic with period MN.
 - Obtain $X(k)$ for the sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ using Decimation-in-Time (DIT), Fast Fourier Transform (FFT) Algorithm.
 - Compute Linear and Circular Periodic Convolutions of the sequence $x_1(n) = \{1, 1, 2, 2\}$ and $x_2(n) = \{1, 2, 3, 4\}$ using DFT.
 - Define discrete Fourier transform. Explain any five properties of discrete Fourier transform.
7. **Attempt any three of the following:** 15
- What is an IIR filter? Compare its characteristics with an FIR filter
 - Explain the procedure for designing an FIR filter using Kaiser window.
 - Explain the effects of windowing. Define Rectangular and Hamming window functions.
 - Describe elliptical filters in detail.
 - Write a short note on Chebyshev filters.
 - Write a short note on Butterworth filters.

T .Y .B .Sc. (I.T.) {SEM –VI}
Data Warehousing (Paper – III)
{ May – 2016 }

QP Code : 26882

(3 Hours)

[Total Marks : 100

- N. B.: (1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labeled diagrams wherever necessary.

1. **Answer any two of the following:** 10
a. Explain the term Data Warehouse.
b. What is the importance of metadata in the data warehouse?
c. What are the two common types of transactions in data warehousing?
d. How the data is protected in data warehouse?
2. **Answer any three of the following:** 15
a. Discuss the impact of the data warehouse on business.
b. Discuss the problems related with Federated data warehouse.
c. Discuss the fundamental operating differences between the various sectors in data warehouse.
d. Explain by giving example structured and unstructured data with respect to a data warehouse.
e. What is the significance of referential integrity of the data in the data warehouse?
f. The challenges of incorporating unstructured data with structured data in a data warehouse are many. What are they?
3. **Answer any three of the following:** 15
a. Write a short note on active and passive metadata repositories in a data warehouse.
b. Explain the term Taxonomy related to unstructured data warehouse. What are its types?
c. Explain the role of Total Information Quality Management stream with respect to seven stream approach to data warehouse.
d. What is meant by heuristic analysis of data in a data warehouse?
e. Differentiate data mart and exploration facility with respect to a data warehouse.
f. Explain data profiling and mapping stream in the seven stream approach to data warehouse.
4. **Answer any three of the following:** 15
a. Explain corporate data model with respect to a data warehouse.
b. Write a short note on transformation of data made as data passes from the Application / Interactive sector to the integrated sector?
c. Discuss the relationship between data models and unstructured data.
d. What is the role of data quality monitor in a data warehouse?
e. Why is the Data Warehouse Monitor a standard recommendation for DW 2.0 environment?
f. Write a short note on Dormant data.

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5. **Answer any three of the following:** 15
- a. Differentiate between discrete time-variant data and continuous time span time-variant data.
 - b. How does data flow into the integrated sector of a data warehouse?
 - c. Data flow into near line sector of a data warehouse is considered optional. Why?
 - d. How is the term "Exception-based flow of data" associated with flow of data in a data warehouse?
 - e. Discuss the points to be taken care of when source-to-target mapping of each unit of data has to be done to form a data warehouse.
 - f. Data throughput is a major concern with ETL processing. Justify.
6. **Answer any three of the following:** 15
- a. How Indexing technique helps to improve performance of a data warehouse?
 - b. How is migration of unstructured data different from migration of structured data in a data warehouse?
 - c. Discuss the importance of good online response time to increase the performance of a data warehouse.
 - d. What are the different functions of the granularity manager in a data warehouse?
 - e. Capacity planning puts the organization in a proactive stance when it comes to performance. Justify.
 - f. Parallelisation of processing is a really good way to enhance performance. Justify.
7. **Answer any three of the following:** 15
- a. Write a short note on an optimizing storage.
 - b. Explain with an example Data Clustering.
 - c. What are the techniques to improve the performance of data warehouse?
 - d. What is the advantage of using pilot systems?
 - e. Explain the procedure of loading dimension tables before the fact tables.
 - f. Write a short note on user acceptance procedure.

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T .Y .B .Sc. (I.T.) {SEM –VI}
Elective: Project Management
(Paper – IV) { May – 2016}

QP Code : 26888

(3 Hours)

[Total Marks: 100]

- N. B.: (1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labeled diagrams wherever necessary.
(6) Use of non-programmable scientific calculators is allowed.
- I. Answer any two of the following: 10**
- What are the strategies to make error-free software?
 - Give a brief outline on The Management Artifact Sets.
 - Hi-Tech IT Company is a 50 employee's organization. It has to develop a Project on "Hospitality Management". Company is expert in developing Moderate Sized Projects.
 - State the traits of modern process of development.
- II. Answer any three of the following: 15**
- How can we improve the Team effectiveness?
 - What kind of strategies can be applied to improve Team effectiveness?
 - Explain the generations of Software Development.
 - How can we Reduce the Software Product Size? Explain in detail.
 - Write detail note on Pragmatic Software Cost Estimation.
 - Present the Boehm's Top-10 Software metrics list in Detail.
- III. Answer any three of the following: 15**
- Explain any Five Davi's principles of conventional software management?
 - Write a short note on Technical perspective architecture.
 - Explain the principles of modern software management?
 - Explain Vision Document in Engineering artifact with its structure.
 - Explain the template of business case.
 - For each of the Inception and Transition phase explain following things...
1)Starting & Ending Point 2)Objectives 3)Activities 3)Evaluation criteria
- IV. Answer any three of the following: 15**
- List and Explain the Seven top level software process workflows.
 - Explain the principles of modern software engineering?
 - What is the significance of periodic assessments?
 - Discuss the cost and schedule estimating process.
 - Write a short note on interaction workflows.
 - Define a WBS. Explain the Evolutionary WBS?
- V. Answer any three of the following: 15**
- Which types of Automation tools we can use to automate the seven work flows?
 - Explain the roles, artifacts and responsibilities of the team responsible for planning?
 - Explain in brief about the process automation?
 - Explain the term "software project team evolution".
 - Explain four important environment disciplines of environment evolution.
 - Enlist the set of activities evolved over the life-cycle. Explain the same.

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- VI. Answer any three of the following:** **15**
- a. Describe any Five core metrics for project control and process instrumentation.
 - b. What is scale of the project? Explain different type of projects according to the scale.
 - c. Compare and contrast small-scale and large-scale projects.
 - d. Describe the four quality indicators in detail.
 - e. Describe the seven core metrics for project control and process instrumentation.
 - f. Write detail note on Management Indicators
- VII. Answer any three of the following:** **15**
- a. Enlist the various principles of modern project management.
 - b. Explain a general structure for a cost estimation model IN modern software process.
 - c. What is Early Risk Resolution? How it is carried out in the iterative process as early in the life cycle? Give its advantages.
 - d. Explain in detail the culture shifts in modern process transition.
 - e. What is Early Risk Resolution? Give its advantages.
 - f. How does cost estimation serve as the potential solution for modern software project management? Explain with neat diagram.



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T.Y.B.Sc. (I.T.) {SEM –VI}
Elective: Project Report
(Paper – V) { May – 2016}

QP Code : 26891

(3 Hours)

[Total Marks: 100

- N. B.: (1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
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(4) Numbers to the right indicate marks.
(5) Draw neat labeled diagrams wherever necessary.
(6) Use of Non-programmable calculators is allowed.

1. Attempt any two of the following: 10
- a. Convert the following into degrees
i. $45^{\circ} 15' 45''$ ii. 1745 rad
- b. Describe the four types of map projection by preserved property.
- c. Explain the TIN data model with suitable example.
- d. What is GIS? List and explain the components of GIS.
2. Attempt any three of the following:
- a. You are given the following information on a 30-meter DEM
- UTM coordinates in meters at the lower-left corner: 560635, 4816399
 - UTM coordinates in meters at the upper-right corner: 570595, 4830380
- How many rows does the DEM have? How many columns does the DEM have?
What are the UTM coordinates at the center of the (row 1 column 1) cell?
- b. Explain the difference between vector data model & raster data model.
- c. Explain the State plane coordinate system with suitable example.
- d. Explain the region data model with suitable example.
- e. Explain the following terms with reference to raster data model
i. Cell value ii. Cell Size
- f. Explain Georelational data model in detail.
3. Attempt any three of the following: 15
- a. Explain the bilinear interpolation resampling method with suitable example.
- b. What are the two types of field data? Explain.
- c. What is the role of control points in Affine transformation? Give suitable example.
- d. Explain the concept of scanning.
- e. Explain the methods used to convert the existing data into format compatible with GIS package.
- f. Explain the following terms
i. COGO ii. Geometric Transformation
4. Attempt any three of the following: 15
- a. Write five commonly used data classification methods.
- b. Explain the two types of attribute table.
- c. Explain
i. Dot map ii. Choropleth map
- d. List different types of relationships used in relational database. Give example of each.
- e. Define following
i. Map design ii. Layout iii. Transparency iv. Contrast v. Chroma
- f. Write a short note on Map Production.

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5. Attempt *any three* of the following:

15

- a. What is the output of the following for a statement (NOT(slope = 4)) OR (Aspect=2)

4	1	4	1	2	3	1	2
4	1	3	2	3	2	2	4
3	2	4	4	4	3	4	3
3	3	1	2	1	2	1	3
2	4	2	3	2	1	2	2
1	2	3	1	3	4	3	3
3	3	1	3	4	3	4	4
4	4	2	2	4	4	2	1

1	1	1	3	4	2	3	3
3	2	1	3	4	4	1	4
3	2	2	1	2	3	2	3
4	3	3	2	3	4	4	4
3	4	4	3	4	2	3	2
2	2	1	2	4	1	2	4
2	1	3	3	4	4	1	1
1	3	3	2	2	3	4	1

- b. Explain the concept of dynamic graphics with suitable example.
 c. What is data exploration? Explain.
 d. Explain different types of operations that can be carried out on attribute data.
 e. Write a short note on data visualization.
 f. Describe brushing as a technique for data exploration.

6. Attempt *any three* of the following:

15

- a. Explain the concept of buffering with suitable example.
 b. Explain G-static for measuring high/low clustering.
 c. Write the purpose of the following map manipulation operations with example.
 i. Erase ii. Update iii. Select iv. Eliminate v. Clip
 d. List and explain various overlay operations based on Boolean connector.
 e. Explain spatial autocorrelation with example.
 f. Find the zonal mean for the input raster(a) using a zonal raster(b)

2	7	1	1
9	8	5	3
2	8	4	6
1	4	5	3

1	1	1	2
1	1	1	2
3	3	2	2
3	3	3	3

(a)

(b)

7. Attempt *any three* of the following:

15

- a. Explain trend surface model with suitable example.
 b. Explain the Thiessen Polygons local method.
 c. Describe how a cell densities are derived used the kernel density estimation method.
 d. What is ordinary kriging? Explain.
 e. List global methods and explain any one.
 f. Explain the Inverse Distance Weighted Interpolation local method.

T . Y . B . Sc. (I.T.) {SEM –VI}
Elective: Project Viva Voice
(Paper – VI) { May – 2016}

QP Code : 26885

(3 Hours)

[Total Marks: 100

- N. B.: (1) All questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. **Attempt any two of the following:** 10
a. Explain the concept of Patent in Cyber World.
b. What does chapter 3 of IT Act, 2000, “Electronic Governance” stress upon?
c. Explain the scope of cyber laws.
d. Explain “Copyright is protection in form and not in idea”.
2. **Attempt any three of the following:**
a. List the main features of Copyright Act of 1957.
b. Explain patent application procedure.
c. Enumerate the basic principles of design rights.
d. Discuss the role of trademark and its usefulness in marketing.
e. What is the difference between provisional and complete specification of a patent? Explain.
f. Discuss the features of Indian Trade Mark Act.
3. **Attempt any three of the following:** 15
a. What are digital Copyright issues?
b. Write a short note on WIPO Treaty.
c. Justify protection of semiconductor chips.
d. Illustrate defences with respect to computer software as intellectual property
e. List and explain the seven US safe harbor principles.
f. Explain the procedure for registration of domain names.
4. **Attempt any three of the following:** 15
a. What are the rights conferred by registration of Trademark? What are its limitations?
b. What are the defences available in case of infringement of Trademarks?
c. Discuss transfer of patent rights in the form of assignment.
d. What are the defences available in case of infringement of patents?
e. What is a Trademark? What are its functions? What are its essential elements?
f. What are the rights awarded to Patentee?
5. **Attempt any three of the following:** 15
a. Discuss the “border security measures”.
b. What is Technology licensing? Explain.
c. Discuss civil remedies in enforcing intellectual property rights.
d. What are general obligations for enforcement of Intellectual property rights?
e. What is IP licensing? What are its advantages and disadvantages?
f. What is licensing agreement? What are its different types?

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6. **Attempt *any three* of the following:** 15
- a. What is E-Governance? Explain.
 - b. Explain Hyperlinking in website. What are issues related to it?
 - c. Explain cryptography in digital signature.
 - d. What are the different roles of Certifying Authorities?
 - e. What is the need of digital signature? Explain the verification process of digital signature.
 - f. What is cybercrime? Brief different cybercrimes.
7. **Attempt *any three* of the following:** 15
- a. What are the conditions under which Intermediary gets exemption from liability?
 - b. Discuss some of the offenses and punishments covered in Chapter 11 of IT Act, 2000.
 - c. Write short notes on cyber law complimentary audit.
 - d. What are the procedures that the Certifying Authorities need to follow, in order to issue the Digital Signature Certificates?
 - e. What kinds of documents are not covered under IT Act, 2000?
 - f. What does Chapter 13 of IT Act, 2000, "Miscellaneous" talk about?
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