Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meaning.

QNo | Question                                      | MM  
--- | --------------------------------------------- | ----  
1   | Attempt any two parts.                      | 6*2=12  
(a) | Differentiate between multi-programmed and multi-tasking operating systems? What type of security problems appear in these systems? Discuss any two.  
(b) | Why programmers prefer API to system calls? List different types of system calls and three example of each.  
(c) | What is a virtual machine? How can they be classified? Explain the implementation of java virtual machine in brief.  
2   | Attempt any two parts.                      | 6*2=12  
(a) | What is a process? What are different process states? List the information which are stored in process control block.  
(b) | Differentiate between message passing and shared memory models of process communication. Explain how communication between two processes takes place in Windows XP.  
(c) | Why is it important for CPU scheduler to differentiate between CPU-bound and I/O-bound processes? Which algorithm(s) discriminate in favor of I/O-bound processes and why?  
3   | Attempt any two parts.                      | 6*2=12  
(a) | What is race condition? Give an example situation which can lead into race condition. How can they be avoided?  
(b) | What are semaphores? Discuss how can they be implemented avoiding busy waiting?  
(c) | Explain banker’s algorithm in brief.  
4   | Attempt any two parts.                      | 6*2=12  
(a) | Explain different methods of contiguous memory allocation. Also discuss the problems associated with them.  
(b) | What is segmentation? Explain in brief how both segmentation and paging are used on Pentium machines.  
(c) | Discuss any three LRU approximation algorithms.  
5(a) | Discuss various protection schemes provided by operating system for files.  
5(b) | Discuss various methods for free space management on disk.  
5(c) | Explain the Linux process scheduling method in brief.  

2013-14
B.TECH. (AUTUMN SEMESTER) EXAMINATION
COMPUTER ENGINEERING
DIGITAL ELECTRONICS
CO-308

Maximum Marks: 60 Credits: 04 Duration: Three Hours

Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meaning.

Q.No. Question M.M.
1(a) Define a digital IC. What is the function of a transducer? Give two examples. [07]
Briefly describe about the noise immunity of a logic circuit using a suitable diagram?

1(b) Explain current sourcing and current sinking action of a logic circuit. Draw and [08]
describe a NOR gate circuit in TTL technology.

OR

1’(b) What do you mean by a digital system? What are the limitations of a digital system? [08]
Implement the circuit in CMOS technology that realizes the function
\[ F = A + BC(D+E) \]

2(a) What is the use of a floating gate in an EPROM? Explain. [05]

2(b) Explain the read and write operation of a DRAM cell. How does CD-ROM work? [10]

OR

2’(b) Draw the architecture of a 128×8 RAM. What are the minimum numbers of pin [10]
required to represent this memory chip? Write a short note on flash memory.

3(a) What do you mean by dynamic CMOS logic? Write its advantages. Draw a 2- to-4 [07]
row decoder in this logic.

3(b) What are the drawbacks of dynamic CMOS logic? What are the methods to [08]
overcome these problems? Explain.

Contd......2
4(a) "Output of a DAC is not analog"----- Justify the statement.

4(b) A 10-bit input digital ramp ADC has the following parameters: clock frequency = 1 MHz; threshold voltage $V_T = 0.1$ mV; and its DAC has F.S. output voltage $10.23$ V. What will be the digital output for the input $3.728$ V? Also find the conversion time.

4(c) Describe the basic operation of a flash ADC using a suitable diagram? Why is it faster than other ADCs? Why is it not so popular?

OR

4'(c) Draw a flowchart of the operation of a successive approximation ADC. What is an alias signal?
1(a) List the internal data operations and the externally initiated operations performed in the 8085 microprocessor. [06]

1(b) Write a program segment in 8085 assembly language to implement an arithmetic right shift operation and display the result at port 20H. How does 8085 distinguish between a port address 20H and a memory address 2020H? [06]

OR

1'(a) List the 8085 machine cycles and the required status and control signals. Draw the timing diagram for fetch machine cycle. [06]

1'(b) A list of ten numbers is stored at locations starting at 2070H. Write a program to add all positive numbers and the 2's complement of all negative numbers. [06]

2(a) Compare the I/O mapped I/O against the memory mapped I/O. [06]

2(b) Using a 74LS138 decoder and proper logic gates interface eight input switches at input port F6H and a seven-segment LED display at output port F7H. Write a program to read the switch positions in the accumulator, and display the contents of accumulator at the LED display. [06]

OR

2'(a) Discuss various formats of data transfer in detail. [06]

2'(b) Draw the pin configuration of 8255 when:

(i) port A is in mode 2 and port B is in input mode 0

(ii) port is in mode 2 and port B is in output mode 1. [06]
3(a) Describe the concept of stack in 8085 and explain, using RTL statements, all the 8085 instructions that modify the stack.

3(b) What is a software interrupt? Explain how RST instruction is inserted through hardware when the INTR line receives an interrupt.

OR

3'(a) Explain interrupt structure of 8085 and discuss the SIM and RIM instructions.

3'(b) Explain what the DMA is used for. Discuss the three forms of DMA.

4(a) Discuss salient features of Intel's MCS-51 microcontroller.

4(b) Explain various areas of applications of microprocessor, and at least three applications where microcontrollers are used.

5(a) List the important advances of Intel 8086 over 8085. Explain upward compatibility, and tell whether 8086 is upward compatible with 8085.

5(b) Explain the memory segmentation and the physical address calculation in 8086 with an example. Show with examples the immediate, direct and register indirect addressing modes.
2013-14
B.TECH. (AUTUMN SEMESTER) EXAMINATION
COMPUTER COMMUNICATION ENGINEERING
EL-340

Maximum Marks: 60
Credits: 04
Duration: Three Hours

Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meaning.

Q. No. Question M.M.
1(a) Discuss how to improve the bandwidth efficiency of a DSB-SC modulated signal. [04]
1(b) Discuss briefly the functions of RF and IF sections of a superheterodyne receiver. [04]
1(c) Design an ideal interpolator to reconstruct the analog signal from its samples. [07]

OR

1(e') Plot the spectrum of a PAM signal produced by the modulating signal \( m(t) = A_m \cos(2\pi f_m t) \) assuming a modulation frequency \( f_m = 0.25 \text{ Hz} \), sampling period \( T_s = 1 \text{ s} \), and pulse duration \( T = 0.45 \text{ s} \). [07]

2(a) A compact disc (CD) records audio signals digitally by using PCM. Assume that the audio signal bandwidth equals 15 KHz.
(i) If the Nyquist samples are uniformly quantized into \( L = 65,536 \) levels and then binary coded, determine the number of binary digits required to encode a sample.
(ii) If the audio signal has average power of 0.1 watt and peak voltage of 1 volt. Find the resulting signal-to-quantization-noise-ratio (SNR)\(_Q\) of the uniform quantizer output in part (i).
(iii) Determine the number of binary digits per second (bit/s) required to encode the audio signal.

OR

2(a') Show that (SNR)\(_Q\) improves by 6 dB for every additional bit in the codeword. [07]
2(b) Discuss how a regenerative repeater works. What advantages it has over the conventional repeater. [04]
2(c) The data sequence 00101110 is first differentially encoded and then transmitted [04]
using bipolar RZ waveform. Sketch the transmitted sequence of waveforms.

3(a) Why the bit error performance of OOK modulation is inferior to that of BASK modulation scheme.

3(a') How bandwidth efficiency and bit error rate trades with varying value of M in a linear M-ary modulation scheme?

3(b) Why QPSK is a preferred modulation scheme compared to BPSK?

3(c) Why FSK modulation scheme is not used in modern wireless communication systems?

3(d) Give a Gray-encoded mapping of 16-QAM signal points. The mapping must ensure that out of the four bits, the left-most two bits specify the quadrant in the 2-dimensional space and the remaining two bits are used to represent one of the four possible points within each quadrant.

4(a) A source emits six symbols with probabilities 0.3, 0.25, 0.15, 0.12, 0.1, and 0.08. Find the Huffman code for this source and also determine its code efficiency.

4(a') Consider the binary sequence 11101001100010110. Find the Lempel-Ziv code for this sequence.

4(b) A voice-grade telephone channel has a bandwidth of 3.4 kHz. Calculate the information capacity of the telephone channel for a signal-to-noise-ratio (SNR) of 30 dB. Also, calculate the minimum SNR required to support a data rate of 56.6 kbps.

4(c) What are the important features of cellular mobile system?

4(d) Differentiate between soft and hard handoff schemes.