

Name _____ Student No. _____

No aids allowed. Answer all questions on test paper. Use backs of sheets if necessary.

Total Marks: **30**

- [10] 1. This question concerns the article *The Dawn of the “Stupid Network”*, by D.S. Isenberg. What are the three basic advantages that “Stupid Networks” (SNs) have over “Intelligent Networks” (IN)? Describe each briefly.

Solution:

- Abundant infrastructure: in a SN, since infrastructure is inexpensive, if you have congestion, just add more connections, bandwidth, switching or preprocessing power. If you want reliability, add more routes or more redundancy. If you want more intelligence for features or services, just add it at the end-point.
- Underspecification: this means, “bits-in, bits-out.” It is nothing special for unspecified networks to carry voice, music, bank balances, e-mail or TV on the same facilities. The convenience of underspecification more than makes up for the occasional jam-up.
- Internetworking: IP points to the key property of SN: to IP it does not matter if the underlying transport is a circuit, Ethernet, Bitnet or FDDI. An IP application works the same no matter what the underlying network technology—this makes the details of how a network works irrelevant, and so users are in control of their interactions.

- [10] 2. This question concerns the article *What DNS Is Not*, by Paul Vixie. What is NXDOMAIN? How does NXDOMAIN relate to the “same origin trust model” used for Web cookies?

Solution: NXDOMAIN is a DNS answer in the case where an application looks up a domain name that is not there; i.e., the answer to a query for a nonexistent name in the DNS database.

Every TCP/IP application knows how to cope with NXDOMAIN. Such an application, when it gets the NXDOMAIN response, is supposed to treat its own request as an error and reject its own underlying work item that led to this lookup. Some DNS sites, instead of sending NXDOMAIN would direct the application to, say, an advertising server.

But NXDOMAIN was not designed to be a revenue hook; applications depend on accurate error signals from DNS. In the “same origin trust model” used for Web cookies, if you have a cookie for, say, `Google.com`, and you make the mistake of following a bogus link `XXXXXXXXXXYYXYYXYYXYYX.Google.com`, and the resulting NXDOMAIN response is remapped into a positive answer to some “rogue” server, then you might send your `Google.com` cookie (and all the private information it contains!) to that “rogue” server.

- [10] 3. Consider a classless inter-domain routing (CIDR) scheme, where the routing table contains the following pairs, network and interface:

Line	Network	Interface
1	00110101 00000000 00000000 00000000	interface ₁
2	01000110 00000000 00000000 00000000	interface ₂
3	01010110 00000000 00000000 00000000	interface ₃
4	01100001 00000000 00000000 00000000	interface ₄
5	10101010 11110000 00000000 00000000	interface ₅
6	10110000 00000010 00000000 00000000	interface ₆
7	10111011 00001010 00000000 00000000	interface ₇

Give the corresponding binary trie. Label each leaf with the number of the corresponding line in the above table.

Solution:

