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10EC/TE61

Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
Digital Communication

Time: 3 hrs. Max. Marks:100

Note: *Answer FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. With neat block diagram, explain the operation of digital communication system. Explain the functioning of each block. (06 Marks)

b. Explain the term qudrature sampling of band pass signal with help of spectrum and block diagram. (08 Marks)

c. A signal $x(t) = 2\cos 400\pi t + 6\cos 640\pi t$ is ideally sampled at $f_s = 500$Hz. If the sampled signal is passed through an ideal low pass filter with cut off frequency $f_s = 400$Hz. Find :
i) X(f) and sketch its spectrum
ii) Sampled signal $X\delta(f)$ and sketch its spectrum
iii) The components that will appear at the filter output. (06 Marks)

2 a. Derive an expression for maximum signal to quantization noise ratio for PCM system that employs linear quantization techniques. What will be the $[S/N]_{dB}$ if the destination power and signal amplitude are normalized. (08 Marks)

b. With a suitable block diagram, explain the functioning of a PCM system. (06 Marks)

c. A PCM system uses a uniform quantizer followed by a 7 bit encoder. The bit rate of the system is equal to 60×10^6 bits/sec. i) What is the maximum message bandwidth for which the system operates satisfactorily. ii) Determine SNR when a full load sinusoidal wave is considered. (06 Marks)

3 a. Explain the principles of delta modulation, with relevant figures and mathematical expressions explain the functioning of DM transmitter and receiver. (08 Marks)

b. For a binary sequence 111000110110. Draw the waveforms for the following :
i) Digital formats
ii) RZ unipolar
iii) RZ polar
iv) NRZ bipolar
v) Manchester coding. (06 Marks)

c. Obtain an expression for the power spectral density of NRZ polar wave form. (06 Marks)

4 a. The binary data 001101001 are applied to the input of a duobinary system. Construct the duobinary coder output and corresponding receiver output assume the precoder is used. (04 Marks)

b. What is an eye pattern? Explain how it is helpful in understanding the ISI problem. (08 Marks)

c. What is ISI? Derive an expression for Nyquist pulse shaping criteria for distributionless base band binary transmission. (08 Marks)

PART – B

5 a. Explain with neat block diagram the coherent QPSK transmitter and receiver. For a given binary sequence 01101000. Draw the signal space representation and relevant QPSK wave forms. (10 Marks)

b. Explain M-ary modulation techniques. (06 Marks)

c. Compare binary PSK and QPSK schemes. (04 Marks)

6 a. Consider the signal $S_1(t)$, $S_2(t)$, $S_3(t)$ and $S_A(t)$ as given below in Fig.Q6(a) :

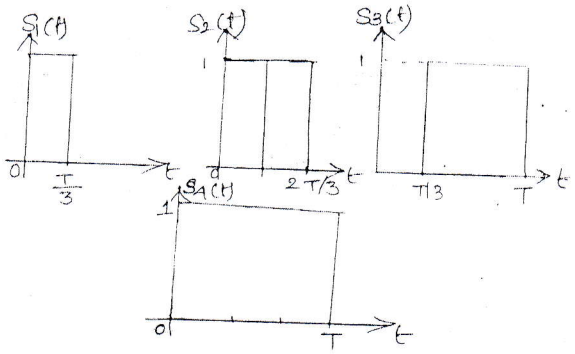

Fig.Q6(a)

Find an orthonormal basis for these set of signal using Gram-Schmidt orthogonalization procedure. (10 Marks)

b. With neat block diagram, explain the principle of detection and estimation. (05 Marks)

c. With vector space representation of message symbols. M = 3, briefly explain geometric representation of message vectors. (05 Marks)

7 a. Derive an expression for probability of error in binary QPSK generation and coherent detection. (08 Marks)

b. Briefly explain the properties of matched filter. (06 Marks)

c. A binary data is transmitted using ASK over a AWGN channel at a rate of 2.4 Mbps. The carrier amplitude at the receiver is 2mv. The noise power spectral receiver is 1MV. The noise power spectral density $\frac{No}{2} = 10^{-15}$ watts/Hz. Find the average probability of error if the detection is coherent. (take erfc(5) = 3×10^{-6}). (06 Marks)

8 a. Explain the principle of direct sequence spread spectrum communication system. (06 Marks)

b. What is spread spectrum? What is the role of PN code in spread spectrum? (04 Marks)

c. Explain the properties of maximum length sequence generated from 3 stage shift resister with linear feedback. Verify these properties and determine the period of the given PN sequence 01011100101110. (06 Marks)

d. Distinguish between slow frequency hopping and fast frequency hopping. (04 Marks)

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10EC/TE62

Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
Microprocessors

Time: 3 hrs. Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1 a. Draw a neat sketch of the execution unit and bus interface unit of 8086 microprocessor and explain. (10 Marks)

b. Explain the different addressing modes of 8086 microprocessor with examples. (10 Marks)

2 a. Explain segment over – side prefix with examples. (05 Marks)

b. Explain fixed port addressing and variable port addressing for IN and OUT instruction. (05 Marks)

c. With an assembly language program to check if the given byte is odd or even. If odd put FFH in next location, if even put 00H in next location. (06 Marks)

d. Explain in the following directives: i) db ii) dw iii) dg iv) dt. (04 Marks)

3 a. Explain the different string instructions. (08 Marks)

b. Write a display MACRO using for statement that is used to display 'VTU' on the screen. (05 Marks)

c. Write a 8086 program with comment that will enter a string and display the reversed string on the screen. (07 Marks)

4 a. Elaborate the function of atleast five dedicated interrupt in 8086 (10 Marks)

b. Explain the priority of 8086 interrupts. (05 Marks)

c. Explain how an interrupt causes the program to go from mainline to interrupt service procedure. (05 Marks)

PART – B

5 a. How would you interface a 4 × 4 keyboard to the 8086 microprocessor? (10 Marks)

b. Explain the stepper motor interface to the micro computer along with full step and half step drive signal order. (10 Marks)

6 a. With a block diagram, explain the 8087 numeric co-processor. (10 Marks)

b. Explain :
i) FSQRT ii) FSCALE iii) FPREM iv) FRNDINT v) FXTRACT. (10 Marks)

7 a. Explain the read cycle timing diagram for minimum mode. (06 Marks)

b. Explain the Peripheral Component Interconnect (PCI) bus in a personal computer system. (06 Marks)

c. Explain : i) $\overline{RD}$ ii) $\overline{WR}$ iii) MN/$\overline{MX}$ iv) $\overline{TEST}$ (08 Marks)

8 a. Explain Pentium processors. (08 Marks)

b. Write a note on programming model of 80486. (12 Marks)

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10EC64

Sixth Semester B.E. Degree Examination, Jan./Feb.2021
Antenna and Propagation

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the following parameters with respect to antenna systems:
(i) Directivity
(ii) Radiation intensity
(iii) Beam width **(09 Marks)**

b. Show that maximum effective aperture of $\frac{\lambda}{2}$ dipole is $0.13\lambda^2$. **(06 Marks)**

c. State and prove Frii's transmission formula. **(05 Marks)**

2 a. Find the directivity for the source with unidirectional cosine squared power pattern. **(05 Marks)**

b. Derive the expression for Array factor in case of linear array of 'n' isotropic sources of equal amplitude and spacing. **(10 Marks)**

c. A linear array consists of 4 isotropic point sources. The distance between adjacent elements is $\frac{\lambda}{2}$. The power is applied with equal magnitude and a phase difference of –dr. Obtain the field pattern and find BWFN and HPBW. **(05 Marks)**

3 a. Derive an expression for radiation resistance of a short electric dipole. **(08 Marks)**

b. Write short notes on folded dipole antennas. **(06 Marks)**

c. For a short dipole $\frac{\lambda}{15}$ long, find the efficiency, radiation resistance if loss resistance is 1 Ω. Find also the effective aperture. **(06 Marks)**

4 a. Derive an expression for far field components of a small loop antenna. **(08 Marks)**

b. State and explain the Babinet's principle. **(06 Marks)**

c. Obtain the value of impedance of slot antenna in terms of its complimentary dipole antenna impedance Z_d. **(06 Marks)**

PART – B

5 a. Explain the features of an helical antenna and the practical design considerations of the helical antenna. **(10 Marks)**

b. Write short notes on:
(i) Yagi-Uda antenna
(ii) Sleeve antenna. **(10 Marks)**

6 a. Explain different types of rectangular and circular horn antennas. Also derive the design equations for rectangular horn antennas. **(10 Marks)**

b. Explain : (i) Turnstile antenna (ii) Ultra wide band antennas. **(10 Marks)**

7 a. Draw and explain different ionized layers in ionospheric propagation. **(10 Marks)**

b. Explain duct wave propagation. **(05 Marks)**

c. Explain the phenomenon of Faraday Rotation and how measurement of total electron content is done for an ionospheric propagation. **(05 Marks)**

8 a. Define the terms with respect to wave propagation :

(i) Skip distance

(ii) Critical frequency.

(iii) Virtual height.

(iv) Maximum usable frequency. **(08 Marks)**

b. Derive the expression for critical frequency in terms of maximum electron density N_{max} . **(09 Marks)**

c. A HF radio link is established for a range of 2000 km. If the reflection region of the ionosphere is at a height of 200 km and has a critical frequency of 6 MHz. Calculate MUF. **(03 Marks)**

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10EC65

Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO full questions from each part.***

PART – A

1 a. Explain the goals of an operating systems. (04 Marks)

b. Write short notes on:
i) Resource allocation and related functions
ii) User interface related functions. (08 Marks)

c. Explain time shared operating system with respect to
i) Scheduling ii) Memory management. (08 Marks)

2 a. What are the functions of an operating system? Explain. (04 Marks)

b. Compare Kernel based and micro Kernel based operating system. (08 Marks)

c. Explain Virtual Machine operating system. What are the advantages of using virtual machines? (08 Marks)

3 a. Write short notes on:
i) Programmer view of processes
ii) OS view of a processes (12 Marks)

b. Write short notes on: i) Processes in unix ii) Threads in solaris. (08 Marks)

4 a. Compare contiguous and noncontiguous memory allocation. (04 Marks)

b. Explain:
i) Lazy buddy allocator in unix
ii) Memory compaction slab allocator of Solaris 2.4 system. (10 Marks)

c. Explain internal fragmentation and external fragmentation with examples. (06 Marks)

PART – B

5 a. Write explanatory notes on: i) Virtual memory in unix ii) Demand paging. (12 Marks)

b. For given reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 and for memory with 3 frames. Calculate the number of page faults for FIFO, optimal and LRU page replacement algorithms. (08 Marks)

6 a. Compare and contrast sequential, direct and index file organization, with examples. (12 Marks)

b. Describe the interface between file and IOCS. (08 Marks)

7 a. Explain the terms long term, short term and medium term scheduling. (06 Marks)

b. Write short notes on: i) Real time scheduling ii) Process scheduling in unix. (14 Marks)

8 Write short notes on:
a. Implementing message passing (08 Marks)
b. Mail boxes (06 Marks)
c. Inter process communication in unix. (06 Marks)

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