(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.

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

a. Explain the difference between equal-cost and unequal-cost load sharing with help of suitable example

b. What is a summary route? In the context of static routing, how are summary routes useful? Explain with suitable examples.

c. What mechanisms does TCP use to provide connection-oriented service?

d. Explain the path determination parameters in detail.

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

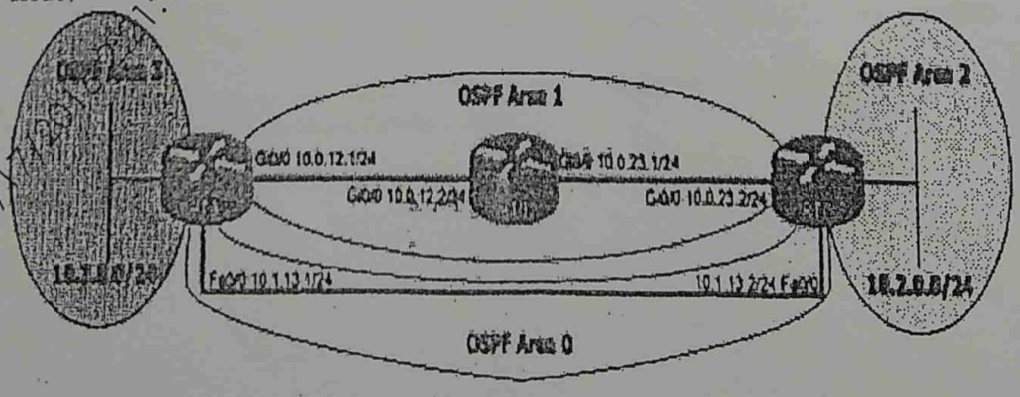
a. Refer to the command and the output below and explain what triggered the first SPF recalculation and how.

```
C1#show ip ospf statistics
            OSPF Router with ID (11.100.1.11) (Process ID 100)
  Area 0: SPF algorithm executed 2 times
  Summary OSPF SPF statistic
  SPF calculation time
Delta T   Intra D-Intra Summ    D-Summ Ext    D-Ext  Total  Reason
00:05:12  0     0       0       0      0      0      0      R, SN, X
00:05:02  0     0       0       0      0      0      0      R, SN, X
00:02:57  0     0       0       0      0      0      0      X
```

b. Explain the factors having the biggest influence on OSPF scalability?

c. Explain the OSPF LSA types which are flooded within the originating area.

d. You have performed multiple changes to your OSPF configuration. After these changes, you receive a lot of calls from users in OSPF area 2 complaining about application performance issues when they access servers connected to area 3. When you check the routing table of router RTC, you notice that packets to network 10.3.3.0/24 are sent out via the slower path out of the Fa0/0 interface. Explain the action you can do to solve this issue?



Contd...

3. **Attempt *any two* of the following:** 12
a. What are the mandatory, well-known BGP attributes? Explain.
b. Router is configured for BGP as dual-homed on the network. Which three BGP attributes are carried in every BGP update on this router (both IBGP and EBGP)? Explain.
c. Explain the major difference between an IPv4-compatible tunnel and a 6to4 tunnel?
d. Differentiate between the PIM-SM and PIM –DM.

4. **Attempt *any two* of the following:** 12
a. Explain what technical metrics SLA should include.
b. Compare and contrast VTP and DTP.
c. Explain the two modes of Ether-Channel in detail.
d. Explain Access-Distribution Block Designs.

5. **Attempt *any two* of the following:** 12
a. Explain the scaling of Aggregation Layer in Data-center.
b. What are different SAN components?
c. Explain SAN Extension Protocols.
d. Explain SSL VPN implementation.

(2½ hours)

Total Marks: 60

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

1. Attempt *any two* of the following: 12
a. Explain the different location dependent services.
b. Explain Space division multiplexing and code division multiplexing.
c. Discuss the advantages and disadvantages of cellular systems with small cells.
d. Discuss the problem of near and far terminals.

2. Attempt *any two* of the following: 12
a. Explain the GSM TDMA frame, slots and bursts.
b. With the help of a neat diagram explain the GPRS transmission plane protocol reference model.
c. What are the five groups of radio access technologies standardised by ITU? Explain each in brief.
d. Explain localisation and handovers in satellites.

3. Attempt *any two* of the following: 12
a. What are design goals for commercial success of wireless LAN? Explain.
b. Explain the concept of DFWMAC-DCF using CSMA/CA and RTS/CTS.
c. Explain the architecture of Bluetooth.
d. Explain the format of IEEE 802.11physical frame format using FHSS.

4. Attempt *any two* of the following: 12
a. What is Mobile-Quality of Service? What are its different parts? What are the two types of services supported by wireless ATM during handover?
b. Explain IP-in-IP encapsulation.
c. With the help of a neat diagram explain the architecture of hierarchical mobile IP.
d. With the help of a neat diagram explain the agent discovery packet.

5. Attempt *any two* of the following: 12
a. What is snooping TCP? How does it work? What are its advantages and disadvantages?
b. Discuss the problems faced by the web applications in mobile and wireless environment.
c. What is selective retransmission? What are its advantages and disadvantages?
d. Explain the WAP 1.x logical architecture.

(2½ hours) Total Marks: 60

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

1. **Attempt *any two* of the following:** 12
a. Explain High Performance Computing(HPC) and High Throughput Computing(HTC) and their applications.
b. Explain the design issues in Clustering.
c. What is utility computing? Give examples of utility computing in existence.
d. State Amdahl's Law. What is the problem with fixed load? How is it overcome?

2. **Attempt *any two* of the following:** 12
a. Explain public, private and hybrid clouds with examples.
b. With the help of a diagram explain the generic cloud architecture.
c. Discuss the virtualization support in Windows Azure, Amazon Web Service and Google App Engine.
d. Discuss the Quality of Service factors for clouds.

3. **Attempt *any two* of the following:** 12
a. Explain the service offerings of any three major cloud platforms.
b. Write a brief note on the interaction of Virtual Machine Managers for cloud creation and management.
c. Describe the architecture of MapReduce in Hadoop.
d. Enlist the techniques related to security, privacy, and availability requirements for developing a healthy and dependable cloud programming environment.

4. **Attempt *any two* of the following:** 12
a. With the help of a neat diagram, explain Google File System.
b. Explain the following:
i) Amazon Elastic Block Store.
ii) Amazon Simple DB service.
c. Write a note on the Nimbus cloud infrastructure.
d. What are the advantages of Aneka over other distributed workload solutions? What are the three types of capabilities offered by Aneka to build, accelerate and manage clouds and its applications?

5. **Attempt *any two* of the following:** 12
a. What is Magellen? What are the research issues addressed by it?
b. List and explain the properties of social network graph.
c. Explain the different application domains of social networks.
d. Compare the programmer's perspective of Data-intensive scalable computing and conventional supper computer.

(2½ hours)

Total Marks: 60

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Q1 Attempt *any two* of the following: 12

a. PQR College is A graded college. It has five departments. The departments are headed by senior most and qualified faculty. The placement of final year students from all branches is managed by placement center. Placement center is managed by one of the faculty from any department. The teaching load of that faculty is zero. To assist placement center head, there are placement secretaries (whose teaching load is 13) from each department along with placement assistance from students (selected by placement center) of all five departments.
Placement center is responsible for on-campus and off-campus recruitment of students. The placement process requires students resume and relevant documents along with the approval from the placement center. Companies invited on campus conduct tests followed by interviews. The criteria of selection depend on academic performance and interview. For off-campus placements, placement center head must accompany students to the venue.
   i. Draw enhanced entity relationship diagram.
   ii. Draw class diagram.
   iii. Write 5 suitable queries in OQL.

b. Explain Hierarchies and Lattices with respect to EER diagram.

c. What are the constraints on Specialization and Generalization? Explain with examples.

d. Explain attribute inheritance and relationship inheritance.

Q2 Attempt *any two* of the following: 12

a. State and explain the rules of OODBMS.

b. Explain the following with respect to object query language:
Views and Named Queries, Collection Operators, Grouping Operators.

c. Discuss the implementation issues for extended type systems.

d. Explain how a persistent pointer is implemented. Contrast this implementation with that of pointers as they exist in general-purpose languages, such as C or C++.

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