

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIFTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018**

**Course Code: CS307**

**Course Name: DATA COMMUNICATION (CS)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 3 marks*

Marks

- 1 Mention the purpose of cladding in Optical Fibres? (3)
- 2 What is the channel capacity for a teleprinter channel with a 300-Hz bandwidth and a signal-to-noise ratio of 3 dB, where the noise is white thermal noise? (3)
- 3 What is Bandwidth? A periodic signal has a Bandwidth of 20 Hz. The Highest frequency is 60 Hz. What is the lowest Frequency? Draw the Spectrum if the signal contains all frequencies of same amplitude. (3)
- 4 Indicate some significant differences between broadcast radio and microwave. (3)

**PART B**

*Answer any two full questions, each carries 9 marks*

- 5 a) Differentiate between Attenuation and Delay Distortion. (4.5)  
b) For a parabolic reflective antenna operating at 12 GHz with a diameter of 2 m, Calculate the effective area and the antenna gain. (4.5)
- 6 a) Briefly discuss Line of Sight Propagation. (4.5)  
b) Assume that a TV picture is to be transmitted over a channel with 4.5 MHz Bandwidth and a 35 dB SNR Ratio. Find the capacity of the channel. (4.5)
- 7 a) What is the thermal noise level of a channel with a bandwidth of 10 KHz carrying 1000 Watts of power operating at 50°C? (4.5)  
b) Explain the following terms: (4.5)  
i) Direct broadcast satellite (DBS) ii) Isotropic antenna

**PART C**

*Answer all questions, each carries 3 marks*

- 8 Find the Bandwidth for a signal transmitting at 12 Mbps for QPSK. The value of  $d=0$ . (3)
- 9 Encode the given bit stream using NRZ-I. 100010001111 (3)
- 10 What is CDMA? Explain. (3)
- 11 Explain Space Division Multiplexing. (3)

**PART D**

*Answer any two full questions, each carries 9 marks*

- 12 a) Differentiate between Synchronous TDM and Statistical TDM. Why is a statistical time division multiplexer more efficient than a synchronous time division multiplexer? (4.5)

- b) With a neat Sketch discuss the various steps involved in PCM. (4.5)
- 13 a) Given the bit pattern 101110001. Encode the stream using BFSK and QPSK. (4.5)
- b) Explain frequency division multiplexing. How is interference avoided by using FDM? (4.5)
- 14 a) Explain the analog modulation techniques briefly. (4.5)
- b) Discuss Synchronous Optical Network (SONET). (4.5)

**PART E**

*Answer any four full questions, each carries 10 marks*

- 15 a) In a CRC error-detecting scheme, choose divisor polynomial  $P: x^4 + x + 1$ . Encode the bits 10010011011. (7)
- b) Why would you expect a CRC to detect more errors than a parity bit? (3)
- 16 a) What is meant by Hamming distance? (3)
- b) Derive a Hamming code for single bit error correction (For a data of length 7 Bit). (7)
- 17 a) Discuss synchronous transmission. How is synchronization provided for synchronous transmission? (7)
- b) What is a major disadvantage of asynchronous transmission? (3)
- 18 a) Explain the difference between datagram and virtual circuit operation. (7)
- b) What is the significance of packet size in a packet-switching network? (3)
- 19 a) What are the advantages of packet switching compared to circuit switching. (7)
- b) What is meant by setup phase in circuit switching? (3)
- 20 Explain the following terms: (10)
- i) DSSS ii) FHSS
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