Indian Institute of Technology Kharagpur
School of Information Technology
IT 30037 : Introduction to Internet

Date: 29th Sept 2011 (after noon) Mid-Semester Examination Marks: 50 Time: 2 hrs

1. Specify the layers present in OSI reference model, and mention any two important services provided by each layer. **(10 Marks)**

2. Briefly, explain the following: (I) Circuit switching, (ii) Packet switching and (iii) Message switching. **(6 Marks)**

3. Design a FDM scheme for multiplexing 10 voice channels. Each voice channel has spectral components up to 4 KHz. Suggest the appropriate carrier frequencies and the overall bandwidth required to carry out the FDM. **(4 Marks)**

4. The following code vectors (1001011, 0101101 and 0011110) are generated from a (7,3) parity check code. Find the rule for generating each of the parity checks. Generate all the valid code vectors. What is the minimum distance of this code? What is the error detection and correction capability of this code? **(10 Marks)**

5. If each packet carries 1000 bits of data, how long does it take to send 1 million bits of data using (i) stop and wait ARQ, (ii) go-back-n ARQ and (iii) selective repeat ARQ. Assume that all three ARQs are using 3 bits for representing sequence numbers. The distance between sender and receiver is 5000 Km and the propagation speed is 2×10^8 m? Ignore transmission, waiting and processing delays. Assume no data or control frame is lost or damaged. **(10 Marks)**

6. Briefly, explain the principles of the following channel allocation protocols:
   (i) Pure and Slotted ALOHA protocols
   (ii) CSMA protocols
   (iii) Collission free protocols
   (iv) Limited contension protocols **(10 marks)**