PRN 2026

THBSCIT sem VI OK

Time: 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 three* of the following: **15**

a. Explain how IT Service Management enables organizations to enhance service delivery, operational efficiency, and customer satisfaction.
b. Explain the concept of value co creation with reference to service management.
c. Differentiate between user, customer, and sponsor with suitable examples.
d. Explain the importance of the organizations and people dimension in service management.
e. Describe how partners and suppliers contribute to service delivery in service management.
f. Explain the relationship between opportunity, demand, and value in the Service Value System.

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

a. Explain how Information Security Management protects organizational data and supports business operations.
b. Discuss the purpose of Portfolio Management. Describe the key activities involved in managing a portfolio in an organization.
c. Elaborate the role of Capacity and Performance Management in forecasting demand and planning resources.
d. Discuss how IT Asset Management helps organizations maximize value, control costs, and manage risks associated with IT assets.
e. Discuss the role of Infrastructure and Platform Management in supporting value creation in an organization.
f. Elaborate the software development lifecycle and activities involved in Software Development and Management.

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

a. Explain any two methods used to understand markets and stakeholders during the Explore step of the customer journey.
b. Explain communication and collaboration practices used to build service relationships during the Engage step.
c. Explain how customer requirements are specified and managed during the Offer step.
d. Differentiate between obligation based, agreement based, and promise based service relationships used during the Agree step.
e. Differentiate between customer offboarding and user offboarding. Describe any four activities involved in the offboarding process.
f. Describe how value is co-created during the Co create step of the customer journey.

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

a. Explain the Shift Left approach. State any four benefits of adopting this approach.

b. Describe workforce planning in the Service Value System. Explain its importance in effective service delivery.

c. Discuss the purpose of Service Design and its role in effective service creation.

d. Differentiate between Release Management and Deployment Management. State their purpose in service delivery.

e. Explain the purpose of Problem Management. Differentiate between Proactive and Reactive Problem Management.

f. Describe monitoring and event management. State any four benefits in maintaining service performance.

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

a. Define High Velocity Information Technology. Explain the concept of velocity with direction in High Velocity Information Technology.

b. Define digital technology. Differentiate between information technology and operational technology.

c. Explain the five key behaviour patterns in High Velocity Information Technology.

d. Define safety culture. State any four characteristics of a safety culture in High Velocity Information Technology environments.

e. Explain Infrastructure as Code and Continuous Integration/Continuous Delivery as techniques used for fast development in High Velocity Information Technology environments.

f. Explain the Toyota Kata approach to continual improvement in High Velocity Information Technology. State the four steps of the improvement kata.

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

a. What are the steps for identifying design requirement?
b. Write a short note on pilot and prototype test.
c. Explain Network Design Lifecycle.
d. Write short note on HSRP (Hot Standby Router Protocol).
e. What are the different layers of hierarchical network models?
f. Explain in detail Enterprise Edge Area with diagram.

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

a. Explain STP (spanning tree protocol) switchports.
b. Write short note on **a)** Layer 3 switches **b)** Routers.
c. Differentiate between Unidirectional link detection (UDLD) protocol and loopguard.
d. Explain in detail Cisco Group Management Protocol (CGMP).
e. Describe Enterprise Data Center Architecture.
f. Define Virtualization and explain any three technologies used in virtualizations?

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

a. Explain Multiprotocol Label Switching (MPLS).
b. List different types of DMZ connectivity and explain each of the type in detail.
c. Elaborate on medium branch design.
d. Explain IPsec Direct Encapsulation.
e. What is the Intracontroller roaming? Explain two types of it.
f. Explain five types of Wireless LAN Control System (WLC).

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

a What is DNS? Explain process of DNS name resolution?
b Draw and explain IPV6 Header.
c Elaborate in detail IPV4 fragmentation.
d State and explain OSPF LSA types.
e Explain IPV6 neighbor discovery protocol with functionalities and message types.
f State and explain concept of BGP neighbors.

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

a. List and explain various security policy components.
b. Write a short note on VPN protocols.
c. What are the techniques for detecting and mitigation threats?
d. Explain types of Firewalls.
e. Explain Syslog and Syslog message level.
f. Explain network management technologies RMON/RMON1.

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

a. What is the difference between data, information and knowledge?
b. What is Business Intelligence? What are the advantages of making decisions using Business Intelligence over making decisions without it?
c. What is a system? Explain a closed-cycle system with a suitable example.
d. Describe the different phases involved in the development of a Decision Support System (DSS).
e. Draw a neat diagram of Business Intelligence (BI) architecture and explain its components.
f. Explain structured, unstructured, and semi-structured decisions.

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

a. Write short notes on predictive models, pattern recognition, and learning models.
b. What is incomplete data? Discuss the techniques used to handle incomplete data effectively.
c. Write a short note explaining the concept of Principal Component Analysis (PCA).
d. Explain categorical and numerical attributes with proper examples in data analysis.
e. Differentiate clearly between supervised and unsupervised learning techniques in machine learning.
f. List and explain various data mining task.

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

a. Define the following terms in one sentence each: (i) agglomerative algorithm and (ii) divisive algorithm.
b. What is classification model? Explain three phases of classification model
c. Write a short note explaining the concept and uses of a confusion matrix.
d. Define clustering and write the k-medoid algorithm used for clustering analysis.
e. What is a neural network? Explain the structure of a multi-level feed-forward network.
f. Explain the ROC curve chart and discuss how it is related to the confusion matrix.

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

a. Explain relationship marketing and describe the objectives of relationship marketing in organizations.
b. Explain the concepts of revenue management systems and sales force management in business operations.
c. Explain the optimization models for logistic planning.
d. What is supply chain management? Give an example of global supply chain.
e. Write short note on efficient frontier and Charnes–Cooper–Rhodes (CCR) model
f. List and explain good operating practices among efficient units.

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

a. Differentiate between human intelligence (natural intelligence) and artificial intelligence.

b. Define Expert Systems? What are the components of an expert system?

c. List and explain the five levels of the Organizational Maturity Model

d. Explain the various machine learning tools available.

e. What is machine learning? Describe the complete process involved in machine learning.

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

a. Explain the power of arrest without warrant under Section 80 of the IT Act, 2000.
b. Differentiate between cognizable and non-cognizable offences.
c. What is cyber crime? Explain its nature under the IT Act, 2000.
d. Explain hacking and cyber fraud with examples.
e. Write a short note on penalties and adjudication under the IT Act, 2000.
f. Who are Network Service Providers? State their role in cyber law.

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

a. What are Click-Wrap and Shrink-Wrap contracts?
b. Explain how contracts are formed on the Internet.
c. What is cause of action?
d. Explain civil jurisdiction in India.
e. Why are terms and conditions important in online contracts?
f. What are foreign judgments?

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

a. Explain the concept of domain names and remedies against cyber squatting.
b. Discuss meta-tagging and legislative measures against cyber squatting.
c. Explain works in which copyright subsists and the meaning of copyright.
d. Discuss copyright ownership, assignment, and licensing.
e. Explain copyright infringement and remedies available in cyberspace.
f. Examine ISP liability and computer software piracy.

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

a. Explain the concept of Permanent Establishment (PE) in cross-border e-commerce.
b. Discuss Double Taxation Avoidance Agreements and taxable jurisdiction over non-residents.
c. Explain source versus residence principles in digital taxation.
d. Describe Digital Signatures and Digital Signature Certificates.
e. Discuss the role and liability of Certifying Authorities.
f. Explain the scope of e-Governance in India with reference to "A Warning to Babudom."

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

a. Discuss admissibility and probative value of electronic records under the Indian Evidence Act, 1872.
b. Explain proof of digital signatures, electronic agreements, and electronic messages.
c. Discuss amendments made to the Indian Evidence Act, Bankers' Books Evidence Act, and RBI Act through the IT Act, 2000.
d. Examine protection available to cyber consumers under the Consumer Protection Act.
e. Explain defect in goods, deficiency in services, and unfair trade practices in cyber transactions.
f. Discuss jurisdiction and remedies available to cyber consumers in India.

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

a. Write four sets of capabilities to handle geo-reference data in GIS.
b. Define Models and Modelling, Maps, database.
c. Describe geographic phenomenon and its types.
d. Explain regular and irregular tessellation.
e. What is GI System, GI Science and GI Application?
f. Write a short note on Temporal dimension.

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

a. Give an account of the various reasons for using DBMS in GIS.
b. Explain spatial Database querying with suitable example.
c. Describe GIS Architecture and its functionality.
d. What do you mean by relational data model: Give an example with relations, tuples and attributes.
e. Write a brief account of Spatial Data Infrastructure (SDI).
f. Elaborate the process of linking GIS and DBMS.

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

a. Explain Geoid and vertical Datum using suitable example.
b. Describe 2D and 3D Geographic Coordinate.
c. Elaborate the terms: direct and indirect spatial data capture, digitizing, scanning and vectorization.
d. What is Accuracy? Explain positional accuracy.
e. Define satellite-based positioning with absolute positioning.
f. Write a short note on Map Projection.

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

a. With the help of an example, explain how Raster overlay operation can be performed using decision table.
b. Write in brief about the five characteristics of GIS-based application models.
c. Write a note on Raster Overlay Operators with examples.
d. Define and explain flow computation on raster with the help of diagram.
e. Explain vector overlay operations using suitable diagram.
f. Discuss user-controlled and automatic classification in brief.

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

a. Explain cartographic visualization process using spatial data.

b. What are Bertin's six categories of visual variables?

c. How to map quantitative Data in GIS?

d. What is terrain elevation? Explain in brief.

e. Describe time series for single map and series of maps with suitable diagram.

f. Write short note on map cosmetics.

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1. Attempt *any three* of the following: 15
a. What are the financial aspects of quality. Explain them in detail.
b. Write a Structured note on requirements of product.
c. Write a note on benchmarking and matrix.
d. State and explain total quality management principles.
e. Describe the continual improvement cycle. (PDCA).
f. Write a short note on Spiral Model?

2. Attempt *any three* of the following: 15
a. What is a Defect in Software quality assurance? Explain the Categories of Defect.
b. Explain requirement traceability matrix
c. Give the difference between black-box, white-box and gray box testing.
d. What are the different Levels of testing. Elaborate them.
e. Explain Basic principles of testing.
f. Explain different approaches to testing.

3. Attempt *any three* of the following: 15
a. Discuss in detail the cause – effect graphing technique.
b. Explain Data flow testing and its uses.
c. Explain the types of equivalence class testing.
d. Describe decision table in testing with example.
e. What are the basic paths in testing? Explain.
f. What is Slice – based testing? Explain in detail. Slice based testing and its Program Slicing Tools.

4. Attempt *any three* of the following: 15
a. Give the methods of verifications. Elaborate them.
b. How does the V and V model help in Software testing and Assurance?
c. What are the different types of coverage in validation? Describe each coverage.
d. Describe the Levels of acceptance testing (alpha beta and gamma)
e. Difference between verification and validation
f. Give the types of milestone reviews. Explain them.

5. Attempt *any three* of the following: 15
a. Explain in brief Compatibility Testing
b. Explain smoke and sanity testing with examples.
c. Describe the State Graph in detail. Give its importance.
d. What is e-business / e-commerce testing? Give its importance.
e. Write short note on Decision Table Testing (Axiom Testing)
f. Explain in brief Compatibility Testing

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

a. Describe any five counter measures to minimize the successful attack.
b. Explain the analogy of Onion Model and Lollipop Model.
c. What is the Concept of Man in the Middle Attack? Explain with suitable examples.
d. Discuss the significance of 3D`s of Security.
e. Explain the following: e-mail worms, Trojans.
f. How to Build a Security Program? Brief the components of it.

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

a. Identify the key steps in the authentication process of Smart Card implementation and outline their role in secure access.
b. Summarize the concept of biometric authentication and discuss its applications in modern security systems.
c. Compare Symmetric key cryptography and asymmetric key cryptography.
d. What are the possible Availability risks in security? Explain.
e. What is the concept of zoning in the storage network? Explain.
f. Describe the concept of one-time password.

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

a. Write a short note on Centralizing Account Management (AAA).
b. Explain the types of ICMP messages.
c. What are the features of Firewall? Explain.
d. Explain the following internal security practices:
1) Intranets
2) Extranets
e. Define network hardening and outline the key steps required to strengthen network security.
f. Explain the concept of Bluetooth IPS.

15

4. **Attempt <u>any three</u> of the following:**

a. Write a short note on ACL.

b. Explain the following: First Generation IDS, Second Generation IDS

c. Describe the components of VoIP.

d. What are the vulnerabilities or problems of Operating system support protocol? Explain.

e. Explain the concept of Network Intrusion Detection Systems (NIDS) and describe how they function in threat detection.

f. Identify different types of network protocol attacks and explain it.

15

5. **Attempt <u>any three</u> of the following:**

a. Describe the concept of the Secure Development Life Cycle (SDLC) and summarize its importance in secure software development.

b. List different types of cloud services and explain their functions in cloud computing.

c. Define the terms "Fraud" and "Hijacking" and explain their significance in the context of information security.

d. Which are the areas of any physical vulnerability assessment? Explain

e. Explain the general types of attacks in web applications.

f. Explain the classification of corporate physical assets.
