INSTITUTE OF AERONAUTICAL ENGINEERING

Dundigal, Hyderabad -500 043

INFORMATION TECHNOLOGY

ASSIGNMENT

Course Name	:	**DATA COMMUNICATIONS**
Course Code	:	A40409
Class	:	II- B. Tech
Branch	:	Information Technology
Year	:	2016 – 2017
Course Coordinator	:	Mrs.J.Sravana
Course Faculty	:	Mrs. J.Sravana

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

S.No	Question	Blooms Taxonomy Level	Course Outcome
	ASSIGNMENT-I **UNIT-I** **INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING** **&** **SIGNALS, NOISE, MODULATION, AND DEMODULATION**		
1.	Describe the architecture and functions of all layers in OSI model.	Remembering	1
2	a) List and compare the basic data communications network topologies? b) What are the advantages of layered architecture?	Understanding	2
3	a)Define protocol? b) Differentiate connection oriented and connection less protocol. c) Describe the following Network topologies i) Bus ii) Star iii) Mesh	Remembering	1
4	a) Explain Network components, functions and features. i) Protocol ii) Peer to Peer data communication iii) Serial and Parallel data transmission iv) Encapsulation and decapsulation	Analyzing	1,2
5	a) List out and describe the functions of different components of a data communications circuit. b) What are the transmission modes of a data communication system? Explain them.	Analyzing	2

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6	a) What are the various factors involved in designing computer network? Explain. b) For an electronic device operating at 17 ^{0}C with a bandwidth of 25 kHz, determine the Thermal noise power in watts and dBm?	Remembering	3
7	i) Define bandwidth efficiency. ii) For a 8-PSK system operating at an information bit rate of 64kbps, determine minimum bandwidth and bandwidth efficiency.	Understanding	2
8	Briefly describe the importance of the Shannon limit for information?	Understanding	4
9	Describe the architecture and functions of all layers in OSI model.	Understanding	1
10	a) List and compare the basic data communications network topologies? b) What are the advantages of layered architecture?	Understanding	2
	ASSIGNMENT – II **UNIT-II** **MULTIPLEXERS& TRANSMISSION MEDIA**		
1	a) Define velocity factor and dielectric constant and explain how they affect the performance of a given transmission line. b) For a given length of a coaxial cable with distributed Capacitance C = 48.3 pF/m, and inductance L = 241.56 nH/m, determine the velocity factor and velocity of propagation of the wave.	Analyzing	5
2	a) Explain the following i) Refraction ii) Snell's law iii) NA iv) Acceptance Angle	Understanding	5
3	a) List out different types of metallic transmission lines and explain them in detail. b) If a coaxial cable of one meter length has inner conductor diameter of 0.025 inch; and inner diameter of the outer conductor of 0.15 inch. Calculate its characteristic impedance.	Applying	5
4	a) With suitable sketches, explain about TDM digital hierarchy system. b) write about concentrators and explain the various switching techniques.	Understanding	4
5	a) list out the features of all six types of unshielded twisted pair cables b) What is the significance of the twisting in twisted pair cable? c) Explain about modal dispersion in optical fiber.	Understanding	5
6	a) Explain the following i) Light Detectors ii) Light sources b) What is Laser? Explain different types of Lasers and also its characteristics?	Understanding	5
7	a) Compare parallel-conductor transmission lines and coaxial transmission lines. b) Why is single-mode propagation impossible with graded-index optical fibers? Explain.	Understanding	5
8	Discuss in detail about a)Terrestrial propagation of waves b)microwave link c)satellite communication	Remembering	6
	UNIT-III **TELEPHONE INSTRUMENTS AND SIGNALS&THE TELEPHONE CIRCUIT**		
1	Explain the working of Electronic telephone and subscriber loop.	Understanding	6
2	a) Briefly describe what happens when a telephone set is taken off hook. b) Briefly describe a local subscriber loop.	Analyzing	6
3	a) Discuss the basic telephone call procedures.	Understanding	6

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	b) What are basic functions of a telephone set? c) What are the various steps involved in completing a local telephone call?		
4	What are the various voice –frequency circuit arrangements? Explain with diagrams.	Understanding	6
5	a) An EDD test on a basic telephone channel indicated that a 1600 Hz carrier experienced the minimum absolute delay of 550µS.Determine the maximum absolute envelope delay that any frequency within the range of 800Hz to 2600Hz can experience.	Applying	6
6	A C-message noise measurement taken at -25dBm TLP indicates -72dBm of noise .A test tone is measured at the sameTLP at -25dBm.Determine the following levels: a. Signal power relative to TLP(dBmO) b. C-message noise relative to reference noise (dBrn) c. C-message noise relative to reference noise adjusted to a 0 TLP(dBrnc0). d. signal to noise ratio	Applying	6
7	The magnitude of the crosstalk on a circuit is 66 dB lower than the power of the signal on the same circuit. Determine the crosstalk in dBx	Applying	6
8	a)Explain the transmission parameters and private line circuits b) Write the various power measurement units.	Remembering	6
	ASSIGNMENT – III **UNIT-IV** **CELLULAR TELEPHONE SYSTEMS&DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS**		
1	a) Determine the BCC for the following data, and CRC generating polynomials: G(x) = x7 + x5 + x4 + x2 + x+1 ; P(x) = x5 + x4 + x + 1; b) Explain the different types of Bar codes that are commonly used.	Applying	7
2	a) What are cyclic codes? Discuss how cyclic codes can be used for error detection. b) Determine the BCC for **G(x)=x +x +x +x and P(x)=x +x +x +x** .	Applying	7
3	a) Explain about the error correction methods used in data communications. b) For a 12 bit data string of 101100010010, determine the number of Hamming bits required; arbitrarily place the Hamming bits into the data string. Also determine the logic condition of each Hamming bit. Assume an arbitrary single bit transmission error, and prove that the Hamming code will successfully detect the error.	Applying	7
4	a) Compare cyclic redundancy checking with vertical redundancy checking with an example. b) Explain the Hamming code with example.	Analyzing	7
5	Explain barcodes in detail with example	Understanding	7
6	a) Briefly describe the N-AMPS cellular telephone system. b) List the specifications of IS-95 standard	Remembering	6
7	Explain the following i) Morse code ii) Baudot code iii) ASCII code	Understanding	7
8	a) Explain the following i) Redundancy ii) Echoplex. iii) Exact-count encoding b) What is the purpose of placing compromise and adaptive equalizers in a modem?	Understanding	7
9	a) Describe the GSM system architecture.	Understanding	6

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	b) What are the advantages and disadvantages of personal communications satellite system?		
10	a) Describe how vertical redundancy checking accomplishes error detection. Explain it with suitable example. b) Explain the difference between probability of error and Bit error rate.	Understanding	7
	UNIT-V **DATA COMMUNICATIONS EQUIPMENT**		
1	a) Explain about DSU and CSU in detail. b) Explain the terms i)BPS ii)Baud when does bps become equal to baud	Understanding	7
2	a) What is the purpose of placing compromise and adaptive equalizers in a modem? b) Discuss about the Voice-Band Modem and its classifications? c) Explain the basic blocks of an asynchronous voice – band modems.	Understanding	7
3	a) Explain about modem control. b) Write short notes on AT command set.	Understanding	7
4	Explain the bell system compatible voice band modem with block diagram.	Understanding	6
5	a) What is the purpose of placing compromise and adaptive equalizers in a modem? b) Discuss about the Voice-Band Modem and its classifications?	Understanding	7
6	Calculate the bandwidth efficiency of a 202 modem with data transmission rate of 1200bps and available bandwidth of 2700 Hz.	Analyzing	7
7	Explain the operation of scrambler and descrambler circuit with example.	Understanding	7
8	a)List the basic blocks of a voice band modem b)List the basic blocks of a asynchronous voice band modem	Remembering	7
9	a)Define data terminal equipment b) Describe the basic functions of a digital service unit	Understanding	7
10	a)Define data communications equipment b) Describe the basic functions of a channel service unit	Understanding	7

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