4E4160

Roll No. _____ Total No of Pages: 3

4E4160

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014
Computer Science and Engineering
4CS1A Microprocessors and Interfaces
(Common with IT)

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1._____ 2._____

UNIT – I

Q.1 (a) Draw the diagram of 8085 microprocessor architecture. Explain the components. [8]

(b) State the differences between static and dynamic RAM. [8]

OR

Q.1 (a) How will you demultiplex the address and databus? How can you interface 2048 KB Ram with 8085 microprocessor? Explain. [8]

(b) Is there any difference among microprocessor, microcontroller and microcomputer? Explain. [8]

UNIT – II

Q.2 (a) Explain direct and indirect addressing with suitable examples. [8]

(b) Explain LDAX with an example. Write no. of T states and machine cycles involved in it. [8]

OR

Q.2 (a) Explain the difference between 1 byte, 2 byte and 3 byte instructions. Quote suitable examples. [8]

(b) Explain STA with are example. Write the no. of T states and machine cycles involved in it. [8]

UNIT – III

Q.3 (a) Is there any difference between vectored and non vectored interrupts? Explain with suitable examples. [8]

(b) Explain the control word of 8259. [8]

OR

Q.3 (a) Explain the implementations of stack in 8085 microprocessor programming. [8]

(b) Explain the format of SIM. [8]

UNIT – IV

Q.4 Explain working and control word format of 8255 programmable peripheral interface. [16]

OR

Q.4 Explain working and modes of 8279 keyboard/display interface. [16]

UNIT – V

Q.5 (a) How can you interface VSART 8251 with microprocessor 8085? Explain. [8]

(b) Explain the interfacing of Liquid crystal display with microprocessor 8085. [8]

OR

Q.5 Write short notes on any two: - [16]

(a) IEEE 488

(b) RS 4222A

(c) 8257

4E4161

Roll No. _____ Total No of Pages: 4

4E4161

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014
Computer Science and Engineering
4CS2A Discrete Mathematical Structures
Common with IT

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. NIL 2. NIL

UNIT – I

Q.1 (a) (i) Prove, for finite sets A and B;

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$ [4]

(ii) In a class of 50 students, 15 play Tennis, 20 play Cricket and 20 play Hockey, 3 play Tennis and Cricket, 6 play Cricket and Hockey, and 5 play Tennis and Hockey. 7 play no game at all. How many play Cricket, Tennis and Hockey? [4]

(b) (i) Define floor function and ceiling function with example. [4]

(ii) "If f and g are two bijections such that gof is defined then gof is also a bijection." Prove it. [4]

OR

Q.1 (a) (i) If f: A → B be one-one onto then the inverse map of f is unique. Prove it. [4]

(ii) Show that set of even positive integers is a countable set. [4]

(b) Sate and prove the Pigeonhole and Generalized Pigeonhole Principles. [8]

UNIT – II

Q.2 (a) Define the following with example:-

(i) Equivalence relation [2]

(ii) Congruence relation [2]

(iii) Partial order relation [2]

(iv) Total order relation [2]

(b) Explain closure of relations. Let A = {1,2,3,4} and let R = {(1,2) (2,3) (3,4), (2,1)} be a relation on A. Find the transitive closure of R using Warshall's algorithm. [8]

OR

Q.2 (a) Let A = Z, the set of integers relation R define in A by aRb as "a is congruent to b mod 2". Prove that R is an equivalence relation. [8]

(b) (i) Show that (Z^+, divisibility) is a poset. [4]

(ii) Compute the number of partitions of a set with four elements. [4]

UNIT – III

Q.3 (a) (i) Prove pv $(q \Lambda r) \equiv (p \vee q) \Lambda (p \vee r)$. [4]

(ii) Write contrapositive, converse and inverse of the statement. "The home team wins whenever it is raining". Also construct the truth table for each statement. [4]

(b) (i) Prove that the linear search algorithm works correctly for every $n \geq 0$. [4]

(ii) Sort the list X = {64, 25, 12, 22, 11} using selection sort algorithm. [4]

OR

Q.3 (a) Every amount of postage of 12 cents or more can be formed using just 4-cent and 5-cent stamps. Prove this by using principle of complete induction. [8]

(b) Prove the implication "If n is an integer not divisible by 3, then $n^2 \equiv 1 (\text{mod } 3)$". [8]

UNIT – IV

Q.4 (a) Define the following with example:-

(i) Complete graph, [2]

(ii) Bipartite graph, [2]

(iii) Isomorphic graph, [2]

(iv) Planar graph, [2]

(b) (i) Suppose that G = (V,E) be a graph with K – component, where each component is a tree. Derive a formula in terms of $|V|, |E|$ and K. [4]

(ii) Let there is a tree with n-vertices of degree 1, 2 vertices of degree 2, 4 vertices of degree 3 and 3 vertices of degree 4. Obtain the value of n. [4]

OR

Q.4 (a) Prove that a simple graph with n vertices and k components can have almost $\frac{1}{2}[(n-k)(n-k+1)]$ edges. **[8]**

(b) Show that the complete bipartite graph $k_{3,3}$ is a non – planar graph. **[8]**

UNIT – V

Q.5 (a) (i) Explain Tautology, contradiction and contingency. [2]

(ii) Show that $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ is a tautology. [2]

(iii) Show that $p \wedge \sim p$ is a contradiction. [2]

(iv) Show that $(p \rightarrow q) \wedge (p \vee q)$ is a contingency. [2]

(b) Test the validity of the following argument:

If I like mathematics, then I will study.

Either I study or I fail.

Therefore, if I fail then I do not like mathematics. [8]

OR

Q.5 (a) Check the validity of the following argument:

Lions are dangerous animals.

There are lions.

Therefore, there are dangerous animals. [8]

(b) (i) Define the quantifiers. Explain types of quantifiers. [4]

(ii) Over the universe of animals, let

P(x) : x is a whale ; Q(x) : x is a fish

R(x) : x lives in water.

Translate the following into English

$\exists x (\sim R(x))$

$\exists x (Q(x) \wedge \sim P(x))$

$\forall x (P(x) \wedge R(x)) \rightarrow Q(x)$ [4]

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4E4162

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4E4162

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014
Computer Science and Engineering
4CS3A Statistics and Probability Theory
Common with IT

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1._____ 2._____

UNIT-I

Q.1 (a) Each coefficient in the equation $ax^2 + bx + c = 0$ is determined by throwing an ordinary die. Find the probability that the equation will have real roots. [8]

(b) In a bolt factory, machines A, B and C manufacture respectively 25%, 35% and 40% of the total bolts. Of their output 5%, 4% and 2% are respectively defective bolts. A bolt is drawn at random from the product, and is found to be defective, What is the probability that it is manufactured by machine A, B and C? [8]

OR

Q.1 (a) Given the joint probability density [8]

$$f(x, y) = \begin{cases} \frac{2}{3}(x+2y), 0<x<1, 0<y<1 \\ 0 \quad : \quad \text{Otherwise} \end{cases}$$

Find.

(i) Marginal density of X and Y.

(ii) Conditional density of X given Y = y and use it to evaluate $P\left\{\frac{X \le 1/2}{Y = 1/2}\right\}$

(b) Let f(t) be the pdf of time to failure T of a system and h(t) be the hazard rate function. Find h(t) and MTTF when. $f(t) = \lambda^2 t e^{-\lambda t}$ [8]

UNIT-II

Q.2 (a) Out of 800 families with 4 Children each, How many families would be expected to have [8]

(i) 2 boys and 2 girls

(ii) at least 1 boy

(iii) at most and girls. Assume equal probabilities for boys and girls

(b) Fit a Poisson distribution to the following data which gives the number of dodders in a sample of clover seeds [8]

No. of Dodders (x):	0	1	2	3	4	5	6	7	8
Observed frequency (f):	56	156	132	92	37	22	4	0	1

OR

Q.2 (a) Find the mean and Variance of Poisson Distribution. [8]

(b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the parameters of distribution. (Given $\phi(0.50) = 0.19$ and $\phi(1.41) = 0.42$) [8]

UNIT-III

Q.3 (a) Calculate the karl Pearson's Coefficient of correlation of the following data: [8]

X :	25	27	30	35	33	28	36
Y :	19	22	27	28	30	23	28

(b) Show that the angle between the lines of regression is given by: [8]

$$\text{Tan}\,\theta = \pm\left(\frac{1-r^2}{r}\right)\frac{\sigma_x\,\sigma_y}{(\sigma_x^{\,2}+\sigma_y^{\,2})}$$

OR

Q.3 (a) Obtain the rank correlation Coefficient for the following data: [8]

x :	68	64	75	50	64	80	75	40	55	64
y :	62	58	68	45	81	60	68	48	50	74

(b) Lines $2x+3y = 10$ and $4x+5y = 18$ are lines of regression between two variables x and y. Decide which one is the line of regression of x on y. Given $x = 5$, find y and also find mean values of Variables. [8]

UNIT-IV

Q.4 (a) Write short note on Pure Birth death process. [8]

(b) Arrivals at a telephone booth are considered to be Poisson, with an average time of 10 minutes between one arrival and the next. The length of a phone call is assumed to be distributed exponentially, with mean 3 minutes. Find: [8]

(i) What is the probability that a person arriving at the booth will have to wait?

(ii) What is the average length of queue that form from time to time?

(iii) The telephone company will install a second booth when convinced that an arrival would have to wait at least 3 minutes for the phone. By how much must the flow of arrivals be increased in order to justify for a second booth?

OR

Q.4 (a) If for a period of 2 hours in a day (8-10 AM), trains arrive at the yard (Capacity of which is 4 trains) in every 20 minutes, but the service time remains 36 minutes. Then calculate for this period: [8]

(i) The probability that the yard is empty.

(ii) The average queue length.

(b) A Supermarket has two girls serving at the counters. The Customers arrive in a Poisson fashion at the rate of 12 per hour. The service time for each customer is exponential with mean 6 minutes. Find: [8]

(i) The probability that an arriving customer has to wait for service.

(ii) The average number of customers in the system.

(iii) The average time spent by a customer in the supermarket.

UNIT-V

Q.5 (a) Write short notes on the following: [8]

(i) Discrete parameter Markov chain.

(ii) Transition probability Matrix

(b) Corresponding to a Markov chain, the initial provability matrix $P^{(o)} = \left(\frac{1}{4}, \frac{3}{4}\right)$ and transition probability matrix (tpm) is $P = \begin{matrix} A \\ B \end{matrix}\begin{bmatrix} A & B \\ 1/3 & 2/3 \\ 1/2 & 1/2 \end{bmatrix}$ where A and B denote the two states of the process. Find:

(i) The probability of reaching state A after two steps $P_A(2)$.

(ii) The probability of state B after two steps.

(iii) $[t_i]$ matrix when $n \to \infty$ [8]

OR

Q.5 (a) Describe briefly the (M/G/1) : (∞/GD) queuing system analysing the steady State solution. [8]

(b) In a heavy machine shop, the overhead crane is 75% utilized. Time study observations gave the average slinging time as 10.5 minutes with a standard deviation of 8.8 minutes. What is the average calling time for the service of the crane and what is the average delay in getting service?

If the average service time is cut to 8 minutes, with standard deviation of 6.0 minutes, how much reduction will occur on an average in the delay of getting served? [8]

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4E4163

Roll No. _____ Total No of Pages: 3

4E4163

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014
Computer Science and Engineering
4CS4A Software Engg.

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1._____ 2._____

UNIT-I

Q.1 (a) What is system? Differentiate between system Engineering and Software Engineering. [3+3=6]

(b) Discuss major problems in System development. [5]

(c) List and describe characteristics of a good Software. [5]

OR

Q.1 (a) What is SDLC? Explain DOD and MIS Oriented SDLC models in brief. [8]

(b) Explain System level project planning in detail. [8]

UNIT-II

Q.2 (a) Define the following:

(i) Software

(ii) Software Engineering

(iii) Software processes

(iv) Software Process model [2×4=8]

(b) Explain incremental process model. Justify that it is appropriate for business Software Systems but less appropriate for real time Systems. [8]

OR

Q.2 (a) With the help of neat diagram, explain Boehm's spiral model. [10]

(b) Spiral model can support both change avoidance and change tolerance. Explain. [3]

(c) Give merits and demerits of spiral model. [3]

UNIT-III

Q.3 (a) Define software requirement Engineering. [3]

(b) What are functional and non- functional Software System requirements? [5]

(c) Explain Finite State Machine (FSM) Models. [8]

OR

Q.3 (a) Describe how to prepare a Software requirement specification (SRS) document. List possible Users and Use of SRS for each User.. [8]

(b) Explain Data Flow and Control flow diagrams with Suitable example. [8]

UNIT-IV

Q.4 (a) What is Software design? [4]

(b) What are architectural and Procedural Software designs? Explain. [12]

OR

Q.4 (a) Discuss preparation of Software Design Document. What is Significance of Design document? [8]

(b) What is Software Coding? Describe programming style and program Quality in Context of Software coding. [8]

UNIT-V

Q.5 (a) Discuss object oriented Analysis (OOA) and modeling in detail. [8]

(b) Explain Object oriented design Concepts and methods. [8]

OR

Q.5 (a) What is UML? [1]

(b) Explain the following in context of UML

(i) Use case Diagrams.

(ii) Sequence Diagrams.

(iii) Classes and objects.

(iv) Interfaces.

(v) State Diagrams. [3×5=15]

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4E4164

Roll No. _____ Total No of Pages: 4

4E4164

B. Tech. IV Sem. (Main) Exam., June/July-2014
Computer Science and Engineering
4CS5A Fundamental of Communication
Common with IT

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. _____ 2. _____

UNIT-I

Q.1. (a) Explain the generation of amplitude modulated signal using square law modulator. Draw the spectrum of the output of square law modulator. [8]

(b) An angle modulated signal is given by $x_c(t) = 6 \text{ Cos } [2\pi \times 10^7 t + 0.2 \sin(10^4) \pi t]$.

(i) If $x_c(t)$ is phase modulated signal with $k_p = 5$ rad / volt; and

(ii) If $x_c(t)$ is frequency modulated signal with $k_f = 5 \times 10^2$ Hz / volt

In each case, determine the modulating signal x(t). [8]

OR

Q.1. (a) Calculate the percentage power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to a depth of (i) 100% (ii) 50%. [8]

(b) With the help of a block diagram, explain the FM demodulation method using phase locked loop (PLL). [8]

UNIT-II

Q.2. (a) State and prove the sampling theorem for low-pass signals. [8]

(b) A signal $m_1(t)$ is bandlimited to 3.6 kHz, and three other signals - $m_2(t)$, $m_3(t)$, $m_4(t)$ are bandlimited to 1.2 kHz each. These signals are to be transmitted by mean of time-division multiplexing (TDM).

(i) Set up a scheme for accomplishing this multiplexing requirement, with each signal sampled at its Nquist rate.

(ii) What must be the speed of the commutator (in samples per second)? [8]

OR

Q.2. (a) The signal $x(t) = 2 \cos 200\pi t + 6\cos 180\pi t$ is ideally sampled at a frequency of 150 samples per sec. The sampled version is passed through a unit gain ideal low – pass filter (LPF) with cut–off of 110Hz. What frequency component will be present in the output of the LPF? Write down an expression for its output signal. [8]

(b) Explain the method of generation and detection of pulse – portion modulated (PPM) signal. [8]

UNIT-III

Q.3. (a) A PCM system uses a step size of Δ. Assuming quantization error is uniformly distributed, determine the mean square value of the quantization error. Also find the signal-to-quantization noise ratio for an n-bit binary PCM with a sinusoidal message signal. [8]

(b) With the help of block diagram explain the working of a Delta modulator (DM) transmitter and receiver. [8]

OR

Q.3. Derive the expression for the average probability of error for a binary encoded PCM receiver using matched filter. Assume that PCM wave uses the NRZ unipolar format E_{max} and T_b are peak signal energy and bit duration respectively. Channel noise is AWGN (additive white Gaussian noise) with zero mean and power spectral density No/2. [16]

UNIT-IV

Q.4. (a) Derive the equation of Nyquist criterion for distortionless baseband transmission in the absence of noise. [8]

(b) With the help of block diagram explain the coherent detection of binary FSK signal. [8]

OR

Q.4. (a) What do you mean by ISI in baseband transmission? Explain the methods to minimize ISI. [8]

(b) Derive the expression of average probability of symbol error for binary PSK using coherent detection. [8]

UNIT-V

Q.5. (a) List and explain the properties of Pseudo noise (P N) sequences. [8]

(b) In a DS/BPSK system, the feedback shift register used to generate the PN sequence has length m=19. The system is required to have a probability of error that does not exceed 10^{-5} (E_b/N_o=10). Calculate the following system parameters in decibels:

(i) Processing gain

(ii) Antijam margin [8]

OR

Q.5. (a) Explain the concept of processing gain in frequency-hop spread spectrum (FHSS). Draw the block diagram of FHSS/M-ary FSK transmitter and receiver. [8]

(b) Write a short note on applications of spread-spectrum modulation. [8]

4E4165

Roll No. _____ Total No of Pages: 4

4E4165

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014

Computer Engg.

4CS6 Principles of Programming Languages

Common with IT

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1._____ 2._____

UNIT-I

Q.1. (a) What do you mean by programming paradigm? Explain different programming paradigm with example. [10]

(b) Describe following properties [6]

(i) Orthogonality

(ii) Reliability

OR

Q.1. (a) Explain the different stages involved in language translation. [10]

(b) Distinguish between static binding and dynamic binding. [6]

UNIT-II

Q.2. (a) Explain representation and implementation of following data types- [8]

(i) Integer Data type

(ii) Real Data type

(b) What is type equivalence? Explain its variations with example. [8]

OR

Q.2. (a) Describe the implementation and specification of sequential and direct access file with suitable example. [8]

(b) What is variant record? Give syntax to declare variant record. [4]

(c) Write short note on sets. [4]

UNIT-III

Q.3. (a) What do mean by structured sequence control? Also discuss the problems in structural sequence control. [8]

(b) Differentiate between: [8]

(i) Subroutine & Macro

(ii) Subroutine & Coroutine

OR

Q.3. (a) Differentiate between: [6]

(i) Implicit & Explicit sequence control

(ii) Substitution and unification

(b) Explain exception handling. [10]

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UNIT-IV

Q.4. What is the role of parameter passing in subprogram invocations? Consider following code: [16]

```
Void swap (int a, int b)
{
    int temp = a ;
    a = b ;
    b = temp ;
}
    Void main ( )
{
    int list [5] = {1, 3, 5, 6, 10};
    Value = 15 ;
    swap (value, list [0];
    swap (list [0], list [2]);
    swap (value, list [3];
}
```

Consider different methods of parameter passing find the values of variable value and list after each call of swap function.

OR

Q.4. Write short note on - [16]

(i) Encapsulation

(ii) Information hiding

(iii) Static and dynamic scop of identifier

(iv) Formal and actual parameter

UNIT-V

Q.5. Differentiate between static and dynamic storage Management approaches. [16]

OR

Q.5. Explain following – (any two) [16]

(a) Garbage collection Algorithm

(b) Variable Block Allocation

(c) Phases of storage Management

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