



SF-7147

B. E. III (Sem. VI) (I.T.) Examination

May / June - 2011

Elements of Information Theory

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दृष्टावेक निशानीवाणी विगतो उतरवडी पर अवश्य लपवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. 3 (SEM. 6) (I.T.)

Name of the Subject :
ELEMENTS OF INFORMATION THEORY

Subject Code No. : 7 1 4 7 Section No. (1, 2,.....): Nil

Seat No. :

Student's Signature

- (2) Figures to extreme right indicate maximum marks.
(3) Make necessary assumptions and clearly mention them, if required.
(4) Support your answers with block diagram or neat sketches, if required.

- 1 (a) Attempt the following questions : 10
- (i) What do you mean by homophones ?
(ii) What is Nonrepudiation ?
(iii) Define Morse code.
(iv) Define the amount of information.
(v) What is trap-door one-way function ?
(vi) List out the different substitution techniques.
(vii) Define Entropy.
(viii) What is One Time Pad ?
(ix) What is denial of service ?
(x) What do you mean by data Integrity ?
- (b) Discuss the Passive Attacks and Active Attacks 4
(c) Explain Shannon's Theorem with Channel Capacity. 4

- 2** Attempt the following questions : (any **four**) **16**
- (i) Explain Monoalphabetic cipher with example.
 - (ii) Derive the formula for the Fourier Transform. With the help of this equation find the value of amplitude spectral density for the $v(t) = \sin \omega_o t$.
 - (iii) Explain working of Hill Cipher.
 - (iv) What is Digital Signature ? Explain its properties.
 - (v) Explain Convolution Theorem.
- 3** Answer the following : **16**
- (a) Describe the algorithm for coding to increase average information per bit with example. **8**
- OR**
- (a) Explain Normalized Power. Also explain Normalized power in a fourier expansion. **8**
 - (b) For the RSA algorithm given plaintext is ATTACKXATXSEVEN **6**
Calculate the following :
 - (a) Find the prime factors
 - (b) Find Encryption, Decryption key
 - (c) Find out cipher text
 Find plain text from the cipher text.
 - (c) Explain the term “Encryption scheme is unconditionally secure.” **2**
- 4** (a) Answer the following questions : **10**
- (i) Define probability with example.
 - (ii) Plot clock wave form for Biphase data.
 - (iii) Define encoding and its types.
 - (iv) ‘JPEG is image compression technique and MPEG is video compression technique’ justify your answer.
 - (v) Draw the waveform for $f_s > 2f_m$ and $f_s < 2f_m$ based on Sampling theorem.
- (b) Answer the following questions : **10**
- (i) Explain sampling theorem and its effect on low-pass signal. **6**
 - (ii) Briefly describe the joint probability of Related and Independent Events. **4**

- 5** Answer the following questions : **15**
- (i) Explain signal determination with noise described by a distribution function. **5**
 - (ii) Explain in detail power spectral density of a sequence of Random pulse. **10**

OR

- (ii) (a) Explain noisy communication channels in brief. **4**
 - (b) Discuss source encoding with example. **6**
- 6** (a) Explain data compression in detail. **8**
- (b) Explain Auto correlation. **7**

OR

- (b) Write note on MPEG standard. **7**
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