T.Y.B.Sc (IT) {Sem – VI}
(Paper – I)
Internet Technologies
(OCT-16)

QP Code : 78227

(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**.

I.   **Answer *any two* of the following:**   10
   a. Write a note on classfull IPVv4 addressing.
   b. Explain algorithm for output module in ARP.
   c. Explain any two timers in TCP.
   d. Explain headers in HTTP protocol.

II.   **Answer *any three* of the following:**   15
   a. Write a note on IPv6 addressing.
   b. Explain how fragmentation is done in IPv4.
   c. Write a short note on ARP.
   d. Write a note on mobile IP.
   e. Explain Cache control module in ARP.
   f. Draw a neat diagram of ARP frame (req. & reply).

III.   **Answer *any three* of the following:**   15
   a. Write a note on ICMP Time exceeded message type.
   b. Explain RIP version 2 message format.
   c. Write a note on Dijkshtra's algorithm.
   d. Explain link state routing.
   e. Explain Path vector routing.
   f. Explain BGP Update message.

IV.   **Answer *any three* of the following:**   15
   a. Write a short note on SCTP protocol.
   b. Write a note on silly window syndrome created by sender.
   c. List & explain any two SCTP packets.
   d. Write a note on TCP's four – way hand shake protocol.
   e. Write a note on UDP Services.
   f. List different mandatory fields in TCP and explain any two.

V.   **Answer *any three* of the following:**   15
   a. Write a short note on Rlogin.
   b. Write a note on distribution of Name Space.
   c. Explain DHCP protocol.
   d. Explain different SSH components.
   e. Explain command processing in FTP.
   f. Differentiate between TFTP & FTP.

VI.   **Answer *any three* of the following:**   15
   a. Explain MPEG compression technique.
   b. Explain Request & response in HTTP.
   c. Explain role of MIB.
   d. Write a note on MIME headers.
   e. Explain commands in SMTP.
   f. Write a note on dynamic documents.

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VII.   Answer *any three* of the following: 15
   a. Write a note on Socket programming.
   b. Write a UDP socket program which reads a string from client, calculate its length and sends it back to the client.
   c. Write a TCP server socket program which reads a message from client and echoes it back to the client.
   d. Explain how packets can be created in UDP programming.
   e. Write a note on server socket.
   f. Explain how multiple client sockets can be created.

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T.Y.B.Sc (IT) {Sem – VI}
(Paper – II)
### *Digital Signals and System*
(OCT-16)

QP Code : 78226

[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**.
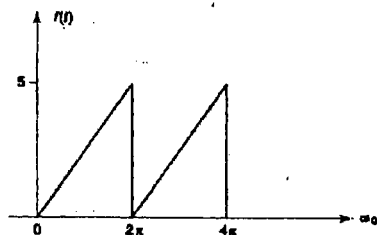 (6) Use of **Non-programmable** calculators is **allowed**.

1. **Attempt *any two* of the following:**　　　　　　　　　　　　10
a. Find the Laplace transform for the following signal:
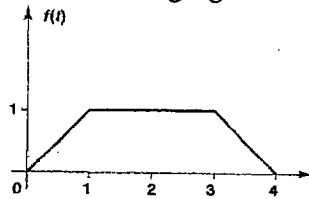
b. By first differentiating X(z) and then using appropriate properties, determine x(n) for
$$X(z) = \log(1 - 2z) \qquad |z| < \frac{1}{2}$$

c. Determine the exponential Fourier Series for the waveform shown below:

d. What are the applications of digital signal processing?

2. **Attempt *any three* of the following:**
a. Explain the following properties of Fourier Transform
  i.　Linearity　　ii.　Symmetry　iii.　Scaling
b. Show that the product of two even signals or two odd signals is an even signal and that the product of an even and an odd signal is an odd signal.
c. What is even signal and odd signal? Determine the even and odd components of x(t) = cos t + sin t
d. Draw and explain the block diagram of an analog – to – digital converter.
e. What is meant by sampling? State sampling theorem.
f. Write a note on Dirichlet's conditions.

3. **Attempt *any three* of the following:**　　　　　　　　　　　　15
a. Determine poles, zeroes of F(s). Obtain f(t) if $F(s) = 4 \cdot \frac{(s+1)(s+3)}{(s+2)(s+4)}$
b. Obtain Laplace transform for step and Impulse Responses of Series R-C Circuit.
c. Find inverse laplace transform of $F_1(s) = \frac{s^2+5}{s^3+2s^2+4s}$
d. Discuss initial value theorem in Laplace transform domain.
e. Define Laplace transform and inverse Laplace transform. What is region of convergence?

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f. Find the laplace transform of
    i. $e^{-t}sin4t$
    ii. $e^{2t} + 2te^{-2t} - t^2$

4. Attempt _any three_ of the following: 15
a. Compare the properties of two-sided z-transform with those of one-sided z-Transform
b. Find the z-transform of the following:
    i. $nu(n)$ ii. $na^n u(n)$
c. Determine the convolution of the two sequences x(n)= {2,1,1,0,5} and h(n)= {2, 3, 2, 1}
d. What is Z-transform? Explain the use of Z-transform. Determine the z-Transform of x(n) = { 1, 2, 5, 4, 1, 1 }
e. Let $x(n)$ be the sequence with z-transform $X(z)$. Determine in terms of $X(z)$, the z-transforms of the following signals:
    i. $x_1(n) = x\left(\frac{n}{2}\right)$ _if n is even_, 0 _otherwise_.
    ii. $x_2(n) = x(2n)$
f. Determine the causal signal having z-trasform

$$X(z) = \frac{z^2+z}{\left(z-\frac{1}{2}\right)^3\left(z-\frac{1}{4}\right)} \text{ for the region of convergence } |z| > \frac{1}{2}$$

5. Attempt _any three_ of the following: 15
a   Explain the Paley-Wiener criterion.
b   Explain stability in Linear Time Invariant system. What is the condition for a system to be BIBO stable?
c   Determine whether the system described by $F[x(n)] = a[x(n)]^2 + b\,x(n)$ is linear and time invariant.
d   Obtain Frequency Response for y(n) =x(n)+10y(n-1) with initial condition y(-1)=0.
e   Determine the impulse response and unit step response of the system described by the difference equations
    i. $y(n) = 0.6y(n-1) - 0.08y(n-2) + x(n)$
    ii. $y(n) = 0.7y(n-2) - 0.1y(n-2) + 2x(n) - x(n-2)$
f   Find the impulse response, frequency response, magnitude response and phase response of the second order system characterised by the difference equation:

$$y(n) - y(n-1) + \frac{3}{16}y(n-2) = x(n) - \frac{1}{2}x(n-1)$$

6. Attempt _any three_ of the following: 15
a. 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.
b. Determine the circular correlation values of the two sequences x(n) = {1,2,0,1} and h(n)={3,3,2,1}.
c. What are the methods used to perform Fast Convolution. Explain any one method giving all the steps involved to perform Fast Convolution.
d. Define Discrete Fourier Transform(DFT) and Inverse Discrete Fourier Transform(IDFT). Also state the Complex Conjugate property and Circular Convolution property of Discrete Fourier Transform(DFT).
e. Compute 8-point DFT of the sequence x(n)={1, 1, 1, 1, 1, 1, 1,1} by using DIF FFT algorithm.
f. Find the circular periodic convolution using DFT and IDFT of the two sequences:
    x(n) = { 1, 1, 2, 2) and h(n) = { 1, 2, 3, 4 }

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7.   Attempt _any three_ of the following: 15

a.   Explain the effects of windowing. Define Rectangular and Hamming window functions.

b.   What are the advantages of FIR filter over IIR filters?

c.   Describe elliptical filters in detail.

d.   What is an IIR filter? Compare its characteristics with an FIR filter

e.   Design a Finite Impulse Response low pass filter with a cut-off frequency of 1kHz and sampling rate of 4kHz with eleven samples using Fourier series.

f.   Design a bandpass filter to pass frequencies in the range 1-2 rad/sec using Hanning window N = 5.

T.Y.B.Sc (IT) {Sem – VI}
(Paper – III)
Data Warehousing
(OCT-16)

QP Code : 78231

[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**.

I.   **Answer _any two_ of the following:**   **10**
  a. Differentiate between data warehouse and operational database.
  b. Explain the term "Source" and "Target"
  c. Explain about the process of Data Transformation.
  d. Write a short note on monitoring of DW2.0 Environments.

II.   **Answer _any three_ of the following:**   **15**
  a. Briefly discuss the evolution of Data warehouse.
  b. Explain about the star schema approach and its limitation.
  c. Differentiate between Data Warehouse and Data Mart.
  d. Explain in brief Interactive sector.
  e. Explain about the life cycle of Data in Data warehouse.
  f. Explain Near Line Sector with its feature.

III.   **Answer _any three_ of the following:**   **15**
  a. Explain with reference to Data Warehouse: "Data inconsistencies are removed; data from diverse operational applications is integrated"
  b. What is metadata? Explain about different types of metadata.
  c. Why most data warehouse systems support index structures? Discuss methods to index OLAP data.
  d. Explain in detail the components of infrastructure management system.
  e. Explain about Spiral Methodology.
  f. Write a short note on taxonomy.

IV.   **Answer _any three_ of the following:**   **15**
  a. List and explain activities of ETL process.
  b. What is a Seven Stream approach? Explain along with limitation.
  c. Explain about dormant data, and how does it affect the performance.
  d. "Data Warehouse is an environment, not a product" Comment.
  e. Explain the different levels of Data Model.
  f. What are the basic security measures? Explain about its drawbacks.

V.   **Answer _any three_ of the following:**   **15**
  a. Explain the importance of Data Cleaning in data warehouse.
  b. What is a data mart? Differentiate between dependent and independent data marts.
  c. Explain about time collapsed data.
  d. Write a short note on exception based flow of data.
  e. Explain the relationship of ETL with metadata.
  f. What is the difference between local and global warehouses?

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VI.   Answer *any three* of the following: 15
    a.   Explain data granularity and how it is applicable to the data warehouse.
    b.   Explain about Bit-map indexing in detail.
    c.   Write a short note on Data Accuracy Vs Data Quality.
    d.   How migration of DW does is achieved? Explain.
    e.   "ETL works as a shock absorber", Explain.
    f.   Write a short note on Workload Management.

VII.   Answer *any three* of the following: 15
    a.   How are "data warehouse" different from a "database"? How are they similar?
    b.   Discuss about the concept of data warehousing and the web.
    c.   Discuss B-Tree and Bitmapped indexing method in detail.
    d.   What is data partitioning? How does it help in data warehousing environment.
    e.   Write a short note on data array.
    f.   Write a note on backup and recovery during data warehouse deployment.

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T.Y.B.Sc (IT) {Sem – VI}
(Paper – IV)
Elective Project Management
(OCT-16)

QP Code : 78236

[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.   What are the three generations of software development? Compare them.

b.   Explain the significance of vision document

c.   What are the four basic principles of software process workflow?
d.   Explain the three states of artifacts in project environment

2.   **Attempt *any three* of the following:**   15
a.   Explain Boehm's staffing principle
b.   Explain some of the suggestion to improve waterfall model

c.   List Boehm's top 10 principles of conventional S/W management
d.   Explain the process of cost estimation
e.   What are five basic parameters of improving software economics? Explain.
f.   What is customization of component & compare them with commercial components.

3.   **Attempt *any three* of the following:**   15
a.   List Davis's any ten principles of conventional software engineering.
b.   Explain the life cycle phases of a modern software development process.
c.   Briefly explain the management artifact sets.
d.   Describe the three aspects of architecture from the management perspective.
e.   "Management set artifacts associated with process planning & execution"- justify the statement.

f.   What are the different types of checkpoints of a process? Explain.

4.   **Attempt *any three* of the following:**   15
a.   Explain the seven top level workflows.
b.   Write a short note on minor milestones and on periodic status assessment
c.   Explain the evolution of Work breakdown structure.

d.   Explain two planning guidelines.
e.   Write a short note on pragmatic planning.

f.   Explain the two perspectives through which project plans need to be derived.

5.   **Attempt *any three* of the following:**   15
a   What is the default project organization? Explain the main characteristics.

b   What are the key points that software architecture team should focus on? Explain their roles, artifacts and responsibilities

c   Compare the life-cycle focus of project organization with respect to software Management team

d   Enlist the set of activities evolved over the life-cycle. Explain the same.

e   Why the tools are considered as the core components in the process automation? Explain.

f   Explain "Round Trip Engineering" with neat diagram.

6.   **Attempt _any three_ of the following:**   15
a.   Discuss the seven core metrics for project control and process instrumentation.
b.   Explain the four quality indicators' metrics in detail.

c.   Explain the automation of process with neat diagram.

d.   Enlist the factors of tailoring a software process framework. Explain the scale factor in detail.

e.   Compare and contrast small-scale and large-scale projects.

f.   Explain the process discriminators resulting from differences in project size.

7.   **Attempt _any three_ of the following:**   15
a.   Explain all the approaches of how a modern process framework resolves the weaknesses of conventional approach.
b.   Enlist the various principles of modern project management
c.   Compare and contrast how the project profiles differ between a conventional approach and a modern process.
d.   Write an exhaustive note on "Culture shift".

e.   Explain the process of denouement
f.   State the traits of modern process of development.

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