(Time: $2\frac{1}{2}$ hours)

[Total Marks: 60]

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** calculator is **allowed**.

1. Attempt *any two* of the following: **12**

a. Explain the following terms in brief
   i)Mainframe Virtualization
   ii) Virtual Memory
   iii) Hot Standby Router Protocol
b. Illustrate in detail Data Center Virtualization Technologies Areas and Subareas
c. What are Network Virtualization Benefits? Explain in detail.
d. With the help of suitable example compare and contrast behavior of Hubs and Switches.

2. Attempt *any two* of the following: **12**

a. Explain in detail Load-Balancing Concepts.
b. With respect to Load-Balancing how Layer 4 switching differs from Layer 7 Switching? Discuss in detail.
c. How Address Translation and Load Balancing works?
d. What is Virtual device contexts? Why use Virtual device contexts?

3. Attempt *any two* of the following: **12**

a. What are different types of Fabric Extender?
b. With the help of suitable diagrams explain Fabric Extender Topologies.
c. Explain the concept of a label-switched path (LSP) in MPLS.
d. Explain the concept of RAID (Redundant Array of Independent Disks) and explain the nested RAID levels.

4. Attempt *any two* of the following: **12**

a. Explain in brief different Server Architectures.
b. Write a note on Introducing x86 Server Virtualization.
c. What are different Server Provisioning Challenges?
d. How Unified Computing and Service Profiles works?

5. Attempt *any two* of the following: **12**

a. Explain the concept and significance of virtual network services.
b. What are Virtual Machine Attributes and Virtual Zones?
c. Explain the Journey to the Cloud.
d. How Software-Defined Networks works?

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1. Attempt *any two* of the following: **12**

a. Explain using schematic diagram a typical biomedical measurement system.
b. Write a short note on signal encoding.
c. Explain the application of frequency domain analysis in diagnosis using bio-signal.
d. A system is defined by the digital transfer function below. Plot its frequency spectrum: magnitude in dB and phase in degrees. Also plot the time-domain response of the system to an impulse input (i.e., the system's impulse response). Assume a sampling frequency of fs = 1 kHz and make N = 512. These are both optional: fs is provided so that the frequency curve can be plotted in Hz instead of relative frequency, and N is chosen to be large enough to produce a smooth frequency curve. (Assume N = 128 would be sufficient).

2. Attempt *any two* of the following: **12**

a. Explain Continuous Wavelet Transform using suitable example.
b. The straightforward approach of slicing the waveform of interest into a number of short segments and performing an analysis on each of these segments is termed as spectrogram or short-term Fourier transform (STFT). Explain.
c. Explain Yule–Walker Equations for the AR Model.
d. Explain the Basic configuration of an adaptive filter using suitable diagram.

3. Attempt *any two* of the following: **12**

a. Write a short note on Phase Space.
b. Explain the Shannon's Entropy Formulation.
c. The study of chaotic and other nonlinear signals often makes use of phase space to provide a descriptive analysis. What is phase space? Explain.
d. Write a short note on Chaotic Systems.

4. Attempt *any two* of the following: **12**

a. Explain Linear Filtering.
b. Write a short note on Spatial Transformation.
c. What is Threshold Level Adjustment? Explain.
d. Write a short note on Radon Transform.

5. Attempt *any two* of the following: **12**

a. A classifier is an input–output device that takes in a number of inputs and, based on the pattern of these inputs, determines the most likely condition associated with that pattern. Explain the working of signal classifier using suitable diagram
b. How to evaluate the performance of signal classifier. Explain.
c. Write a short note on Neuron Models.
d. The gradient decent method is used in adaptive filtering. Explain using suitable example.

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(2½ Hours)

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

Q. 1 **Attempt *any two* of the following:** **12**
a. List and explain hacking phases.
b. Explain the concept of banner grabbing.
c. Explain the NETBIOS enumeration.
d. Write a short note on Network Sceurity zoning.

Q. 2 **Attempt *any two* of the following:** **12**
a. What is password cracking? List and explain types of password attacks.
b. List and explain the categories of vulnerabilities present in system or network.
c. What are the components of malware program.
d. Explain different types of sniffing.

Q. 3 **Attempt *any two* of the following:** **12**
a. List and explain the categories of social engineering attacks
b. Write a short note on session hijacking.
c. What is a distributed denial of service attack?
How does a distributed denial of service attack work?
d. What is Intrusion Detection System(IDS)? Write the functions of IDS.

Q. 4 **Attempt *any two* of the following:** **12**
a. Write the impact of web server attacks.
b. Discuss OWASP Application Security risks.
c. Write a short note on Blind SQL injection.
d. Discuss types of wireless encryption.

Q. 5 **Attempt *any two* of the following:** **12**
a. Explain any three mobile risks.
b. What is IoT? How IoT works?
c. Discuss any two cloud computing threats.
d. Explain different types of ciphers.

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(Time: $2\frac{1}{2}$ hours)

[Total Marks: 60]

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1. Attempt *any two* of the following: **12**

a. What is "Technical Communication"? Explain four basic communication skills to produce technical communication.
b. Write short notes on :
   i. Copyright Laws
   ii. Trademarks Laws
   iii. Contract Law
c. What do you mean by collaboration in technical writing? Explain it advantages and disadvantages.
d. How communication skills and qualities affect your career? Explain in brief.

2. Attempt *any two* of the following: **12**

a. How content can be distributed across the different channels? Explain in detail.
b. What are the different factors to be considered when organizing technical documents? Explain in brief.
c. Write down the various steps for creating blogs.
d. Explain Problem-Methods-Solution pattern in detail.

3. Attempt *any two* of the following: **12**

a. Explain various benefits of graphics with respect to technical communication in brief.
b. Explain four phases of experiment in primary research.
c. What do you mean by “Literature Review”? Explain.
d. What is “Full-Scale Introduction” of the technical document? Explain in detail.

4. Attempt *any two* of the following: **12**

a. What do you mean by solicited and unsolicited research proposal? Explain.
b. Write short notes on “Trip Report and Trouble Report”.
c. Define term innovation and also give explain different types of innovation.
d. What is “Minutes of the meeting”? How to write the same? Explain.

5. Attempt *any two* of the following: **12**

a. What is proposal? Explain its structure in detail.
b. What are the criteria to be followed for a patent to benefit from legal protection?
c. What is Research and Development? Explain in detail.
d. Explain various changes in the way companies manage their technological resources in R&D.

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