B.E. (Elect.) VII (Rev.) 2/6/07

Comm. Engg. II

Con. 2958-07. ND-1459

(REVISED COURSE)

(3 Hours) [Total Marks : 100

N.B.(1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume suitable data wherever **necessary**.

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1. (a) Explain the functioning of a BPSK transmittter and receiver with the help of neat block diagram. 10
   (b) Explain the following :— 10
      (i) Keppler's laws
      (ii) Satellite transponder.

2. (a) Draw architecture diagram of a GS M system and explain its features and operation. 10
   (b) Construct the code for G matrix given below for a non-systematic (6, 3) code. 10

$$G = \begin{bmatrix} 0 & 1 & 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

   Also show that $d_{min} = 3$.

3. (a) A discrete memoryless source has an alphabet of seven symbols with probabilities 0·25, 0·25, 0·125, 0·125 0·125, 0·0625, 0·625. Compute Huffman codes. 10
   (b) The input data d(t) to DPSK modulator is 001010011010. Determine DPSK output bit stream b(t). Show that b(t) b(t – T_b) yields the original data. 10

4. (a) State and prove channel capacity theorem. 10
   (b) Explain binary FSK transmitter and Coherent binary FSK receiver. Draw and explain signal space diagram for coherent binary FSK system. 10

5. (a) Explain coherent QPSK transmitter and receiver along with signal space diagram. 10
   (b) Differentiate between followings : 10
      (i) M-PSK and QPSK
      (ii) Systematic codes and non-systematic codes

6. (a) Find out the generator matrix for a systematic (7, 4) cyclic code if 10
      $G(p) = p^3 + p + 1$
      Also find out the parity check matrix.
   (b) Draw the block diagram of a satellite earth station and explain the operation. 10

7. Write short notes on any **three** :— 20
      (i) Matched filter
      (ii) Trellis diagram for convolutional encoder
      (iii) Cell splitting and frequency reuse
      (iv) Syndrome decoding for hamming codes.