Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech/IT(OLD)/SEM-6/IT-603/2013

2013

DATA COMMUNICATION AND NETWORKING

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) If 8 station have to be connected using mess topology, then total number of links required is

a) 64 b) 28

c) 16 d) 8.

ii) If a FDMA network has eight stations, the medium bandwidth has ..... bands,

a) 16 b) 8

c) 4 d) 1.

iii) In an optical fiber, the inner core is ..... the cladding.

a) denser than b) less dense than

c) the same density as d) another name for.

iv) Which of the following is true ?

a) FTP allows systems with different directory structures to transfer file

b) FTP allows a system using ASCII and a system using EBCDIC to transfer file

c) FTP allows a PC and a Sun workstation to transfer files

d) All of these are true.

v) Hamming code is a method of

a) Error detection b) Error correction

c) Error encapsulation d) Both (a) and (b).

vi) In the string 219.46.123.107, what is the network address of the host we are looking for ?

a) 219.46.123.0 b) 107.123.0.0

c) 219.46.0.0 d) 219.0.0.0.

vii) Connection establishment involves a ..... handshake.

a) One-way b) Two-way

c) Three-way d) None of these.

viii) Given the IP address 180.25.21.172 and the subnet mask 255.255.192.0, what is the subnet address ?

a) 180.25.21.0 b) 180.25.0.0

c) 180.25.8.0 d) 180.0.0.0.

ix) A bridge has access to the ..... address of a station on the same network.

a) Physical (MAC) b) Network

c) Service access point d) All of these.

x) For stop and Wait ARQ, for n data packets sent, ... acknowledgements are needed.

a) n b) $2n$

c) $n - 1$ d) $n + 1$.

xi) Which of the following is an interior routing protocol ?

a) RIP b) OSPF

c) BGP d) Both (a) and (b).

xii) The Hamming distance between (101011) and (110001) is

a) 1 b) 3

c) 2 d) 6.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Why does the Internet model have been divided into layers ? Write down the differences between TCP/IP model and OSI model. 3 + 2

3. What is subnetting ? How do the subnet mask and supernet mask differ from a default mask in classful addressing ?

2 + 3

4. Write down the differences between connectionless connection oriented services with example. Which type of service is provided by IPv4 ? 4 + 1

5. What are the differences between the delivery of a frame in data link layer and the delivery of a packet in network layer ? Why do OSPF message propagate faster than RIP messages ?

3 + 2

6. Why do we need a DNS system, when we can directly use an IP address ? In electronic mail, what is MIME ? 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Briefly explain two dimensional parity check method of error detection with an example.

   b) If m is the message bits and r is the redundant bits, then prove the following relation

   $$2^r >= m + r + 1$$

   c) Given a 10 bit sequence 1010011110 and a divisor of 1011, find the CRC. Check your answer.

   d) A channel has a data rate of 4 kbps and propagation delay of 20 ms. For what range of frame size does stop-and-wait give an efficiency of at least 50% ?

   3 + 3 + 5 + 4

8. a) What is the basic difference between1-persistent and *p*-persistent strategy ?

   b) Briefly describe the Pure ALOHA procedure.

   c) How is the loop problem removed in transparent bridges ? Explain with an example.

d) What are the main differences between Amplifier and Repeater ?

e) What is VLAN ? How does a VLAN reduce network traffic ? 2 + 3 + 4 + 2 + 4

9. a) Explain count to infinity problem with an example.

b) What is the purpose of BGP ?

c) What is the role of Dijkstra algorithm in unicast routing ?

d) Write down the advantages of hierarchical name space over flat name space.

e) How does recursive resolution differ from iterative resolution ?

f) What is the purpose of inverse domain ?

3 + 3 + 2 + 2 + 3 + 2

10. a) What is silly window syndrome ?

b) Describe the functions of the two FTP connections.

c) Explain RSA algorithm with an example.

d) Do port addresses need to be unique ? Write down the reasons to justify the answer.

e) What are four general techniques to improve QoS ?

2 + 3 + 5 + 3 + 2

11. a) Compare TCP header and UDP header.

b) 'Transport layer is the true end to end layer' — Critically comment.

c) Briefly explain the Leaky Bucket technique.

d) Explain RIP updating procedure with an example.

4 + 2 + 4 + 5