(2½ 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** calculators is **allowed**.

Q1 **Attempt *any two* of the following:** **12**

a. Discuss various types of Antennas used for signal transmission.
b. Explain frequency hopping spread spectrum (FHSS) techniques with suitable diagram.
c. Explain Packet reservation technique PRMA in detail.
d. Explain the concept of multiplexing. Discuss code division multiple access (CDMA) technique in detail.

Q2 **Attempt *any two* of the following:** **12**

a. Discuss various security services defined in GSM system.
b. Explain the functional architecture of GPRS system.
c. Differentiate among GEO, LEO, and MEO.
d. Explain the basic architecture of DECT.

Q3 **Attempt *any two* of the following:** **12**

a. Discuss the specification and structure of Multimedia object transfer protocol.
b. List the advantages and disadvantages of infrared and radio transmission.
c. Discuss different features of Bluetooth in detail and compare it with IEEE802.11.
d. Discuss various features of HiperLAN2 standard.

Q4 **Attempt *any two* of the following:** **12**

a. Discuss various services of WATM.
b. Explain Handover reference model of BRAN.
c. Discuss the process of IP packet delivery over mobile network.
d. What is Reverse tunneling process in Mobile IP? Explain in detail.

Q5 **Attempt *any two* of the following:** **12**

a. Discuss various advantages and limitations of Mobile TCP.
b. Compare between I-TCP and Snooping TCP in detail.
c. What are the primary goals of the WAP forum efforts and how are they reflected in the initial WAP protocol architecture?
d. What is selective retransmission? What are its advantages and disadvantages?

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 calculators is allowed.

Q1 **Attempt *any two* of the following:** 12

a. Consider a two and three wheeler insurance company whose customers own one or more vehicles each. Each vehicle has associated with it zero to any number of recorded accidents.
i) Design an EER schema, stating any assumptions you make.
ii) Show mapping of EER schema to relational schema.

b. Explain User defined abstract data types and Structured types.

c. Define specialization and generalization. Discuss the constraints and characteristics of Specialization and Generalization.

d. Explain the super class sub class relationships. What are the degrees of relationships? Explain with examples.

Q2 **Attempt *any two* of the following:** 12

a. Give the specifications of type hierarchies and inheritance.

b. What is complex object? Explain its structure.

c. Explain the architecture of object oriented database management system.

d. Explain objectives of persistent and transient objects. How they are implemented?

Q3 **Attempt *any two* of the following:** 12

a. What are extended types? Discuss the implementation issues for extended types.

b. Give comparison between OODBMS and ORDBMS.

c. Write a note on optimization.

d. Explain the mechanism of ORDBMS query processing.

Q4 **Attempt *any two* of the following:** 12

a. Describe steps used to perform joins in parallel databases.

b. Give the comparison between parallel and distributed database processing.

c. What is data transparency? Explain types of transparencies that distributed data should achieve.

d. Explain the concept of fragmentation with an example.

Q5 **Attempt *any two* of the following:** 12

a. What is DTD? Explain syntactical definition of DTD.

b. Explain the general architecture of Web Database.

c. What type of spatial analysis is possible with Geographic Information System? Explain.

d. What is Active Database? Explain factors that affect Active Database.

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**

Q1 **Attempt *any two* of the following:** **12**

a. Explain High-performance computing and High-throughput computing.
b. Discuss the evolution of service oriented architecture.
c. Write a note on trend towards Distributed Operating Systems.
d. Consider a multi-core processor with heterogeneous cores: A, B, C and D where core B runs twice as fast as A, core C runs three times as fast as A and cores D and A run at the same speed (i.e. have the same processor frequency, micro architecture etc.). Suppose an application needs to compute the square of each element in an array of 256 elements. Consider the following divisions of labor:
Core A 32 elements, Core B 128 elements, Core C 64 elements, Core D 32 elements.
Compute the total execution time taken and cumulative processor utilization.

Q2 **Attempt *any two* of the following:** **12**

a. What are the designs issues in a cluster?
b. Explain Infrastructure as a service model of cloud with an example.
c. Discuss the requirements for design of virtual machine monitor.
d. Explain the generic cloud architecture.

Q3 **Attempt *any two* of the following:** **12**

a. What is Hadoop? Explain the architecture of MapReduce in Hadoop.
b. How is efficient provisioning of resources done? What are different methods of resource provisioning in cloud computing services?
c. State and Explain the service offerings of the following cloud platforms:
IBM, Google, Microsoft and Amazon.
d. Explain the different data and software protection techniques in cloud environment.

Q4 **Attempt *any two* of the following:** **12**

a. Explain Google's NOSQL system.
b. Explain the execution environment of Amazon Simple Storage Service.
c. What is Sector and Sphere? Explain its architecture.
d. With the help of a diagram explain the features of programming Azure cloud platform.

Q5 **Attempt *any two* of the following:** **12**

a. Enumerate the ideas for providing online social networking services. What are the benefits of social networks?
b. Explain the following in short:
i. Grid '5000 ii. Open Cirrus iii. Science Clouds iv. Sky Computing
c. List and explain the properties of social network graph.
d. With the help of a neat diagram explain the architecture of Facebook.

—x—

N. B.: (1) All questions are compulsory and state suitable assumptions wherever necessary.
(2) Make **suitable assumptions** wherever necessary and **state them clearly**.
(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:** 12

a. When static routes are configured to reference an exit interface instead of a next-hop address, how will the route table be different? Explain with example

b. What is load balancing? Explain in detail types of load balancing.

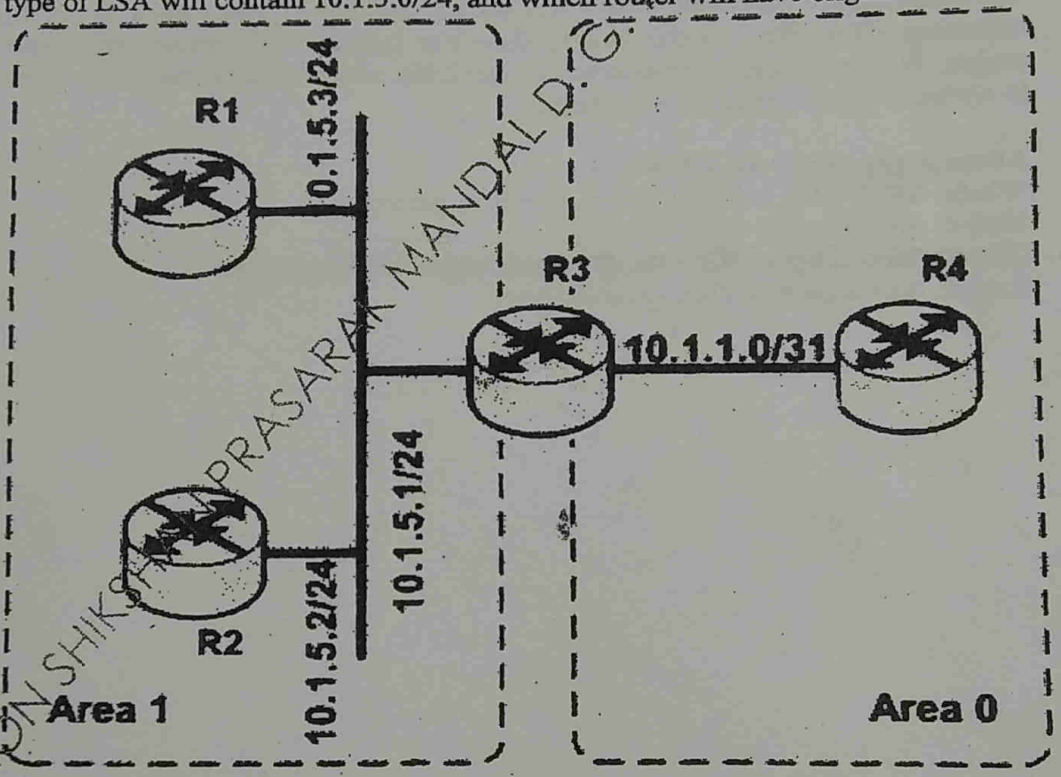
c. Explain in detail the difference between a RIP Request message and a RIP Response message

d. Explain how an SPF algorithm works.

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

a. Explain OSPF neighbor state machine mechanism.

b. Based on the network provided in the exhibit, in these two areas, all routers are performing OSPF on all interfaces. After examining the OSPF database on R4, which type of LSA will contain 10.1.5.0/24, and which router will have originated it?



c. Explain the role of LSA 3, LSA 4, LSA 5 in OSPFv2. Who generates it? With whom are they shared? Why?

d. Which three factors have the biggest influence on OSPF scalability? Why?

Contd…

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

a. A Router is configured for BGP as dual-homed on the network. Explain [illegible] BGP attributes are carried in every BGP update on this router (both IBGP and EBGP)?

b. Your company is researching a new application that runs over IPv6, but part of it must still have IPv4 support. Your company uses a traditional IPv4 network. Your plan is not to run IPv6 over the whole network, but to segment parts of the network or even to operate simultaneously with IPv6 and IPv4. You must make a brief presentation about IPv6 technology to the board of technical directors. Which are the supporting factors you must take into consideration?

c. Which types of subnets will a router running BGP most likely advertise to an IBGP peer, assuming it is not configured as a route reflector? Why?

d. Explain the major differences between an IPv4-compatible tunnel and IP6 to IP4 (6to4) tunnel?

12

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

a. What are the Quality of Service Considerations in Enterprise Campus Network Design?

b. Loop guard and UnDirectional Link Detection both protect against Layer 2 STP loops. In which ways does loop guard differ from UDLD in loop detection and prevention?

c. Explain fast convergence in OSPF. What are the parameters that control the OSPF LSA propagation? Explain.

d. The EtherChannel between your LAN switch and the Internet router is not load-balancing efficiently. On the switch, there are several workstations with valid IP ranges. Which different load-balancing algorithms can be used in the switch in order to optimize this load balancing? Explain.

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

a. What is SSL? What is its use in virtual private networks?

b. Explain SAN Extension Protocols

c. Discuss the concept of Virtualization with respect to Data Center.

d. Explain the concept of VSAN and Zoning