BE(E) VII (R)
COMMUNICATION ENGG.

Con. 2947–09. VR–4707

(3 Hours) Page 1 [Total Marks : 100

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

1. (a) State and explain Shanon-Hartely Theorem. 5
   (b) Explain eye pattern with a neat sketch. 5
   (c) State and explain Keppler's laws. 5
   (d) Explain the terms, 'Cell Splitting' and 'frequency reuse'. 5

2. (a) Draw and explain orthogonal QPSK transmitter and receiver. 10
   (b) Draw the block diagram of a satellite earth station and explain the working. 10

3. (a) Compare the following :— 10
      (i) ISI and ICI
      (ii) Systematic and Non-systematic Codes
   (b) State and prove the Sampling Theorem for low pass signal. 10

4. (a) Explain the following terms :— 10
      (i) Entropy
      (ii) Information rate
      (iii) Channel Capacity
   (b) Consider a telegraph source having two symbols dot and dash. The dot duration is 0·2 sec. and the dash duration is 3 times the dot duration. The probability of dots occuring is twice that of dash and time between symbols is 0·2 seconds. Calculate information rate of the telegraph source. 10

5. (a) Explain Syndrome decoding for Cyclic codes. 10
   (b) Find out the generator matrix for a systematic (7, 4) cyclic code, if 10
      $G(p) = p^3 + p + 1$
      Also find the parity check matrix.

6. (a) Explain the various losses that occur in optical fibers. 10
   (b) Explain the working of a 2 Cavity Klytron with the help of a neat sketch. 10

7. Write short notes on any **three** :— 20
   (a) Duobinary encoder
   (b) MTSO
   (c) PIN Photodiode
   (d) Station Keeping.