Printed Pages – 4 Roll No. : .....

324612(24)

B. E. (Sixth Semester) Examination 2020

(Old Scheme)

(Branch : Elect.)

POWER SYSTEM PROTECTION & SWITCHGEAR

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. The first part in each question is compulsory which is of 2 marks. Attempt any* ***two*** *parts from the rest three, each is of 7 marks.*

Unit - I

1. (a) Draw a typical time current characteristics of inverse over current relays.

(b) Describe the construction and principle of operation of an induction type over current relay.

(c) Derive the torque equation for impedance relay, reactance relay & Mho relay with the help of universal torque equation. Draw the R-X diagram for all the relays also.

(d) Explain with neat diagram the construction and working of Buchholz relay.

Unit - II

2. (a) What are the major faults which may occur on an alternator.

(b) Describe the schemes of protection against inter-turn fault for an alternator.

(c) Explain the frame leakage protection scheme for bus bar arrangement.

(d) Give the detailed analysis of automatic field suppression and neutral circuit breaker of an alternator.

Unit - III

3. (a) What are the various CT arrangement in different star delta power transformer differential protection scheme.

(b) What are the difficulties encountered in differential protection of transforer. Give the remiders to overcome difficulties.

(c) Explain the principle of time graded protection for parallel and ring main feeders equiped with IDMT overcurrent relays.

(d) Explain the carries current protection scheme for transmission lines.

Unit - IV

4. (a) What do you mean by comparators?

(b) Describe the duality between amplitude and phase comparators.

(c) Explain averaging type and phase splitting type instantaneous amplitude comparators.

(d) Describe coincidence type phase comparator.

Unit - V

5. (a) Define restriking voltage & recovery voltage?

(b) Explain the construction, principle & operation of minimum oil circuit breaker.

(c) Describe the construction, principle of operation and application of SF_6 circuit breaker.

(d) Discuss the opeation & construction of HRC fuse. Explain the characteristics of HRC fuse.

Printed Pages – 3 Roll No. : .....

327613(27)

B. E. (Sixth Semester) Examination April-May 2020

(Old Scheme)

(E&I Branch)

INDUSTRIAL INSTRUMENTATION-2

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d) of each question.*

Unit-I

1. (a) Define Frequency. 2

   (b) Describe the working of Sept superheterodyne for frequency analysis. 7

(c) How we can use different electronics techniques of frequency measurement? 7

(d) Explain multi-filter Real-time spectrum analyzer in detail. 7

Unit-II

2. (a) What is Power? 2

(b) Explain Bolo meter method for high power measurement in detail. 7

(c) Describe colorimeter method of power measurement with application. 7

(d) Discuss the construction and working of Directional couplers. 7

Unit-III

3. (a) What are the units of voltage and current? 2

(b) Discuss digital voltmeter in detail. 7

(c) Explain the construction and working of synchronous detector. 7

(d) Write short note on DC & AC probes. 7

Unit-IV

4. (a) What is dual slope A/D converter? 2

(b) Discuss the Ramp type A/D converter with advantages. 7

(c) Explain Weighted-Resister D/A converter with example. 7

(d) A 5-bit converter is used for a DC voltage range of 0-10 V. Find the weight of MSB and LSB. Also find the exact range of the converter and the error. 7

Unit-V

5. (a) What is Transducer? 2

(b) Discuss the Universal Counter in detail. 7

(c) Explain IEEE 488 Bus. 7

(d) Write short notes on : 7

(i) Digital Tachometer

(ii) Digital pH meter

Printed Pages – 4 Roll No. : .....

328611(28)

B. E. (Sixth Semester) Examination 2020

(Old Scheme)

(Branch : Et & T)

COMMUNICATION HARDWARE DESIGN

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) is compulsory from each unit. Part (a) contains 2 marks. Part (b), (c) and (d) contains 7 marks each. Attempt any* ***two*** *parts out of (b), (c) and (d).*

Unit - I

1. (a) Why class C amplifier is used for AM Generation? 2

   (b) Explain Grid-bias modulation? Give its advantages and disadvantages? 7

(c) Describe AM Modulation? Explain linear series plate modulation? 7

(d) In a series plate modulated amplifier, plate supply voltage is 300 V and the DC plate current under unmodulated condition is 204. The sinusoidal modulating voltage which appears in the plate circuit of modulated amplifier has amplitiude of 150 V. The unmodulated o/p carrier power is 4.5 kW. Calculate : 7

(i) Modulation Index

(ii) Carrier power under modulated condition.

Unit - II

2. (a) What do you understand by frequency Scintillation? 2

(b) Draw the block diagrams of amplitude modulation radio transmitter using modulation at high carrier power level. 7

(c) With the help of block diagram, explain working of VODAS? 7

(d) Explain with the help of block diagram phase shift method of side band suppression? 7

Unit - III

3. (a) What are the basic function of AM Receivers? 2

(b) Give the characteristic of ideal receiving antenna. What is meant by tracking error? 7

(c) With the help of circuit diagram. Explain MUSA system of reception of short wave signal? 7

(d) Explain with block diagram space diversity reception? 7

Unit - IV

4. (a) Describe the need of Limiter? 2

(b) Explain single tuned discrimination circuit? 7

(c) Draw block diagram of Armstrong transmitter and briefly explain? 7

(d) A carrier of 90 MHz with 5 V peak amplitude a modulating signal of 5 V peak amplitude and frequency of 5 kHz. The frequency deviation constant is 1 kHz/V. Determine the bandwidth of frequency modulated signal? 7

Unit - V

5. (a) What is Aspect ratio? 2

(b) Explain in brief about the Horizontal Resolution. 7

(c) Write short notes on sound and video modulation. 7

(d) Draw the block diagram of TV transmitter and explain in brief. 7

Printed Pages – 4 Roll No. : .....

328612(28)

B. E. (Sixth Semester) Examination, 2020

(Old Scheme)

(Branch : Et & T)

ADVANCED ELECTRONIC CIRCUITS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) is compulsory from each questions. Attempt any two parts from (b), (c) and (d).*

Unit - I

1. (a) What are the advantages and limitation of R-2R ladder network type DAC over Binary-weighted resistor type DAC? 2

(b) Explain the operation of 3-bit R-2R type DAC and derive the expression for the output voltage. 7

(c) Explain Dual-slope type ADC with the help of block diagram. 7

(d) Explain the operation of successive approximation type ADC with the help of block diagram. 7

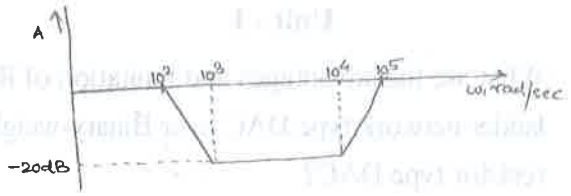
Unit - II

2. (a) Define bilinear transfer function. 2

(b) Design a circuit to provide a set of three phase 60 Hz voltage each separated by 120° and equal in magnitude. Assume $C = 1\,\mu f$. 7

(c) Explain Biquad circuit with circuit diagram and also derive an expression for frequency response. 7

(d) For the Bode plot given below, find the transfer function and design the corresponding filter. Use all capacitors of value of $0{\cdot}01\,\mu f$. 7



Unit - III

3. (a) What is RC-CR transformation. 2

(b) Describe the sallen and key circuit with three design strategies. 7

(c) Defie sensitivity. Explain the sensitivity analysis of sallen and key circuit. 7

(d) If $\alpha_{max} = 0.25$ dB, $\alpha_{min} = 18$ dB, $f_p = 1000$ Hz, $f_s = 1400$ Hz for Butterworth LPF. Determine order of filter, Half power frequency, attenuation at passband and attenuation at the edge of stopband. 7

Unit - IV

4. (a) Define Lock Range and capture Range 2

(b) Discuss the various application of PLL. 7

(c) With the help of functional diagram explain the operation of PLL 565. 7

(d) A PLL has a VCO with $K_0 = 25$ KHz/v and $F_c = 50$ KHz. The amplifier gain is $A = 2$ and the phase detector has a maximum output voltage swing

of + 0·7 volt. Find the Lock range of PLL. Assume filter gain equal to unity. 7

Unit - V

5. (a) Define multiplier. 2

(b) Discuss the various application of analog multiplier. 7

(c) Explain the basic method of performing analog multiplication. 7

(d) Explain the various characteristics of multiplier. 7

Printed Pages – 4 Roll No. : .....

328613(28)

B. E. (Sixth Semester) Examination April-May 2020

(Old Scheme)

ADVANCED MICROPROCESSOR & INTERFACING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory and carries 2 marks. Attempt any* ***two*** *parts from (b), (c) and (d) of each question which carry 7 marks each.*

Unit-I

1. (a) If DS = 3458 H and SI = 13 DCH then calculate the physical address. 2

(b) Draw and explain the flag register of 8086. 7

(c) Explain the significance of queue in 8086 micro-processor with diagram. Why is the 8086 queue only six byte long? 7

(d) Explain different Addressing modes of 8086 with examples. 7

Unit-II

2. (a) What do you mean by Maximum Mode? 2

(b) Draw the interrupt vector table of 8086. Explain various type of interrupt of 8086. 7

(c) Explain minimum mode configuration with read and write timing diagram. 7

(d) Design an interface between 8086 and two chips of 16 k × 8 EPROM and two chips of 32 × 8 RAM. RAM address should be 0000H. 7

Unit-III

3. (a) Explain $C/\overline{D}$ pin of 8251 A. 2

(b) Draw and explain architecture of 8257. 7

(c) Explain the following terms in relation to 8259 : 7

(i) EOI

(ii) Automatic Rotation

(iii) Automatic EOI

(iv) Specific Rotation

(d) Explain different operating modes of 8253. 7

Unit-IV

4. (a) Why the instruction queue is 16 byte long in 80386? 2

(b) Explain RISC and CISC processor in detail. 7

(c) What are difference between real, protected and virtual mode of 80386? 7

(d) What is Paging? Discuss the paging mechanism of 80386 in detail. 7

Unit-V

5. (a) Define Multiprocessor System. 2

(b) Draw and explain internal architecture of 8087. 7

(c) Write a procedure to calculate the volume of a sphere using MASM syntax. 7

(d) Explain closely coupled and lossely coupled system in detail. 7

Printed Pages – 6 Roll No. : .....

328614(28)

B. E. (Sixth Semester) Examination, 2020

(Old Scheme)

(Et & T Branch)

DIGITAL SIGNAL PROCESSING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) of each unit are compulsory. Attempt any* ***two*** *parts from (b), (c) & (d).*

Unit - I

1. (a) Draw the basic building blocks for representing digital system. 2

(b) Determine the direct form I & II realisation for a

third order IIR transfer function

$$H(Z) = \frac{0{\cdot}28z^2 + 0{\cdot}319z + 0{\cdot}04}{0{\cdot}5z^3 + 0{\cdot}3z^2 + 0{\cdot}17z - 0{\cdot}2}$$ 7

(c) Obtain the cascade realisation for system function given by

$$H(z) = \frac{1 + \frac{1}{4}z^{-1}}{\left(1 + \frac{1}{2}z^{-1}\right)\left(1 + \frac{1}{2}z^{-1} + \frac{1}{4}z^{-2}\right)}$$ 7

(d) Obtain direct form & cascade form realisation for transfer function of an FIR system given by :

$$H(z) = \left(1 - \frac{1}{4}z^{-1} + \frac{3}{8}z^{-2}\right)\left(1 - \frac{1}{8}z^{-1} - \frac{1}{2}z^{-2}\right)$$ 7

Unit - II

2. (a) What are the types of analog filters? 2

(b) For the analog transfer function.

$$H(s) = \frac{1}{(S+1)(S+2)}$$

Determine $H(z)$ using impulse invariant technique.

Assume $T = 1$ second. 7

(c) Apply bilinear transformation to

$$H(s) = \frac{2}{(s+1)(s+3)}$$ with $T = 0{\cdot}1$ second. 7

(d) Design a digital butterworth filter that satisfies the following constraint using bilinear transformation.

Assume $T = 1$ second.

$$0{\cdot}9 \le \left|H\left(e^{j\omega}\right)\right| \le 1 \quad 0 \le \omega \le \pi/2$$

$$\left|H\left(e^{j\omega}\right)\right| \le 0{\cdot}2 \quad 3\pi/4 \le \omega \le \pi$$ 7

Unit - III

3. (a) Enlist any two disadvantages of digital filter as compared to analog filter. 2

(b) Explain window technique to design an FIR filter. 7

(c) A filter is to be designed with the following desired frequency response.

$$H_d\left(e^{jw}\right)=\begin{cases}0 & \frac{-\pi}{4}\le w\le\frac{\pi}{4}\\ e^{-j2w} & \frac{\pi}{4}<|w|\le\pi\end{cases}$$

Determine the filter coefficients $h_d(n)$ if the window function is defined as

$$w(n)=\begin{cases}1 & 0\le n\le 4\\ 0 & \text{otherwise}\end{cases}$$ 7

(d) The desired response of a low-pass-filter is

$$H_\alpha\left(e^{jw}\right)=\begin{cases}e^{-j3w} & -\frac{3\pi}{4}\le w\le\frac{3\pi}{4}\\ 0 & \frac{3\pi}{4}<|w|\le\pi\end{cases}$$

Determine $H\left(e^{jw}\right)$ for $M=7$ using a Hamming window.

Unit - IV

4. (a) ..... is for reducing sampling rate & ..... is for increasing sampling rate. (Fill in the blanks). 2

(b) Obtain the two-fold expanded signal $y(n)$ of the input signal $x(n)$. 7

$$x(n)=\begin{cases}n & n>0\\ 0 & \text{otherwise}\end{cases}$$

(c) The transfer function of an IIR filter is given by

$$H(z)=\frac{1+0{\cdot}7z^{-1}}{1-0{\cdot}9z^{-1}}$$

Obtain the polyphase decomposition of $H(z)$ to decompose into 2 sections. 7

(d) Explain various applications of multirate digital signal processing. 7

Unit - V

5. (a) Give any two application areas of digital signal processing in the field of image processing. 2

(b) Explain the application of DSP in RADAR system. 7

(c) Draw the model of vocal organs to represent the mechanism of human speech production. 7

(d) Explain digital comb filter and draw its frequency response. 7

Printed Pages– 3 Roll No. .....

328615(28)

B. E. (Sixth Semester) Examination, 2020

(Old Scheme)

(ET & T Branch)

COMMUNICATION SYSTEM-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note *: Attempt all questions. Part (a) of each unit is compulsory. Attempt any* ***two*** *question from part (b), (c) and (d).*

Unit-I

1. (a) What is Aliasings? 2

(b) State and prove sampling theorem in time domain. 7

(c) Explain generation and detection of pwm signal with neat diagram. 7

(d) Write the comparison between TDM and FDM system. 7

Unit-II

2. (a) What is quantization process? 2

(b) Draw the functional block diagram of PCM and explain its working. 7

(c) What is companding? Also explain the types of it. 7

(d) Draw the block diagram of delta modulation and explain its working. 7

Unit-III

3. (a) What is ASK and also draw its waveform? 2

(b) Explain generation and detection of QPSK. 7

(c) Explain the generation and detection of BPSK. 7

(d) Find the transfer function of optimum filter. 7

Unit-IV

4. (a) What is near-far problem? 2

(b) Explain the frequency hopping spread spectrum technique with block diagram. 7

(c) Explain the working principle of CDMA. 7

(d) Draw the functional block diagram of direct sequence and explain its working spread spectrum. 7

Unit-V

5. (a) Define information theory. 2

(b) Explain Shannon-Fano coding with the help of suitable example. 7

(c) Explain majority logic (threshold) decoding with diagram. 7

(d) Apply Huffman coding procedure for following message and also calculate coding efficiency :

$$[X] = [x_1,\ x_2,\ x_3,\ x_4,\ x_5,\ x_6,\ x_7]$$

$$[P] = [0{\cdot}05,\ 0{\cdot}15,\ 0{\cdot}2,\ 0{\cdot}05,\ 0{\cdot}15,\ 0{\cdot}3,\ 0{\cdot}1]$$

Printed Pages – 3 Roll No. .....

328631(28)

B. E. (Sixth Semester) Examination, 2020

(Old Scheme)

(ET & T Engg.)

TELECOMMUNICATION SWITCHING CIRCUITS & NETWORKS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) from each question is compulsory. Solve any* ***two*** *parts from parts (b), (c) and (d) of each question.*

Unit-I

1. (a) Define transit exchange. 2

(b) What are the advantages of Automatic switching system over manual exchange. 7

(c) What are the different signalling tones in an automatic exchange? 7

(d) Write short note on cross-bar exchange. 7

Unit-II

2. (a) What do you mean by speech digitization? 2

(b) What are the types of fibers? Explain with suitable diagram. 7

(c) Draw and explain the time division switching technique. 7

(d) Write short note on optical detector. 7

Unit-III

3. (a) Define Erlang (E). 2

(b) Draw and explain Telecommunication network topologies. 7

(c) With the help of suitable diagram, explain the process of echo suppressor in the returning path. 7

(d) What is the objective of number plan? 7

Unit-IV

4. (a) What do you meant by Entity? 2

(b) Explain data rates in PSTN. 7

(c) Differentiate between voice traffic & data traffic. 7

(d) Draw and explain ISO-OSI reference model. 7

Unit-V

5. (a) Enlist any four services that ISDN supports. 2

(b) What are the three motivational factors that are responsible for the development of ISDN. 7

(c) Draw and explain the ISDN architecture. 7

(d) Write short note on ISDN standards. 7

Printed Page – 3 Roll No. .....

328632(28)

B. E. (Sixth Semester) Examination, 2020

(Old Scheme)

(ET & T, Mechatronics Engg.)

COMPUTER NETWORK

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) from each question is compulsory. Attempt any two parts from parts (b), (c) and (d) of each question.*

Unit-I

1. (a) What is Null Modem? 2

(b) What do you mean by topology of network?

Compare advantages and disadvantages of different topologies. 7

(c) What is OSI reference model? Explain the function of each layer in short. 7

(d) Compare UTP and STP cable 7

Unit-II

2. (a) Define CRC. 2

(b) An 8-bit byte with binary value 10101111 is to be encoded using an even-parity hamming code. What is binary value after encoding? 7

(c) Explain the flow control mechanism in data link layer. What is the need of flow control. 7

(d) How many types of frames HDLC uses? Explain with their frame format. 7

Unit-III

3. (a) What is a rule added to convert CSMA to CSMA/CD. 2

(b) Compare ethernet, token bus and token ring. 7

(c) Explain FDDI in detail. 7

(d) Explain in detail IEEE 802·3 by access method. 7

Unit-IV

4. (a) What is header overhead in IP protocol? 2

(b) Explain TCP operation. What is TCP header format. 7

(c) Explain different types of IP address format. For the address 132·7·21·84 find the type of network and network address. 7

(d) Explain the function of network layer (including its services). 7

Unit-V

5. (a) What types of transmission media are used in LANs. 2

(b) Explain high speed LANs. 7

(c) Explain 100 VG-Any LAN. 7

(d) Explain fast ethernet system and compare various forms of it. 7

Printed Pages – 4 Roll No. : .....

328636(28)

B. E. (Sixth Semester) Examination, 2020

(Old Scheme)

(EEE, Et & T Engg. Branch)

COMPUTER ORGANISATION & ARCHITECTURE

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *All questions are compulsory. Part (a) carries 2 marks is compulsory and attempt any two from part (b), (c) and (d) carries 7 marks each.*

Unit-I

1. (a) What is program counter? 2

(b) Explain any three addressing modes with example. 7

(c) How does the transfer of information takes place between memory and BUS, support your answer with suitable diagram. 7

(d) How does the usage of rigister helpful is working of instruction? Explain different register used and their use. 7

Unit-II

2. (a) What do you mean by hard wired control? 2

(b) What is micro instruction format? Explain all functional parts related to it. 7

(c) Describe about microprogramming. 7

(d) Explain about microprogrammed control organization with diagram. 7

Unit-III

3. (a) Write the follwing numbers into 2's complement representation : 2

(i) 10101

(ii) 001010

(b) What is use of booth algorithm? Explain it for multiplying binary integers is signed 2's complenent representation. 7

(c) Write algorithm for adding two fixed point number given is 2's complement representation. 7

(d) Explain floating point representation with example. 7

Unit-IV

4. (a) What is DMA? 2

(b) What do you mean by interrupt? What are interrupt initiated I/O? Explain about priority interrupt. 7

(c) Write short notes on : 7

(i) Risc

(ii) CISC

(d) Describe about DMA controlles with block diagram. 7

Unit-V

5. (a) What is Cache Memory? 2

(b) Explain different types of mapping procedures used in cache memory. 7

(c) What do you mean by virtual memory? How it is useful? 7

(d) Exp[lain about memory management requirement. 7

Printed Pages – 6 Roll No. : .....

328651(28)

B. E. (Sixth Semester) Examination April-May 2020

(New Scheme)

(Et & T Engg. Br.)

DIGITAL SIGNAL PROCESSING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d) of each question. Assume suitable data wherever is required.*

Unit - I

1. (a) State the shifting property of the DFT. 2

   (b) Find the DTFT of the following finite deviation sequence of length L.

$$x(n)=\begin{cases}A, & \text{for } 0 \le n \le L-1\\ 0, & \text{otherwise}\end{cases}$$

Also find the inverse DTFT to verify $x(n)$ for L = 3 and A = 1 V. 7

(c) Compute $x_1(n) * x_2(n)$ if

$x_1(n)=\delta(n)+\delta(n-1)-\delta(n-2)-\delta(n-3)$ and

$x_2(n)=\delta(n)-\delta(n-2)+\delta(n-4)$

Give $N = 5$. 7

(d) Given $x(n)=\{0, 1, 2, 3, 4, 5, 6, 7\}$, find $X(K)$ using DIT-FFT algorithm. 7

Unit - II

2. (a) What are the advantages of representing digital systems in block diagram form? 2

(b) Determine the parallel realisation of the IIR digital filter transfer function :

$$H(z)=\frac{3(2z^2+5z+4)}{(2z+1)(z+2)}$$ 7

(c) Give the system function :

$$H(z)=\frac{2+8z^{-1}+6z^{-2}}{1+8z^{-1}+12z^{-2}}$$ 7

Realize using ladder structure.

(d) Obtain FIR linear phase and cascade realizations of the system function :

$$H(z)=\left[1+\frac{1}{2}z^{-1}+z^{-2}\right]\left[1+\frac{1}{4}z^{-1}+z^{-2}\right]$$ 7

Unit - III

3. (a) What is an FIR system? Compare an FIR system with an IIR system. 2

(b) The following transfer function characteristics an FIR filter (M = 11). Determine the magnitude response and show that the phase delay and group delays are constant.

$$H(z)=\sum_{n=0}^{M-1}h(n)z^{-n}$$ 7

(c) A filter is to be designed with the following desired frequency response :

$$H_d\left(e^{jw}\right)=\begin{cases}0, & -\pi/4 \le w \le \pi/4 \\ e^{-j2w}, & \pi/4 |w| \le \pi\end{cases}$$

Determine the filter coefficient $h_d(n)$ if the window function is defined as :

$$w(n)=\begin{cases}1, & 0 \le n \le 4 \\ 0, & \text{otherwise}\end{cases}$$

Also, determine the frequency response $H(e^{jw})$ of the designed filter. 7

(d) The desired response of a low-pass filter is :

$$H_d^{\left(e^{jw}\right)}=\begin{cases}e^{-j3w}, & -3\pi/4 \le w \le 3\pi/4 \\ 0, & 3\pi/4 < |w| \le \pi\end{cases}$$

Determine $H\left(e^{jw}\right)$ for $M=7$ using a Hamming window. 7

Unit - IV

4. (a) What are the different design techniques available for IIR filters? 2

(b) Convert the analog filter with system function :

$$H(s) = \frac{s + 0{\cdot}1}{(s + 0{\cdot}1)^2 + 9}$$

Into a digital IIR filter using bilinear transformation. The digital filter should have a resonant frequency of $w_r = \pi/4$. 7

(c) Design a digital Butterworth filter that satisfies the following constraint using bilinear transformation. Assume T = 1 sec.

$$0{\cdot}9 \left| H\left(e^{jw}\right) \right| \leq 1 \qquad 0 \leq w \leq \pi/2$$

$$\left| H\left(e^{jw}\right) \right| \leq 0{\cdot}2 \qquad 3\pi/4 \leq w \leq \pi$$

7

(d) For the analog transfer function :

$$H(s) = \frac{1}{(s+1)(s+2)}$$

Determine $H(z)$ using impulse invariant technique. Assume T = 1 sec. 7

Unit - V

5. (a) What is the need for multirate signal processing? 2

(b) Obtain the two-fold expanded signal $y(n)$ of the input signal $x(n)$.

$$x(n)=\begin{cases} n, & n>0 \\ 0, & \text{otherwise} \end{cases}$$ 7

(c) Obtain the expression for the output $y(n)$ in terms of $x(n)$ for the multirate systems given as follows :

$$x(n) \rightarrow \boxed{\uparrow 5} \rightarrow \boxed{\downarrow 20} \rightarrow \boxed{\uparrow 4} \rightarrow y(n)$$ 7

(d) Obtain the polyphase decomposition of the IIR system with transfer function :

$$H(z)=\frac{1-4z^{-1}}{1+5z^{-1}}$$ 7

Printed Pages – 4 Roll No. : .....

328652(28)

B. E. (Sixth Semester) Examination, April-May 2020

(New Scheme)

(Et & T Branch)

ELECTRONIC CIRCUIT DESIGN

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) is compulsory and carries 2 marks and, attempt any two from part (b), (c) & (d) and carries 7 marks.*

Unit - I

1. (a) Draw circuit for current and voltage sweep generator.

(b) Draw schematic diagram of Sawtooth-Wave generator & explain how the potentiometer affects

the frequency & amplitude of output waveform.

(c) Explain negative clamper circuit, with proper circuit diagram and waveforms to the junction.

(d) The input voltage V_i to the two-level clipper shown in figure varies linearly from 0 to 150 V. Sketch the output voltage V_o to the same time scale as the input voltage.

Unit - II

2. (a) What is the role of commutating capacitors in multivibrator circuit.

(b) Derive the expression for the gate-width of Monostable multivibrator.

(c) Design an astable multibrator to generate a square wave of 1 kHz frequency with the duty cycle of 25%. Assume Si transistors with $h_{fe} = 40$. Take $V_{CE(sat)} = 0.3V$, $V_{BE(sat)} = 0.7V$, $I_{B(actual)} = 1{\cdot}5$ *

$I_{B(min)}$ and when transistor in saturation $I_{C(sat)} = 5$ mA and $V_{CC} = 12$ V.

(d) Explain transistor as a switch.

Unit - III

3. (a) Defne duty cycle.

(b) Explain any two applications of 555 timers as a monostable multivibrator.

(c) Explain the operation of 555 timer as astable multivibrator.

(d) Describe square wave generator using 555 timer.

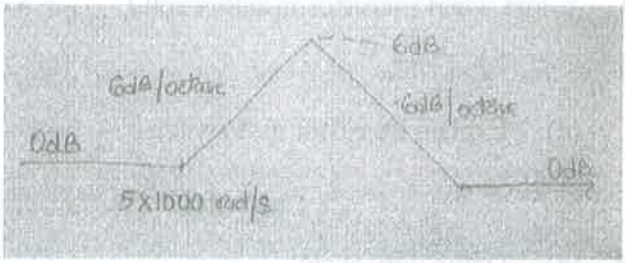
Unit - IV

4. (a) Draw magnitude and phase response of LPF.

(b) Draw the lattice circuit for an all-pass filter. Also derive its transfer function.

(c) Shows that RC low pass filter is a phase-lagging circuit.

(d) Find the transfer function for given asymptotic of bode plot shown below.



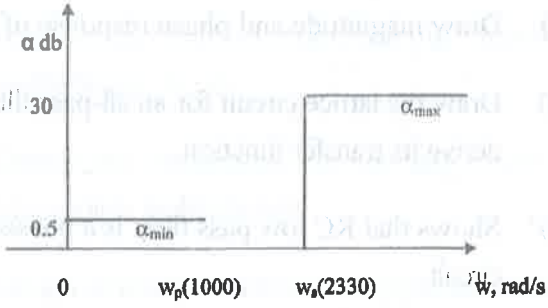
Unit - V

5. (a) What is the order of Butterworth low-pass filter.

(b) What do you mean by RC-CR transformation?

(c) Derive the transfer function of sallen-key circuits.

(d) Design a low pass Butterworth filter for specification shown below :



Printed Pages – 4 Roll No. : .....

328653(28)

B. E. (Sixth Semester) Examination, April-May 2020

(New Scheme)

(Et & T Branch)

MICROCONTROLLER & EMBEDDED SYSTEMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) of each question is compulsory and carries 2 marks attempt any two parts from (b), (c) & (d) of each question and carries 7 marks. Assume suitable data if required.*

Unit - I

1. (a) Write the difference between 8051 and AT89C51 micro controller.

(b) Write the function of following pins of 8051 microcontroller :

$\overline{PSEN}$, ALE, RST, $\overline{EA}$, $\overline{WR}$, XTAL1 & XTAL2

(c) Draw the architecture of microcontroller 8051 and explain the functions of each block.

(d) Assume that register A has pucked BCD No. write a program to convert packed BCD number to two ASCII numbers and place them into register R2 and R6.

Unit - II

2. (a) Write the function of TCON Register.

(b) Discuss the various timer mode supported by 8051. What is special about the auto reload mode.

(c) Write an assembly language program to count 1000 pulses extremally connected to ρ 3·4 of 8051 and after receiving all 1000 pulses, display "OK" message on display connected to the port P2.

(d) Write a program for get data from port-1 and send it to port 0 continuously. When interrupt than generate a square wave of 200 μs period on pin P2.1. Use Timero to create a square wave.

Unit - III

3. (a) Write the difference between 1488 and 1489 standard.

(b) Design a interfacing circuit to interface 8051 micro controller with serial port PC using MAX-232. State the advantages of MAX 232 and MAX-233.

(c) Write an assembly language program to send the message serially "CSVTU" with Baud Rate 9600 (Assume XTAL = 12 MHz).

(d) Write short notes on following standards :

RS - 422, GP8B, RS - 232.

Unit - IV

4. (a) What is address decoding techniques?

(b) Interface DAC 0808 with microcontroller and write a assembly language program to generate a "SINE WAVE".

(c) A robotic arm consist of two stepper motors M_1 and M_2 at two joints. Each motor has step angle has 2 degree. Write an ALP to rotate M_1 by 64

degree clockwise and M_2 by 24 degree anticlockwise. Use 4-step sequence. Connect motor M_1 with port 1 (P1) and M_2 with port 2 (P2).

(d) Interface following memory chips with 8031 microcontroller:

(i) Program ROM 32 K × 8

(ii) Data RAM 16 K × 8

(iii) Data ROM 16 K × 8

Unit - V

5. (a) What is embedded system?

(b) Explain designing parameters of an Embedded system and its significances.

(c) Explain characteristics or real time Embedded system.

(d) Explain software and hardware development process of Embedded system.

Printed Pages – 4 Roll No. : .....

328654(28)

B.E. (Sixth Semester) Examination April-May 2020

(New Scheme)

(Et & T Branch)

VLSI DESIGN

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory, which is of 2 marks. Attempt any* ***two*** *parts from (b), (c) and (d) each is of 7 marks.*

Unit-I

1. (a) What is Moore's law? Explain. 2

(b) Explain front end design and back end design using VLSI design flow. 7

(c) What is CMOS transmission gate? Design XOR Gate using CMOS transmission gate. 7

(d) Design the following logics using CMOS :

(i) $AB + \overline{B}C + (A + B) \cdot C$ 4

(ii) $AB + \overline{A}\overline{B}$ 3

Unit-II

2. (a) What is Euler Graph? 2

(b) Draw and explain fabrication process of nMOS with suitable diagram. 7

(c) What do you mean by Lambda based design rule? Discuss in detail with suitable diagram. 7

(d) Draw the schematic, stick diagram and layout for 2-input CMOS NAND Gate. 7

Unit-III

3. (a) What is W/L Ratio? 2

(b) Construct stick diagram and layout of Half Adder. 7

(c) What are semi conductor memories? Explain SRAM & DRAM in detail. 7

(d) Draw the schematic diagram and layout of $1 - T$ DRAM cell. 7

Unit-IV

4. (a) What do you understand by SSI, MSI, LSI, VLSI and ULSI? 2

(b) Explain If / Else statement with their syntax in VHDL and write VHDL code for full adder using If / Else statement. 7

(c) Write the VHDL code for 4-bit Adder using structural modeling style. 7

(d) Write the syntax of the following in VHDL : 7

(i) Library Declaration

(ii) Entity Declaration

(iii) Architecture Declaration

(iv) Case Statement

Unit-V

5. (a) Write the two difference between Mealy and Moore FSM. 2

(b) Write the VHDL code for JK Flip-flop. 7

(c) Design a 4-bit up counter using VHDL and write their code. 7

(d) What do you understand by test bench? Write a test bench for full adder in VHDL. 7

Printed Pages– 5 Roll No. .....

328655(28)

B. E. (Sixth Semester) Examination, April-May 2020

(New Scheme)

(ET & T Engg. Branch)

INFORMATION THEORY & CODING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory and carries 2 marks. Attempt any two parts from b, c and d of each question and carries 7 marks.*

Unit-I

1. (a) Calculate extended entropy $H(X^2)$ of source symbol whose probabilities are 0·25, 0·25, 0·34 and 0·16.

(b) Consider a DMS with source probabilities (0·20, 0·20, 0·15, 0.15, 0·10, 0·10, 0·05, 0·05).

(i) Determine an efficient fixed length code for the source.

(ii) Determine the Huffman code for this source.

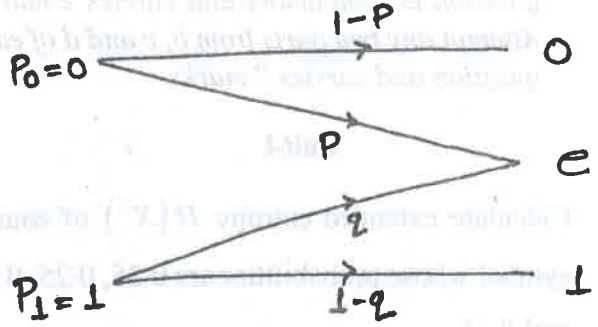
(iii) Compare the two codes and comment.

(c) Determine the Lempel-Ziv code for the following bit stream :

0100111110010100000101010110011000 0

Recover the original sequence from the extended stream.

(d) Find the capacity of the binary erasure channel shown in figure, where p_0 and p_1 are the priori probabilities.



Unit-II

2. (a) What are the objectives of a good error control coding.

(b) Construct the addition and multiplication table for :

(i) $F(x)/(x^2+x+1)$ defined over GF (2) ;

(ii) $F(x)/(x^2+1)$ defined over GF (2) ;

(c) Design the encoder for the (7, 3) cyclic code generated by $G(P) = P^3 + P + 1$ and verify its operation for any message vector.

(d) The impulse response of the input top adder output path and input bottom adder output path of convolution encoder is {1, 1, 1} and {1, 0, 1} respectively and message sequence is {1, 0, 0, 1, 1}. Calculate the convolution encoder sequence.

Unit-III

3. (a) What are the elements of GF(2)? Show the addition and multiplication of elements of GF(2) in a table.

(b) Explain encoding, decoding and also application of RS codes.

(c) Construct GF(16) as an extension field of GF(4) using primitive polynomial $P(x) = x^2 + x + 2$ over $GF(4)$.

(d) Find the generator polynomial $g(x)$ for a single error correcting binary BCH code with a block length $n = 15$. What is code rate for this code.

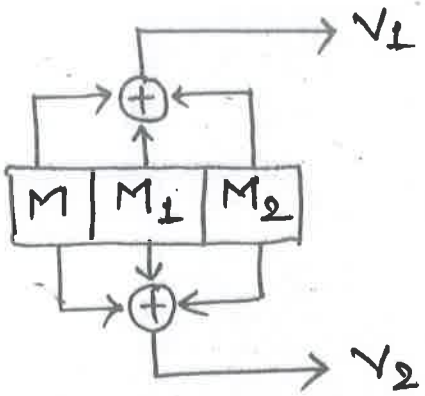
Unit-IV

4. (a) How convolutional codes are different from block code?

(b) Construct a systematic (7, 4) cyclic code using the generator polynomial $g(x) = x^3 + x^2 + 1$ what are the error correcting capabilties of this code? For the received word 1101101, determine the transmitted code word.

(c) Discuss Trellis code with example.

(d) Obtain the convolution code for the bit stream 11011011 by constructing code free.



Unit-V

5. (a) Define free Euclidean Distance of the TCM scheme.

(b) Explain in details Underboek's TCM Design Rules, also explain TCM decoder.

(c) Explain the process of Mapping by set partitioning. Why it is done.

(d) Describe the set partitioning of 8-PSK signal set along with its need.

Printed Pages – 3 Roll No. : .....

328671(28)

B. E. (Sixth Semester) Examination, April-May 2020

(New Scheme)

(Et & T Branch)

INTERNET & WEB TECHNOLOGY

(Professional Elective-I)

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note** : Part (a) of each unit is compulsory and carries 2 marks. Attempt any two parts from (b), (c) and (d) which carry 7 marks each.*

Unit-I

1. (a) What do you mean by Network Byte Order? 2

   (b) Differentiate between TCP and UDP. 7

(c) Define IP addressing. Describe IPv4 and IPv6. 7

(d) Explain three-Tier web based architecture. 7

Unit-II

2. (a) What is CGI? 2

(b) Describe DTD with an example. 7

(c) Explain the basic HTML elements in brief. 7

(d) What is need for CSS? What are the different types of creating style sheet? 7

Unit-III

3. (a) What is XML? 2

(b) What do you mean by XML schema? Explain. 7

(c) What is DTD? Explain the attributes and entities in DTD with help of example. 7

(d) Explain how to write a sample XML file. 7

Unit-IV

4. (a) What do mean by Virus? 2

(b) Explain with a neat diagram the working of Hardened firewall host. 7

(c) What do you understand by gateways? How can gateways be used for proxy Application? 7

(d) Explain the Security threats in Client-Server System. 7

Unit-V

5. (a) What is Web Page? 2

(b) What is FTP? Explain the various types of FTP Servers. 7

(c) Explain the procedure for registration of site on Search Engines and Indexes. 7

(d) Write a short note on Usenet and Internet Relay Chat. 7

Printed Pages – 5 Roll No. : .....

328672(28)

B. E. (Sixth Semester) Examination, April-May 2020

(New Scheme)

(Et & T Engg.)

(Professional Elective-I)

OPERATING SYSTEM

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) is compulsory in each unit. Attempt any two parts from (b), (c) and (d).

Unit-I

1. (a) What is Time-Sharing operating system? 2

   (b) Define operating system. What are the functions provided by the operating system? 7

(c) Differentiate between : 7

(i) Time-Sharing system and Real-Time system

(ii) Multiprogramming system and multiprocessing system

(d) Explain the file allocation methods in detail. 7

Unit-II

2. (a) Define the term process. 2

(b) Explan life cycle of a process. 7

(c) For different processes the arrival and burst time is given as below : 7

Process	Burst Time (in ms)	Arrival Time (in hrs)
P_1	5	0
P_2	15	1
P_3	10	2

Calculate average waiting time using FCFS, SJF (Preemptive and Non-Preemptive) scheduling mechanism. 7

(d) Suppose the moving head disk with 200 tracks is

currently serving a request for track 143. If the queue of the request is kept in FIFO order : 86, 147, 91, 177, 94 and 150. What is the total head movement for the following scheduling schemes?

(i) FCFS

(ii) SSTF

(iii) C-SCAN 7

Unit-III

3. (a) What is Demand paging? 2

(b) Explain memory management techniques paging and segmentation in detail. 7

(c) What is Thrashing and how it can be handled? Explain in brief. 7

(d) Consider the following reference string : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3. How many page fault will occur for the following algorithm. (Assume frame size = 3).

(i) FIFO

(ii) LRU

(iii) Optimal Page Replacement 7

Unit-IV

4. (a) What is Resource Allocation Graph? 2

(b) Define Deadlock. Explain four necessary conditions for deadlock to occur. 7

(c) What is critical section problem? Give two solutions for critical section problem. 7

(d) Consider a system with five processes P_0 through P_4 and three resources *A, B, C*. Resource *A* has 10 instances, *B* has 5 instances and type *C* has 7 instances. Suppose at time t_0 following snapshot of the system has been taken :

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

(i) What will be the content of need matrix.

(ii) Is the system in safe state? If yes, then what is the safe sequence?

Unit-V

5. (a) What is device-driver and device-controller? 2

(b) Explain interrupt handlers. 7

(c) Write short notes on the following operating systems : 7

(i) MS-DOS

(ii) Unix

(d) Explain Direct Memory Access (DMA). 7

Printed Pages – 4 Roll No. : .....

328673(28)

B. E. (Sixth Semester) Examination, April-May 2020

(New Scheme)

(Et & T Engg. Branch)

BIOMEDICAL ELECTRONICS

(Professional Elective-I)

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note** : Attempt all the questions. Part (a) of each question is compulsory and carries 2 marks.. Attempt any **two** from (b), (c) & (d) and carries 7 marks.*

Unit-I

1. (a) Draw an action potential waveform and label the amplitude and time values. 2

(b) Mention the component of man instrument system and also describe their functions. 7

(c) List and explain the problems encountered in measuring a living system. 7

(d) Explain the origin of resting and action potential. Mention their characteristics. 7

Unit-II

2. (a) What are the three basic types of bio potential electrodes? 2

(b) Explain with neat and clean diagram the working of cardio vascular system. 7

(c) Explain the electrical activity of heart. What is SA node? 7

(d) Draw and explain the Einthoven triangle. 7

Unit-III

3. (a) Write three method of direct blood pressure measurement. 2

(b) Explain measurement of heart sound and draw the frequency spectrum of heart sound. 7

(c) Discuss various type of temperature measurement. 7

(d) Discuss the principles of operation of medical diagnosis using ultrasound. 7

Unit-IV

4. (a) Draw the block diagram of pacing modes. 2

(b) Explain the working of pacemaker. 7

(c) What are the elements of intensive care monitoring. 7

(d) Explain heart lung machine. 7

Unit-V

5. (a) Draw the block diagram of a biotelemetry transmitter. 2

(b) Give a brief account of the role played by laser in biomedical instrumentation. 7

(c) What are the implantable units in biotelemetry? 7

(d) Define Biotelemetry. Explain the basic components of biotelemetry systems. 7

Printed Pages – 4 Roll No. : .....

328674(28)

B. E. (Sixth Semester) Examination, April-May 2020

(New Scheme)

(Et & T Engg. Branch)

ELECTRONIC ENGINEERING MATERIALS & COMPONENTS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note** : Attempt all the questions. Part (a) of each question is compulsory and carries 2 marks.. Attempt any **two** from (b), (c) & (d) and carries 7 marks.*

Unit-I

1. (a) Write the composition of Photoresist material used in Photolithography. 2

(b) A uniformly doped P-type Semi-conductor has a background concentration of $10^{15}/cm^3$. Phosphorous is diffused into P-type substrate at 1100°C. Solid solubility of Phosphorous in Si is 10^{19} /cm^3. Find Junction Depth. Given erfc [2·75] = 10^{-4}, D = 10^{-14} cm^2/sec, t = 15 min. 7

(c) Describe the fabrication processes of a PN Junction diode. 7

(d) Discuss Diffusion process in monolithic IC 7

Unit-II

2. (a) Define Polarization. 2

(b) Derive Claussius-Mosotti Relation for dielectric constant of solids. 7

(c) Describe any **two** of the given below : 7

(i) Static Dielectric constant

(ii) Dipole moment

(iii) Internal fields in solid and liquids

(d) A Dielectric material contains 2×10^{19} polar molecules/m^3, each of the dipole moments is $1{\cdot}8 \times 10^{-27}$ C-m. Assuming that all the dipoles are aligned in the direction of the electric field $E = 10^5\ a_x$ V/m, Find the polarization, the electric susceptibility & the Relative Permittivity. 7

Unit-III

3. (a) Write the significance of + and – sign of susceptibility for a magnetic material with example. 2

(b) The magnetic susceptibility of Fe_2O_3 is $1{\cdot}4 \times 10^{-3}$. Calculate the flux density & Magnetization when it is subjected to a magnetic field of 10^6 A/m. 7

(c) Explain the origin of permanent dipole moment in matter in detail. 7

(d) Discuss Ferromagnetic Domain, Spontaneous Magnetization & Coercive forces. 7

Unit-IV

4. (a) What are the factors which affect Resistivity of metals? 2

(b) A conduction wire has a resistivity of 3×10^{-8} $\Omega - m$ at room temperature. The fermi energy for such a conduction is 4 eV. There are $5{\cdot}8 \times 10^{28}$ electron/m^3. Calculate : 7

(i) Mobility & Relaxation time

(ii) Average drift velocity of electron when electric field applied to conductor is 1 V/Cm.

(iii) Velocity of an electron with fermi energy.

(c) Derive the law relating thermal conductivity and electrical conductivity of metals. 7

(d) Derive Ohms law relating relaxation time of electrons. 7

Unit-V

5. (a) Write two uses of trimmer capacitor. 2

(b) Explain the characteristics of Resistor in detail. 7

(c) What are the design considerations for Electronic audio transformer? 7

(d) Explain the selection factors considered for different types of capacitor. 7

Printed Pages – 3 Roll No. : .....

328675(28)

B. E. (Sixth Semester) Examination, April-May 2020

(New Scheme)

(Et & T Branch)

COMPUTER ORGANIZATION & ARCHITECTURE

(Professional Elective-I)

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note *: Attempt all questions. Part (a) of each question is compulsory. Attempt any* ***two*** *parts from (b), (c) & (d) of each question. Answer should be to the point and brief. Assume any suitable data if necessary.*

Unit-I

1. (a) Define Accumulator. 2

(b) Explain Memory Data Register instruction register with examples. 7

(c) Explain various micro operations with example. 7

(d) Explain various addressing modes with the instruction formats. 7

Unit-II

2. (a) Define Microinstructions. 2

(b) Compare Hard wired and Microprogrammed Control Organization. 7

(c) Explain the implementation of control unit memory with the help of block diagram. 7

(d) Explain the address and instruction sequencing in Microprogramming. 7

Unit-III

3. (a) Define Overflow and Underflow. 2

(b) Explain signed magnitude addition and subtraction operation with example. 7

(c) Explain the hardware Algorithm for fixed point division. 7

(d) Explain Booth's algorithm for multiplicaton with suitable example. 7

Unit-IV

4. (a) Define I/O intrerfacing. 2

(b) Discuss programmed I/O with the help of block diagram. 7

(c) Explain working of DMA controller with the help of block diagram. 7

(d) Compare loosely coupled and tightly coupled systems. 7

Unit-V

5. (a) Draw memory Hierarchy. 2

(b) Explain memory interleaving schemes with example. 7

(c) Explain Cache memory and Virtual memory and draw the memory mapping table for virtual address. 7

(d) Compare RISC & CISC processors. 7