T.Y.B.Sc. (I.T.) (Sem. VI) (REVISED COURSE) **QP Code : 21963** April - 2015

(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**.

Q1 Attempt any two
a) Explain input module of TCP. 5
b) Explain recursive and iterative resolution in DNS. 5
c) Explain IPv6 base header format. 5
d) Explain update message of BGP. 5

Q2 Attempt any three
a) Write a note on NAT (network address translation) 5
b) Explain role of transport layer. 5
c) Explain supernetting with example. 5
d) Explain unicast, anycast and multicast address in IPv6. 5
e) Explain strategies for transmission from IPv4 to IPv6. 5
f) Write a note on Classless addressing. 5

Q3 Attempt any three
a) Draw and explain packet format of ARP. 5
b) Write and Explain pseudo code of cache control module of ARP. 5
c) List and explain in brief error reporting messages of ICMP. 5
d) Explain registration request format of mobile communication. 5
e) Explain two-node instability in RIP. 5
f) Explain various types of links in OSPF. 5

Q4 Attempt any three
a) State and explain services of UDP. 5
b) Write and Explain pseudo code of input module of UDP. 5
c) Explain byte number, sequence number and acknowledgment number used in TCP with example. 5
d) Explain TCP connection establishment. 5
e) Explain SCTP Packet format. 5
f) Explain SACK chunk of SCTP. 5

Q5 Attempt any three
a) Draw and explain DHCP client transition diagram. 5
b) Explain different sections of domain name space tree. 5
c) Explain the concept of NVT and NVT character set. 5
d) Explain in brief components of SSH. 5
e) Explain in brief communication over control connection and data connection. 5
f) Explain RRQ and WRQ messages of TFTP. 5

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Q6	Attempt any three	
a	Explain in detail static, dynamic and active web documents.	5
b	Explain persistence and nonpersistent connection of HTTP.	5
c	Write a note on User Agent of email system.	5
d	Explain in detail the role of POP3 and IMAP4 in email system.	5
e	Draw and explain SNMP PDU format.	5
f	Draw and explain RTP Packet format.	5
Q7	Attempt any three	
a	Explain in detail four constructors used to create DatagramSocket.	5
b	Write TCP socket program that will reverse a number.	5
c	Explain ServerSocket class with its methods and properties.	5
d	Explain how UDP socket programming works?	5
e	Write UDP socket program that will display factorial of a number.	5
f	Write a Client/server application where a client contacts the server to obtain random number. Use Socket and Server Socket.	5

T.Y.B.Sc (I.T)
(Sem – VI)
Digital Signals and System
April - 2015

(REVISED COURSE) QP Code : 21960

(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. What are the applications of Digital Signal Processing?
b. Explain the Paley-Wiener criterion.
c. Explain any five properties of DFT
d. What are the advantages of digital filters? Explain.

2. Attempt *any three* of the following: 15

a. Define and give the graphical representation of the following functions:
   i. Unit ramp
   ii. Unit step
   iii. Unit impulse
b. State and prove Parseval's theorem for Fourier transform.
c. What is meant by sampling? State sampling theorem.
d. 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.
e. State and explain any five properties of Fourier transform.
f. Write a note on Dirichlet's conditions.

3. Attempt *any three* of the following: **15**

a. Find the Laplace transform of $\cos^3 3t$
b. State and explain any five properties of Laplace transform.
c. Determine poles, zeroes of F(s). Obtain f(t) if F(s)=4 . $\frac{(s+1)(s+3)}{(s+2)(s+4)}$
d. Discuss final value theorem in Laplace transform domain.
e. Derive from the principals, the laplace transform of a unit step function. Hence or otherwise determine the Laplace transform of a unit ramp function and a unit impulse function
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. Define z-Transform. What is the use of z-transform How is it obtained from Laplace transform?
b. State and explain any five properties of z-transform.
c. Obtain the Z-Transformation of $x(n)=2^n u(n-2)$.
d. Determine the Z-Transform and the region of convergence of

$$x(n) = \begin{cases} 2^n & n \geq 0 \\ 0 & n < 0 \end{cases}$$

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e. State the Contour-Integration Residue method to calculate Inverse Z-Transformation. Hence obtain Inverse Z-Transform of $X(z) = \frac{1}{(z-1)(z+3)}$

f. Determine the convolution of the two sequences x(n)= {2,1,0,0,5} and h(n)= {2, 2, 1, 1}

5. Attempt *any three* of the following: **15**

a Explain stability in Linear Time Invariant system. What is the condition for a system to be BIBO stable?

b Check whether the following systems are BIBO stable or not
   i. $y(n) = ax(n+1) + bx(n-1)$
   ii. $y(n) = ax(n).x(n-1)$

c Check whether the system $F[x(n)] = n[x(n)]^2$ is Linear and Time-Variant.

d Obtain Frequency Response for y(n) =x(n)+10y(n-1) with initial condition y(-1)=0.

e Find the convolution of the two signals $x(n) = u(n)$ and $h(n) = a^n u(n)$, ROC: $|a| < 1; n \geq 0$

f What is frequency response? What are the properties of frequency response?

6. Attempt *any three* of the following: **15**

a. 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).

b. 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.

c. What are the methods used to perform Fast Convolution. Explain any one method giving all the steps involved to perform Fast Convolution.

d. 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.

e. Determine DFT of the sequence $x(n) = \begin{cases} \frac{1}{4} & 0 \leq n \leq 2 \\ 0 & Otherwise \end{cases}$

f. Compute the N-point discrete Fourier transform of $x(n) = a^n$ for $0 < a < 1$

7. Attempt *any three* of the following: **15**

a. What is bilinear transformation? Apply bilinear transformation to $H(s) = \frac{2}{(s+1)(s+3)}$ with T=0.1 s.

b. Describe the Inverse Chebyshev filters.

c. Obtain the system functions of normalized Butterworth filters for order N = 1 and N = 2.

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

e. Write note on Chebyshev filters.

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

T.Y.B.Sc (I.T)
(Sem – VI)
Data Warehousing
April - 2015

QP Code : 21894

(2½ Hours) **[Total Marks : 75**

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 operational databases? Explain the basic characteristics of a data warehouse.
b. Describe virtual data warehouse and central data warehouse.
c. Explain the various types of additivity of facts with examples.
d. Explain star schema model with the help of diagram.

2. Attempt *any two* of the following: **10**

a. What is a listener? How is it configured?
b. What is design center? Explain the functions of project explorer and connection explorer windows.
c. Explain OWB components and architecture with diagram.
d. Explain the various steps involved in installing oracle database software.

3. Attempt *any two* of the following: **10**

a. What is a target schema? How is a target module created?
b. What is time dimension? Discuss various steps involved in creating a time dimension using time dimension wizard.
c. Explain the various characteristics of a dimension.
d. Write notes on i) Slowly changing dimension ii) Surrogate keys

4. Attempt *any two* of the following: **10**

a. What is ETL? Explain the importance of source target map.
b. What is staging? What are its benefits? Explain the situation where staging is essential.
c. Briefly explain the functions of filter and joiner operators.
d. What are data flow operators? Explain the concept of pivot operator with example.

5. Attempt *any two* of the following: **10**

a. What is the purpose of main attribute group in a cube operator? Discuss about dimension attributes and measures in the cube.
b. What is expression operator? Explain the mapping of a date field SALE_DATE to a numeric field DAY_CODE by applying TO_CHAR() and TO_NUMBER() functions through expression operator. The string format for TO_CHAR() function is 'YYYMMDD'.
c. Explain the concept of validating and generating objects.
d. What is object deployment? Explain the functions of Control Center Manager.

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6. Attempt *any two* of the following: **10**

a. What is Recycle Bin? Describe the features of warehouse builder Recycle Bin window.

b. Explain data sparsity and data explosion.

c. What is a snapshot? Explain full snapshot and signature snapshot.

d. Explain the export feature of Metadata Loader.

7. Attempt *any three* of the following: **15**

a. Write any five significant differences between OLTP database and Data warehouse database.

b. What are the hardware and software requirements for installing Oracle Warehouse Builder?

c. Explain multidimensional implementation of data warehouse.

d. What are mapping operators? Explain any two source target mapping operators in detail.

e. What are the two ways of validating repository objects in Object Editor? Briefly explain various deploy actions of Object Details window.

f. What are the matching strategies for synchronizing workspace objects with its corresponding mapping operator? Explain inbound and outbound synchronization.

(3 Hours) Total Marks: 100

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(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

I. Answer *any two* of the following: 10

a. **"Project software standard is to be set by organization policy".** Discuss
b. Enlist the factors of tailoring a software process framework. Explain any of the 4 factors in detail.
c. Explain the best practices listed it out by "Airline Software Council".
d. What are the 3 generations of s/w development? Compare them.

II. Answer *any three* of the following: 15

a. Explain Boehm's staffing principle
b. Explain the Principles of Conventional Software Engineering.
c. Explain the Predominant Cost Estimation Process with Suitable Diagram.
d. Explain the importance of performance assessment.
e. Explain risk management of convention at software management.
f. Explain in detail General Quality improvements with modern Processes.

III. Answer *any three* of the following: 15

a. Describe the three different aspects of architecture from the management perspective.
b. Describe in brief life cycle phases of a modern software development process.
c. Write a short note on Technical perspective architecture.
d. List and explain the principles of modern software management.
e. Discuss in detail engineering artifact sets.
f. Write a short note on pragmatic artifacts

IV. Answer *any three* of the following: 15

a. Describe the typical sequence of life cycle check points using a diagram.
b. Explain the major and minor milestones in a project life cycle.
c. Briefly discuss the perspectives through which project plans need to be derived.
d. Write a short note on interaction workflows.
e. List and sxplain the Seven top level software process workflows.
f. Discuss the cost and schedule estimating process.

V. Answer *any three* of the following: 15

a. Write the detail about the Primitive Components (Basic Fields) of Software Change Order Documentation.
b. What is Process automation? Explain 3 levels of process in detail.
c. What is scale of the project? Explain the ways to decide the scale of project?
d. Write a detailed note on Management Indicators
e. Explain the three states of artifacts in project environment
f. Explain the roles and artifacts of software architecture team

Contd...

VI. **Answer *any three* of the following:** **15**

a. Explain the software metrics required in modern software management.
b. Describe any Five core metrics for project control and process instrumentation.
c. Describe the basic operational concept for a Software Project Control Panel.
d. What is scale of the project? Explain the ways to decide the scale of project?
e. Describe the four quality indicators in detail.
f. Write detail note on Management Indicators with 3 metrics.

VII. **Answer *any three* of the following:** **15**

a. What is Early Risk Resolution? How it is carried out in the iterative process as early in the life cycle? Give its advantages.
b. Discuss in detail Best Practices in Software Management.
c. Explain the possible improvements in the next generation cost estimation models over the conventional ones.
d. Explain how balancing the top Ten software management principles achieve economic results.
e. Explain a general structure for a cost estimation model in modern software process.
f. Explain the cultural shifts in modern process transition.

T.Y.B.Sc (I.T) (Sem – VI)
Elective : IPR and Cyber Laws
April - 2015

(REVISED COURSE) **QP Code : 21968**

(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**.

I. **Answer *any two* of the following:** **10**
a. What are the defenses available in case of infringement of designs?
b. Explain cryptography in digital signature.
c. Explain Copyright issue in India? Explain Copyright in WWW.
d. Explain "Security Risk" to database.

II. **Answer *any three* of the following:** **15**
a. Explain the need to protect Intellectual Property.
b. Discuss the role of trademark and its usefulness in marketing.
c. List the main features of Copyright Act of 1957.
d. What are the basic principles of patent law?
e. Discuss different types of claims in Patent Specification & their importance.
f. What do you understand by Patent Law? Explain the features of patent Law.

III. **Answer *any three* of the following:** **15**
a. Explain UK data protection act.
b. List out seven US safe harbor principles.
c. Explain the concept of Semi-Conductors. State and explain Semiconductor IC layout design act?
d. Write short note on WIPO Treaty.
e. Explain the procedure for registration of domain names.
f. What are digital Copyright issues?

IV. **Answer *any three* of the following:** **15**
a. What are design objectives?
b. What are the rights granted for registration of design?
c. Discuss transfer of patent rights in the form of assignment.
d. Explain different rights conferred by copyright.
e. What are the rights conferred by registration of Trademark? What are its limitations?
f. Explain how copyright can be protected through good will.

V. **Answer *any three* of the following:** **15**
a. What are disadvantages of IP licensing?
b. What is licensing agreement? List its different types.
c. List out and explain briefly the criminal remedies in enforcing intellectual property rights.
d. Explain practical aspects of licensing.
e. What are general obligations for enforcement of Intellectual property rights?
f. Explain the term "Technology licensing".

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VI. **Answer *any three* of the following:** 15

a. What are the different roles of Certifying Authorities? Explain.
b. What is cybercrime? Brief the different cybercrimes.
c. Describe implementation of cyber law in India.
d. List out various domain related issues.
e. Discuss the privacy & freedom issues in the cyber world.
f. Explain the need or purpose of digital signatures.

VII. **Answer *any three* of the following:** 15

a. What are the duties of the subscriber of Digital Signature certificate?
b. What is Cyber Appellate Tribunal? What are its powers?
c. When does the Certifying Authority suspend or revoke the Digital Signature certificate?
d. What does chapter 4 of IT Act, 2000, "Attribution, Acknowledgement & Dispatch of Electronic records" cover?
e. What does Chapter 13 of IT Act, 2000, "Miscellaneous" talk about?
f. What kinds of documents are not covered under IT Act, 2000?

T.Y.B.Sc (I.T) (Sem – VI)
GIS
April - 2015

(REVISED COURSE) **QP Code : 21974**

(3 Hours) **Total Marks: 100**

N. B.: (1) **All** questions are **compulsory**.
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(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**.

I. Answer *any two* of the following: **10**

a. What is datum? Explain with suitable example.
b. Explain the TIN data model with suitable example.
c. Explain Network database with suitable example.
d. What is descriptive statistics? Explain.

II. Answer *any three* of the following: **15**

a. Discuss various components of GIS.
b. Explain the region data model with suitable example
c. Explain the following terms of object based data model and give suitable example.
i. Association ii. Aggregation
d. Explain with suitable example cell-by-cell encoding raster data structure.
e. Explain Quad Tree with suitable example.
f. What is the importance of header file in raster model? Explain with suitable example.

III. Answer *any three* of the following: **15**

a. What is the importance of metadata? Explain.
b. Explain the following terms
i. COGO ii. Geometric Transformation
c. Write the four types of transformation methods. Also show their effects on a rectangular object.
d. Explain Affine transformation.
e. List the common resampling methods and explain them.
f. Write a short note on Root Mean Square error.

IV. Answer *any three* of the following: **15**

a. List the types of attribute data based on measurement scale. Explain.
b. Explain file and hierarchical database with suitable example.
c. What is normalization? What are the objectives of normalization?
d. Explain
i. Pie Chart map ii. Flow map
e. Write a short note on Visual Hierarchy.
f. Write a short note n Map Production.

V. Answer *any three* of the following: **15**

a. What is data exploration? Explain.
b. Explain Boxplots with suitable example.
c. Describe brushing as a technique for data exploration.
d. Explain feature selection by graphic data query with suitable example.
e. Explain spatial data query with suitable example.
f. List different types of operation that can be carried out on attribute data. Explain with suitable example.

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VI. Answer *any three* of the following: **15**

a. Explain the following map manipulation operations with example.
   i. Append ii. Split
b. List and explain various overlay operations based on feature type.
c. Explain spatial autocorrelation with example.
d. Explain the reclassification local operation of raster.
e. What is the physical distance measure operation?
f. Explain the raster data generalization operation with suitable example..

VII. Answer *any three* of the following: **15**

a. Explain the Inverse Distance Weighted Interpolation local method.
b. Explain the Thin-Plate Splines local method.
c. What is Kriging? Explain.
d. What is spatial interpolation? List and explain the types of spatial interpolation.
e. Explain trend surface model with suitable example.
f. Describe how semivariance can be used to qualify the spatial dependence in a data asset.
