CS/IT/EC

3E1103

Roll No. _____ Total No of Pages: 3

3E1103

B. Tech. IV - Sem. (Main) Exam., May - 2019

HSMC

Managerial Economics & Financial Accounting

All Branches

Time: 2 Hours **Maximum Marks: 80**

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 GDP

Q.2 Giffen Goods

Q.3 Marginal Cost

Q.4 Perfect Competition

Q.5 Capital Budgeting

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 What is circular flow of economic activity? Explain the circular flow in four sector model.

Q.2 Following table exhibits demand and supply condition of a commodity at different price levels –

Price (₹)	Demand ('000/month)	Supply ('000/month)
110	-	1000
100	40	900
90	80	800
80	120	700
70	160	600
60	200	500
50	240	400
40	280	300
30	320	200
20	360	100
10	400	-

(a) Draw the demand and supply curves.

(b) What is the equilibrium price and quantity?

Q.3 "In perfect competition a firm is price taker". Explain the statement with the help of a suitable illustration.

Q.4 What is Elasticity of Demand? What are the factors affecting the Elasticity of Demand?

Q.5 What is Isoquant? Explain with the help of diagram.

Q.6 Compute the Net Present Value of a project if it requires an initial investment of ₹ 2,25,000 and is expected to generate the following net cash inflows.

Year 1	Year 2	Year 3	Year 4
₹ 95,000	₹ 80,000	₹ 60,000	₹ 55,000

The minimum desired rate of return is 12%.

PART – C

(Descriptive/Analytical/Problem Solving/Design Question) **[2×15=30]**

Attempt any two questions

Q.1 Explain the various methods of measuring Nation Income.

Q.2 What is meant by production function? Explain the 3 stages of production with the help of diagram.

Q.3 Prepare the Trading and Profit and Loss account and a balance sheet from the following particulars for ABC firm as on 31 March 2018.

Account Title	Amount (₹)	Account Title	Amount (₹)
Sundry debtors	200000	Bills payable	86500
Bad debts	6000	Sundry creditors	48000
Trade expenses	2500	Provision for bad debt	7200
Printing and Stationary	7400	Return outwards	5500
Rent, Rates and Taxes	8600	Capital	500000
Freight	5000	Discount received	11540
Sales return	11200	Interest received	20000
Vehicle	30000	Sales	123000
Opening stock	100000		
Furniture and Fixture	22000		
Purchases	71000		
Drawings	34900		
Investments	92000		
Cash in hand	75000		
	136140		
	801740		801740

Adjustments:

(1) Closing stock was valued ₹ 45000.

(2) Depreciation charged on Furniture and Fixture @ 5%.

(3) Depreciation charged on vehicle @ 10%.

4E1213

Roll No. _____ Total No of Pages: 4

4E1213

B. Tech. IV - Sem. (Main) Exam., May - 2019

BSC Computer Sc. & Engg.

4CS2 – 01 Discrete Mathematics Structure

CS, IT

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Prove that for any two sets A and B: $A - (A \cap B) = A - B$

Q.2 Give an example of a partially ordered set which is not a lattice.

Q.3 Show that the multiplicative group $G = \{1, -1, i, -i\}$ is cyclic. Find its generators.

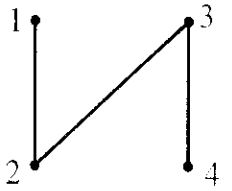
Q.4 Define finite state Machines.

Q.5 Find the minimum number of students in a school to be sure that 5 of them are born in the same month.

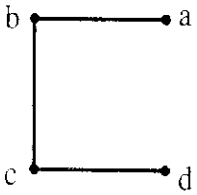
Q.6 Prove that α^2 is an even integer, then α is an even integer.

Q.7 Find the generating function for the sequence $\{1, 1, 0, 0, 1, 1, 1, \ldots\ldots \infty\}$

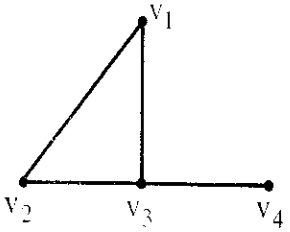
Q.8 Prove that these graphs G_1, G_3 and G_2, G_3 are non – isomorphic.



(G_1)



(G_2)



(G_3)

Q.9 Find the domain of the following function:

$$f(x) = \sqrt{\log\left(\frac{5x-x^2}{4}\right)}$$

Q.10 In how many ways can a team of 11 cricketers be chosen for 6 bowlers, 4 wicket keepers and 11 batsman to give majority of batsman so that at least 4 bowlers are there and 1 wicketkeeper?

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 (a) Write the scope and objective of DMS in Computer Science? [4]

(b) In a test 70% of the candidates passed in Science, 65% in Mathematics, 27% failed in both Science and Mathematics and 124 passed in both the subjects. Find the total number of candidates for the test. [4]

Q.2 Show that in the power set P(A) of all subsets of a set A = {a, b, c}, 'Set inclusion, $\subseteq$' is a partial order relation. Also draw the Hasse diagram for the POSET. [6+2=8]

Q.3 (a) Solve the recurrence relations – [4]

$a_n - 5a_{n-1} + 6a_{n-2} = 3n^2 - 2n + 1$

(b) Prove by induction that sum of the cubes of three consecutive integers is divisible by 9. [4]

Q.4 (a) Let $f : R \to R$ and $g: R \to R$ where R is the set of real numbers. Find gof and fog where $f(x) = x^2 - 2$ and $g(x) = x + 4$. State whether these functions are injective, surjective or bijective. [4]

(b) Draw the transition diagram of the finite state machine M (I, S, O, s_0, f, g), where I = {a, b}, S = {S_0, S_1}, O = {0, 1} and the transition table is as follows – [4]

	f		g	
S \ I	a	b	a	b
s_0	s_1	s_0	0	1
s_1	s_0	s_1	1	0

Also, find the output string for the input b b a a.

Q.5 Define and explain the following by suitable examples – [4×2=8]

(i) Cyclic group (ii) Order of an element in a group

(iii) Field (iv) Zero divisor of a ring

Q.6 (a) Show that ~ (pv (~p∧q)) ≡ (~p) ∧ (~q) (without truth table) [4]

(b) 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]

Q.7 Write short notes on the following – [4×2=8]

(a) Planar graphs

(b) Isomorphism of graphs

(c) Cut sets

(d) Vertex connectivity

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Let R = {(1, 2), (2, 3), (3, 1)} and A = {1, 2, 3}. Find reflexive, symmetric and transitive closure of R using – [5×3=15]

(a) Composition of relation R

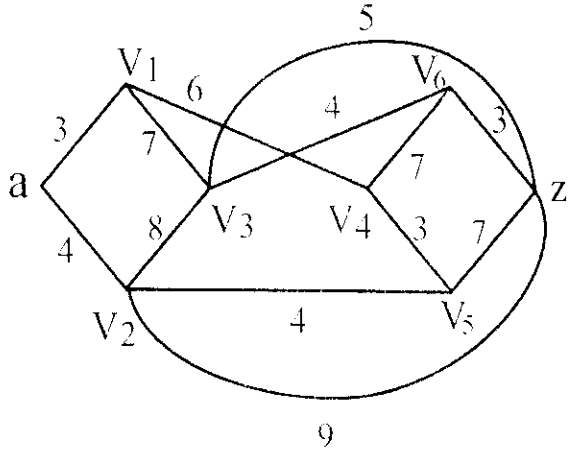
(b) Composition of matrix relation R

(c) Graphical representation of R

(a) Define Bounded lattices, complement of an element of a lattices and distributive lattices. [6]

(b) Let $(L, \leq)$ be a bounded distributive Lattice, if an element $a \in L$, has a complement then it is unique. [9]

Q.3 (a) Find the shortest path from a to z in the following graph – [5]



(b) Suppose that a connected planar graph has 30 vertices, each of degree three. Into how many regions is the plane divided by a planar representation of this graph. [5]

(c) Let G be the set of all non -- zero real numbers and Let $a * b = \frac{ab}{2}$, then show that $(G, *)$ is an abelian group. [5]

Q.4 (a) Obtain the Principal disjunctive normal forms of $(p \wedge q) \vee (\sim p \wedge r) \vee (q \wedge r)$. [5]

(b) Let $\Delta(G)$ be the maximum of the degrees of the vertices of a graph G then $K(G) \leq 1 + \Delta(G)$ where K(G) is the chromatic number of graph. [5]

(c) In a complete graph with n – vertices there are $\frac{(n-1)}{2}$ edge disjoint Hamiltonian circuits, if n is an odd number ≥ 3. [5]

Q.5 (a) Define tautology and prove the following – [4]

$\{(p \rightarrow q) \wedge p\} \rightarrow q$ is tautology

(b) Define fallacy and prove the following – [4]

$(p \wedge q) \vee \sim(p \wedge q)$ is $\wedge$ fallacy

(c) Let (m, *) be a semi group and $a \in m$ such that the equations $a * u = x$ and $v * a = x$ have solutions in M for all $x \in M$. Show that (M, *) is a monoid. [7]

4E1230

Roll No. _____

Total No of Pages: 3

4E1230

B. Tech. IV - Sem. (Main) Exam., May - 2019
ESC Information Technology
4IT3 – 04 Principle of Communication

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What do you mean by the analog and digital communication?

Q.2 Write the expression for power relation in AM value.

Q.3 What is the BW for AM wave?

Q.4 What is carrier swing?

Q.5 What is Carson's rule?

Q.6 What do you mean by Nyquist rate?

Q.7 What do you mean by Quantization?

Q.8 Explain the importance of delta modulation.

Q.9 What do you mean by inter symbols interference?

Q.10 Write the advantages and limitations of NRZ codes.

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 In an AM system, the modulating signal is sinusoidal with frequency f_m Hz. If 80% modulation is used, then find the ratio of total side band power in the modulation signal, to the total power.

Q.2 Draw the circuit diagram of generation of PPM signal. Write the advantage of PPM.

Q.3 What are the properties of PN sequence? Explain the method of generation of PN sequence with suitable diagram / circuit.

Q.4 Draw the block diagram of ADM. Explain its working and compare it with PCM.

Q.5 For a FSK system the following data are observed, transmitted binary data rate = 2.5×10^6 bits/sec, PSD of noise = 10^{-20} Watt/Hz. Amplitude of received signal = 1μv. Determine the average probability of symbol error assuming coherent detection.

Q.6 Explain the Quadrature Phase Shift Keying (QPSK) modulation technique. Draw the schematic diagram of QPSK transmitter and receiver and explain the working.

Q.7 Explain pre-emphasis and de-emphasis in FM broadcasting.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Explain with the help of block diagram the binary PSK transmitter and receiver. Show that the average probability of symbol error for coherent binary PSK equals-

$$P_e = \frac{1}{2}\,\text{erfc}\,\sqrt{\frac{E_b}{N_o}}$$

Q.2 Sketch the waveform for each of the following codes for the bit stream 1011101011

(a) Unipolar RZ

(b) Bipolar RZ

(c) Unipolar NRZ

(d) Bipolar NRZ

(e) Split phase Manchester

Q.3 Draw and explain the working of delta modulation. For a delta modulation system find the maximum output signal to noise ratio for sinusoidal modulation under the assumption of no slope overload. The receiver contains a low pass filter at its output end having bandwidth equal to the message bandwidth.

Q.4 What is SSB modulation? Describe various methods of generation of SSB-SC signal.

Q.5 What is meant by spreading a signal? What are the modulation techniques used in FHSS system?

4E1214

Roll No. _____ Total No of Pages: 3

4E1214

B. Tech. IV - Sem. (Main) Exam., May - 2019
ESC Computer Science & Engineering
4CS3 – 04 Microprocessor & Interfaces

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What is Microprocessor?

Q.2 What is the role of accumulator in Microprocessor?

Q.3 Define general purpose registers and their use.

Q.4 Why AD_0-AD_7 lines are multiplexed?

Q.5 What is the use of ALE signal?

Q.6 Define Instruction. & Instruction set.

Q.7 What are Interrupts?

Q.8 What do you mean by Input port and output Port?

Q.9 What is the need of DMA in Microprocessor?

Q.10 List the features of 8251.

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Explain the role of following in 8085-

(a) Program Counter [4]

(b) Stack Pointer [4]

Q.2 Explain role of flag register in Assembly Language Programming also describe various flags available in 8085. [8]

Q.3 Write a program in Assembly Language to find number of 1's in the given bit pattern of 8 bits. [8]

Q.4 Explain various modes supported in 8254 Timer in detail. [8]

Q.5 Write and explain control word in 8254 Timer in detail [8]

Q.6 Explain signals of RS-232C in detail. [8]

Q.7 What is Subroutine? Explain the use of stack in CALL and RETURN Instructions. [8]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Explain the organization and architecture of 8255 Programmable peripheral Interface IC with a function block diagram also draw the Interfacing scheme of 8255 and 8085 in memory mapped I/O mode. [15]

Q.2 (a) Draw and explain the functional block diagram of 8085 microprocessor along with the features in detail. [10]

(b) Explain the concept of multiplexing and De multiplexing of buses. [5]

Q.3 Explain the operational difference between following pair of instructions: [5×3=15]

(a) SPHL and XTHL

(b) LHLD and SHLD Addr

(c) XRA A and MVIA, OOH

(d) DAD RP and DAA

(e) INR A and ADI01 H

Q.4 (a) Explain the organization and architecture of 8251 (USART) with a functional block diagram. [10]

(b) Differentiate between Synchronous and Asynchronous data transfer. [5]

Q.5 Explain following in detail -

(a) RS422A Standard [5]

(b) 8279 Keyboard Interface [5]

(c) Parallel Interface – Centronics & IEEE 488 [5]

4E1215

Roll No. _____ **4E1215** Total No of Pages: 3

B. Tech. IV-Sem. (Main) May - 2019
PCC Computer Science & Engineering
4CS4-05 Database Management System
CS, IT

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

PART – A

(Answer should be given up to 25 words only) [10×2=20]

All questions are compulsory

Q.1 What is DBMS?

Q.2 What is Entity? Explain with a suitable example.

Q.3 What is the purpose of normalization in DBMS?

Q.4 Explain the concepts of Primary key.

Q.5 What is the meaning of sub-query in terms of SQL?

Q.6 What do you mean by Referential Integrity?

Q.7 Why E-R model used in DBMS?

Q.8 Explain the role of Triggers in SQL programming.

Q.9 What is the need of serializability in transaction processing?

Q.10 What is Concurrency?

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Differentiate between file system and DBMS. Explain the ternary relationship with a suitable example.

Q.2 What is E-R model? What are the features of E-R model? Draw and explain E-R model for Library Management System.

Q.3 What do you mean by Null Values? Explain Dynamic SQL in detail.

Q.4 What are the difference between JDBC and ODBC?

Q.5 What is Normalization? Also explain functional dependencies with a suitable example.

Q.6 Write a short note on transaction properties and recoverable schedules.

Q.7 What is shadow paging? Explain in detail.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 What is embedded SQL?

Write the following queries in SQL by considering the employee data base.....

(a) Find all the employees in database who live in the same cities as the companies for which they work.

(b) Find all the employees who earn more than the average salary.

Q.2 Explain Boyce-Codd normal form and 3-NF in detail.

Q.3 Explain the followings in detail :

(a) Aggregation v/s ternary relationship

(b) Entity v/s Attribute

(c) Conflict v/s View serializability

Q.4 What is cascadeless schedule? Why is cascadeless ness of schedules desirable? Are there any circumstances under which it would be desirable to allow non-cascadeless schedules? Explain and justify your answer.

Q.5 Why must lock and unlock be atomic operations? Explain recovery related data structure in detail. Also explain deadlock handling.

4E1216

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Total No of Pages: 3

4E1216

B. Tech. IV - Sem. (Main) Exam., May - 2019

PCC Computer Sc. & Engg.

4CS4 – 06 Theory of Computation

CS, IT

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What is sets and subsets?

Q.2 What are graphs?

Q.3 What is Binary tree?

Q.4 What is finite automata?

Q.5 What is NOFA?

Q.6 What is Moore Machine?

Q.7 What is Turing Machine?

Q.8 What is context free grammar?

Q.9 What is vertex cover problem?

Q.10 What is Universal Turing Machine?

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

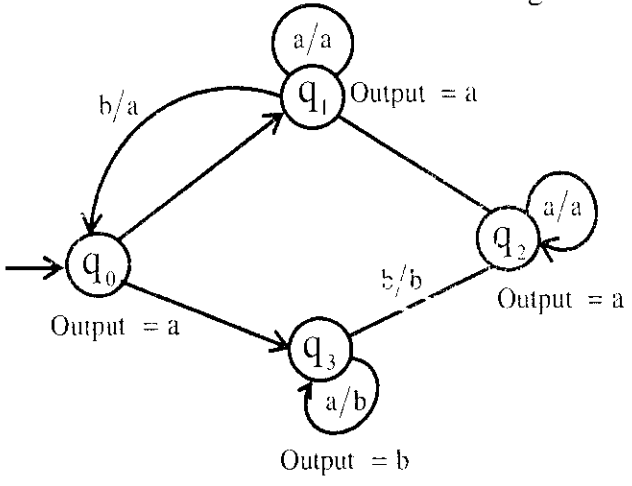
Attempt any five questions

Q.1 Explain the difference between Deterministic and non-deterministic finite automation.

Q.2 Design a FA which checks whether the given binary number is even.

Q.3 Check whether the strings abb, aba and abb abb are accepted by transition graph or not.

Q.4 Consider the Moore Machine shown in figure. What is the output for the input ababa?



Q.5 Convert the following Moore Machine into Mealy Machine:

State	Input		Output
	a	b	
→ q_0	q_1	q_3	1
q_1	q_3	q_1	0
q_2	q_0	q_3	0
q_3	q_3	q_2	1

Q.6 Consider the context free grammar-

$S \rightarrow AA$

$A \rightarrow AAA \backslash bA \backslash Ab \backslash a$

Find the parse tree for the string bbaaaab

Q.7 Explain the difference between Deterministic and Non Deterministic Pushdown Automata.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Example Chomsky classification of language with the help of suitable example.

Q.2 How can a pushdown automata be constructed for a given language? Explain with example.

Q.3 Explain the procedure for minimization of finite automata with example.

Q.4 Explain Turing Machine with its various way of representation.

Q.5 Explain Hamiltonian path problem.

4E1217

Roll No. _____ Total No of Pages: 3

4E1217

B. Tech. IV - Sem. (Main) Exam., May - 2019
PCC Computer Science & Engineering
4CS4 – 07 Data Communication and Computer Networks
CS, IT

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 List the seven layers of the OSI model.

Q.2 What is difference between analog and digital signals?

Q.3 Differentiate between single-bit error and burst error.

Q.4 Define framing and the reason for its need.

Q.5 Differentiate between IPv4 address and IPv6 address.

Q.6 What is physical address?

Q.7 Differentiate between connectionless and connection-oriented service.

Q.8 Write any two differences between UDP and TCP.

Q.9 What are the two main categories of DNS messages?

Q.10 What are the three FTP transmission modes?

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Explain TCP/IP model with suitable diagram.

Q.2 What is line coding? Explain its characteristics.

Q.3 Explain block coding with suitable diagrams.

Q.4 Explain Go-back-N ARQ protocol.

Q.5 Explain ARP and RARP address mapping protocols.

Q.6 Explain the services provided by the TCP.

Q.7 Explain the services provided by network security.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Explain any two functions of each layer in the OSI model.

Q.2 Explain pure ALOHA protocol with suitable diagrams.

Q.3 Explain distance vector routing protocol with suitable example.

Q.4 Explain the leaky bucket algorithm with the help of suitable diagrams.

Q.5 Explain the HTTP protocol with the help of suitable diagrams.

4E4160

Roll No. _____ Total No of Pages: 3

4E4160

B. Tech. IV Sem. (Back) Exam., May - 2019
Computer Science & Engineering
4CS1A Microprocessor and Interfaces
CS, IT

Time: 3 Hours **Maximum Marks: 80**
Min. Passing Marks: 26

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) Explain the following terms with respect to 8085 microprocessor – [8]

(i) Address bus

(ii) Data bus

(iii) Control bus

(b) Why are $AD_7 - AD_0$ lines multiplexed? With the help of latching circuit, explain how these lines are demultiplexed. [8]

OR

Q.1 Draw the block diagram and pin diagram of 8085 microprocessor and explain its various pins. [16]

UNIT- II

Q.2 (a) Explain various addressing modes of 8085 microprocessor with an example. [8]

(b) Explain the use of rotate instruction with the help of suitable example. [8]

OR

Q.2 (a) Write an assembly language program for subtraction of two unsigned numbers. Draw the flow chart also. [8]

(b) Explain the following instruction of 8085 microprocessor with example-

(i) XTHL [2]

(ii) MVI [2]

(iii) XCHG [2]

(iv) STA [2]

UNIT- III

Q.3 (a) What is stack? What is the function of stack pointer? Discuss PUSH and POP operation. [8]

(b) What are subroutines? How they are useful? [8]

OR

Q.3 (a) Explain the use of RIM and SIM instruction. Write sequence of instructions to enable RST 7.5, RST 6.5 and RST 5.5 respectively. [8]

(b) Explain the implementation of INTR interrupt, using External hardware. [8]

UNIT- IV

Q.4 (a) Explain 8255 PPI with the help of block diagram. [8]

(b) Explain 8254 programmable interval timer (PIT) with the help of block diagram. [8]

OR

Q.4 Draw the block diagram and pin diagram of 8279 and explain the function of each block. Also describe its command word format. [16]

UNIT- V

Q.5 Draw the block diagram and pin description of USART 8251 and briefly explain formats of its mode, command and status words. [16]

OR

Q.5 (a) Draw a schematic to interface a 16 key matrix keyboard using port C of the 8255 A. Write instructions to initialize the port. [8]

(b) Write short note on any two - [2×4=8]

(i) IEEE 488

(ii) RS 232 C

(iii) Serial port and parallel port

(iv) Synchronous and Asynchronous Transmission

4E4161

Roll No. _____ Total No of Pages: 4

4E4161

B. Tech. IV Sem. (Back) Exam., May - 2019
Computer Science & Engineering
4CS2A Discrete Mathematical Structures
CS, IT

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

Min. Passing Marks: 26

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) Define power set. If S be a finite set of order n then prove that power set p(s) is a finite set of order 2^n [8]

(b) Define the following –

(i) Cross partition of a set

(ii) Duality

(iii) Floor function or greatest integer function

(iv) Bijection [8]

OR

Q.1 (a) What is the Pigeonhole and Generalized Pigeonhole principle, Explain and prove with example. [8]

(b) Explain the following functions –

(i) Floor and ceiling

(ii) Mod and Div function

(c) Prove $n(A \cup B) = n(A) + n(B)$ for two finite sets A and B which are disjoint. [8]

UNIT- II

Q.2 (a) Compute the number of partitions of a set with- [8]

(i) Four elements

(ii) Five elements

(b) Explain different properties of a relation with example. [8]

OR

Q.2 (a) Explain the Warshall's algorithm with example. [8]

(b) Show that in the set I of integers, the relation R defined by (aRb) if $a \cong b \bmod 2$ or (a-b) is a multiple of 2, is an equivalence relation. [8]

UNIT- III

Q.3 (a) Prove that the sum- [8]

$$1^2 + 2^2 + \ldots\ldots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

(b) Show that for any integer $n \geq 1$, [8]

$(11)^{n+2} + (12)^{2n+1}$ is divisible by 133.

OR

Q.3 (a) Sort the list X = [64, 25, 12, 22, 11] using selection sort algorithm. [8]

(b) Write short notes on – [8]

(i) Vacuous proof

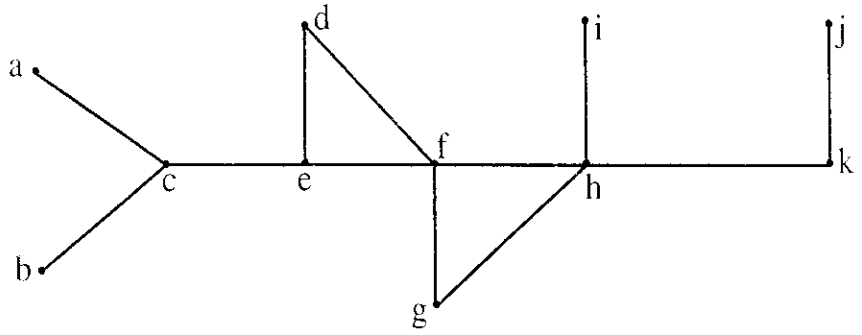
(ii) Trivial proof

(iii) Constructive proof

(iv) Non-constructive proof

UNIT- IV

Q.4 (a) Use Depth-first search to find a spanning tree for the following graph G- [8]



(Graph G)

(b) Explain the following graph operations with examples – [8]

(i) Union

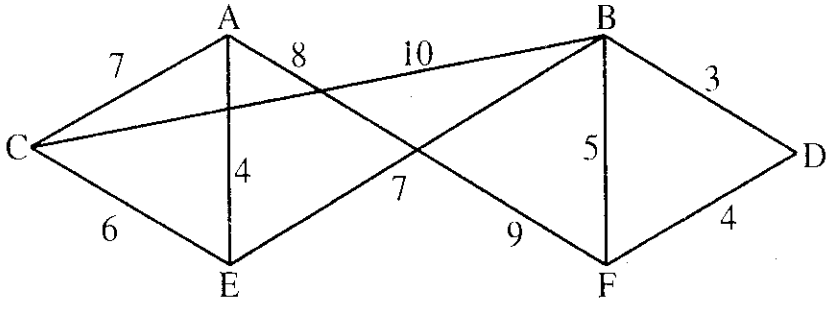
(ii) Intersection

(iii) Ring sum

(iv) Complementary graph

OR

Q.4 (a) Explain the minimal Spanning Tree. Find minimum spanning tree of the following graph – [8]



(b) Define the following with example – [8]

(i) Eulerian graph

(ii) Hamiltonian Graph

(iii) Complete bipartite graph

(iv) Isomorphic Graphs

UNIT- V

Q.5 (a) Write contrapositive, converse and inverse of the statement

"The home team wins whenever it is raining" Also construct the truth table for each statement. [8]

(b) Obtain Disjunctive Normal form (DNF) of the statement - $\sim (p \vee q) \leftrightarrow p \wedge q$ [8]

OR

Q.5 (a) Define Tautology, Contradiction and Contingency. Determine the contrapositive of each statement – [8]

(i) If John is a poet, then he is poor.

(ii) Only if Mary studies will she pass the exam.

(b) (i) Show that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology. [8]

(ii) Find PCNF of a statement S whose PDNF is -

$(p \wedge q \wedge r) \vee (p \wedge q \wedge \sim r) \vee (\sim p \wedge \sim q \wedge r)$

4E4162

Roll No. _____

Total No of Pages: 4

4E4162

B. Tech. IV Sem. (Back) Exam., May - 2019
Computer Science & Engineering
4CS3A Statistics & Probability Theory
CS, IT

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

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) The chances that doctor C will diagnose disease X correctly is 60%. The chances that a patient will die by his treatment after correct diagnosis is 40% and the chance of death by wrong diagnosis is 70%. A patient of doctor C, who had disease X died. What is the chance that his disease was diagnosed correctly? [8]

(b) A random variable X has density function given by $f(x) = \begin{cases} 2e^{-2x} & x \geq 0 \\ 0 & x < 0 \end{cases}$. [8]

Find

(i) The generating function,

(ii) The first four moments about the origin

OR

Q.1 (a) A random variable X has density function given by [8]

$f(x) = \begin{cases} 4x(9 - x^2)/81, & 0 \leq x \leq 3 \\ 0 & otherwise \end{cases}$. Calculate

(i) P (1 < X < 2)

(ii) P (X > 2).

(b) For a chip made by a company, the failure rate is constant and time to failure (in Hours) follows the distribution $f(x) = \begin{cases} 4e^{-4x} & x \geq 0 \\ 0 & x < 0 \end{cases}$. Calculate mean time to failure. [8]

UNIT- II

Q.2 (a) Suppose the temperature T during May is normally distributed with mean 68° and standard deviation 6°. Find the probability that temperature during May is

(i) Between 70° to 80°

(ii) Less than 60°. [Given that $\varphi(2.00) = 0.4772$, $\varphi(0.33) = 0.1293$, $\varphi(1.33) = 0.4082$]. [8]

(b) A Poisson distribution has a double mode at x = 3 and x = 4. What is the probability that x will have one or the other of these two values. [8]

OR

Q.2 (a) When will be a Binomial distribution symmetric? Assuming half the population of a town consumes chocolates and that 100 investigators each take 10 individuals to see whether they are consumers, how many investigators would you expect to report that three people or less were consumers? [8]

(b) Calculate mean and variance of rectangular distribution. [8]

UNIT- III

Q.3 (a) If θ is the angle between the two regression lines, show that

$\tan\theta = \frac{1-r^2}{r} \frac{\sigma_x \sigma_y}{\sigma x^2 + \sigma y^2}$. Explain the significance when r = 0 and r = ± 1. [8]

(b) Fit a second degree parabola in the following data: [8]

x	1	2	3	4	5	6	7	8	9
y	2	6	7	8	10	11	11	10	9

OR

Q.3 (a) Ten competitors in a beauty contest were ranked by three judges in the following orders: [8]

First Judge	1	6	5	10	3	2	4	9	7	8
Second Judge	3	5	8	4	7	10	2	1	6	9
Third Judge	6	4	9	8	1	2	3	10	5	7

Use the method of rank correlation, determine which pair of judges has the nearest approach to common tests in beauty.

(b) Ten students got the following percentage of marks in Principles of Economics and Statistics: [8]

Roll No.	1	2	3	4	5	6	7	8	9	10
Marks in Economics	78	36	98	25	75	82	90	62	65	39
Marks in Statistics	84	51	91	60	68	62	86	58	53	47

Calculate coefficient of correlation.

UNIT- IV

Q.4 The men's department of a large store employs one tailor for customer fitting. The number of the customer requiring fitting appears follow a Poisson distribution with mean arrival rate 24 per hour. Customers are fitted on a first come, first served basis, and they are always willing to wait for the tailor's service, because alterations are free. The time it takes to fit a customer appears to be exponentially distributed with a mean of 2 min. [16]

(a) What is the average number of customers in the fitting room?

(b) How much time should a customer expect to spend in the fitting room?

(c) What percentage of the time is the tailor idle?

OR

Q.4 The owner of a small but busy newspaper and the tobacco store serves customers on an average of one every 30 s, the actual distribution being exponential. Customers arriving according to Poisson process, at a mean rate of three per minute, and they can wait for service if the owner is busy with another customer. A number of customers choose not to wait and take their business elsewhere. The probability that an arriving customer walks in n/3 where n is the number of customers already in store. How much profit must the shop owner expect to lose from customers who take their business elsewhere, if the average profit per customer is 30/-? [16]

UNIT- V

Q.5 The output buffer of an ATM multiplexer can be modelled as an M/G/1 queue. Constant service time means now that an ATM cell has a fixed size (53 octets) and its transmission time to the link is constant. If the link speed is 155 Mbit/s, then the transmission time is S = 2.7μs. What is the mean number of cells in the buffer (including the cell being transmitted) ant the mean sojourn time of the cell in the buffer when the average information rate on the link is 124 Mbit/s? [16]

OR

Q.5 Describe discrete parameter birth-death process with example. [16]

4E4163

Roll No. _____ Total No of Pages: 3

4E4163

B. Tech. IV Sem. (Back) Exam., May - 2019
Computer Science & Engineering
4CS4A Software Engineering
CS, IT

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

Min. Passing Marks: 26

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 (i) Explain the system development life cycle (SDLC) in detail. [8]

(ii) Explain system level project planning in detail. [8]

OR

Q.1 (i) What is system? Differentiate between System Engineering and Software Engineering. [6]

(ii) Discuss major problem in system development. [5]

(iii) List and describe characteristics of a good software. [5]

UNIT- II

Q.2 (i) Explain software development life cycle with diagram. [8]

(ii) Explain advantages and disadvantages of evolutionary process model. [8]

OR

Q.2 (i) Explain the prototype model? Under what circumstances is it beneficial to construct a prototype model? [8]

(ii) Explain incremental process model. Justify that it is appropriate for business software system but less appropriate for real time systems. [8]

UNIT- III

Q.3 (i) Explain Data flow and control flow diagrams with suitable example. [8]

(ii) Write short note on finite state machine (FSM). [8]

OR

Q.3 (i) What is requirement analysis? Explain the requirement analysis tasks and principles. [8]

(ii) Write short note on - [2×4=8]

(a) Software prototyping

(b) Behavioral modeling

UNIT- IV

Q.4 (i) Explain effective modular design in detail. [8]

(ii) Explain the design documentation with example. [8]

OR

Q.4 (i) What is software coding? Describe programming style and program quality in context of software coding. [8]

(ii) Define the meaning of software design. Explain the design fundamental for software design. [8]

UNIT- V

Q.5 (i) Explain object-oriented design concepts and methods. [8]

(ii) Explain the object modularization with example. [8]

OR

Q.5 Write short notes on – (any two) [8×2=16]

(i) Unified Modeling Language (UML)

(ii) Object Oriented Analysis Modeling

(iii) Object Oriented Design

4E4164

Roll No. _____ Total No of Pages: 2

4E4164

B. Tech. IV Sem. (Back) Exam., May - 2019
Computer Science & Engineering
4CS5A Principles of Communication
CS, IT

Time: 3 Hours **Maximum Marks: 80**
Min. Passing Marks: 26

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) Explain VSB in detail? [8]

(b) Explain the generation of amplitude modulated signal using square low modulator. Draw the spectrum of the output of square low modulator. [8]

OR

Q.1 (a) Explain Pre – emphasis and De – emphasis in details? [8]

(b) Calculate the percentage power saving when the carrier and one of side bands are suppressed in an AM wave modulation to a depth of: [8]

(a) 100%

(b) 50%

UNIT- II

Q.2 (a) Explain time division multiplexing? [8]

(b) Describe modulation and Demodulation method of PAM? [8]

OR

Q.2 (a) Write a short note on sampling theorem? [8]

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

UNIT- III

Q.3 (a) Compare PCM and Delta modulation? [8]

(b) Write a short note on T1 carrier system. [8]

OR

Q.3 (a) Explain in detail ADM? [8]

(b) What is companding? Explain a μ – Law and A – Law for non – uniform quantization? [8]

UNIT- IV

Q.4 (a) Write a short note on Inter Symbol Interference? [8]

(b) The bit sequence 1010110011 is to be transmitted using different coding techniques. [8]

(i) Unipolar RZ and NRZ.

(ii) Polar RZ and NRZ

OR

Q.4 (a) Explain ASK and FSK in detail? [8]

(b) Explain generation and detection of QPSK signals using suitable diagram. [8]

UNIT- V

Q.5 (a) Explain DSSS and FHSS? [8]

(b) Define processing gain in a CDMA system. How is the capacity calculated for CDMA system? [8]

OR

Q.5 (a) Write a short note on – [8]

(i) PN sequence

(ii) CDMA

(b) What is direct sequence spread spectrum modulation. [8]

4E4165

Roll No. _____ Total No of Pages: 3

4E4165

B. Tech. IV Sem. (Back) Exam., May - 2019

Computer Science & Engineering

4CS6A Principles of Programming Languages

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

Min. Passing Marks: 26

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) What attributes in C programming language makes it a good language? [8]

(b) What is language paradigms? Explain. [8]

OR

Q.1 Write short note on the following - [8×2=16]

(a) Language Translators

(b) Syntax & Semantics

UNIT- II

Q.2 (a) Explain type conversion and type equivalence roles used for programming language. [8]

(b) What is structured data? Explain. [8]

OR

Q.2 Write short note on – [4×4=16]

(a) Vectors

(b) Types of Array

(c) Files

(d) Structure

UNIT- III

Q.3 (a) How many types of sequence control are there? Explain each. [8]

(b) What are the general characteristics of sub program? Explain. [8]

OR

Q.3 (a) How many types of control statements are there? Explain. [8]

(b) What is exception handling? Explain. [8]

UNIT- IV

Q.4 (a) What do you mean by static and dynamic scope? Explain. [8]

(b) Differentiate between static memory allocation and dynamic memory allocation. [8]

OR

Q.4 Write short note on – [4×4=16]

(a) Parameter Passing

(b) Parameter Transmission

(c) Block Structure

(d) Local and Shared data

UNIT- V

Q.5 (a) What is fixed and variable size heap storage management? Explain. [8]

(b) What are the concept of abstract data types? Explain. [8]

OR

Q.5 (a) What is garbage collection? Explain. [4]

(b) Write short note on – [4×3=12]

(i) Storage management

(ii) Abstract data types

(iii) Type definitions
