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**Question Paper Code : 40903**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018  
Third/Fourth Semester  
Computer Science and Engineering  
CS6304 – ANALOG AND DIGITAL COMMUNICATION  
(Common to Biomedical Engineering/Information Technology)  
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Give the classification of noise.
2. A carrier of 10 MHz frequency and peak value of 10 V is amplitude modulated by a 5 KHz sinewave of 6 V amplitude. Find the modulation index.
3. For 16 PSK and a transmission system with a 10 KHz bandwidth, find the maximum bit rate.
4. What is QAM ?
5. Find the number of Hamming bits required for a 12 bit data string to form an error control code.
6. State two functions of UART.
7. Find the entropy of the source  $X = \{x_1, x_2\}$  with the message probabilities  $\{1/2, 1/2\}$ .
8. Define channel capacity.
9. Find the number of cells in a cluster and locate the first-tier-co-channel cells for the following values :  $j = 2$  and  $i = 3$ .
10. What is FDMA ?

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PART - B

(5×13=65 Marks)

11. a) i) The available output noise power from an amplifier is 80 nW, the available power gain of the amplifier being 40 dB and the equivalent noise bandwidth being 25 MHz. Find the noise figure, assuming room temperature to be 27°C. (4)
- ii) Explain the phasing method of generation of SSB-Sc signal. (9)
- (OR)
- b) i) A FM radio link has a frequency deviation of 30 KHz. The modulating frequency is 3 KHz. Find the bandwidth needed for the link. (3)
- ii) An angle-modulated signal has the form  $v(t) = 100 \cos [2\pi f_c t + 4 \sin 2000\pi t]$  where  $f_c = 10$  MHz.
- Find :
- a) The average transmitted power (1)
- b) Peak phase deviation (3)
- c) Peak frequency deviation (3)
- d) Is this FM or a PM signal ? Explain. (3)
12. a) i) Find :
- a) The peak frequency deviation
- b) Minimum bandwidth
- c) Band for a binary FSK signal with a mark frequency of 49 KHz, a space frequency of 51 KHz and an input bit rate of 2 kbps. (3)
- ii) Draw the ASK, FSK, BPSK and QPSK waveforms for the bit stream 10110001. (8)
- iii) What is MSK ? (2)
- (OR)
- b) Compare the various digital modulation techniques. (13)
13. a) i) Explain the working of a simplified two-station data communication circuit. Explain the various data transmission modes. (8)
- ii) Briefly write on standard organisations for data communications. (5)
- (OR)
- b) i) Explain the working of PCM transmitter. (10)
- ii) Define PAM and PTM. (3)



14. a) i) Encode the following source using Shannon-Fano technique. Find the coding efficiency  $P[X] = [0.48 \ 0.15 \ 0.10 \ 0.10 \ 0.07 \ 0.05 \ 0.03 \ 0.02]$  (11)  
ii) State channel coding theorem. (2)

(OR)

- b) Explain viterbi decoding algorithm. Make suitable assumptions. (13)
15. a) Explain the following :  
i) Frequency reuse (5)  
ii) Channel assignment and Hand off strategies. (8)

(OR)

- b) i) Write notes on Bluetooth. (4)  
ii) Explain various multiple access schemes. (9)

PART - C

(1×15=15 Marks)

16. a) i) Consider a discrete memoryless source with five different symbols with their respective probabilities as 0.1, 0.2, 0.4, 0.1 and 0.2. Encode the source using Huffman coding and find the coding efficiency. (12)  
ii) What is the need for modulation. (3)

(OR)

- b) i) Explain, satellite communication system using a block diagram. (12)  
ii) Draw the signal constellation diagrams of 16 QAM and 16 PSK. (3)