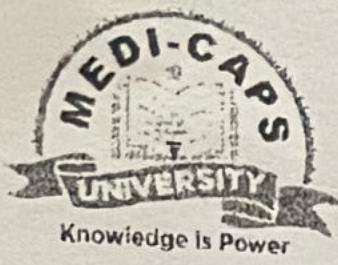


Total No. of Questions: 3



Enrollment No. EN21CS301678

Faculty of Engineering
Mid Sem I Examination March - 2023
CS3CO38 Theory of Computation

Programme: B.Tech.

Duration: 1.5 Hrs.

Branch/Specialisation: CSE

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

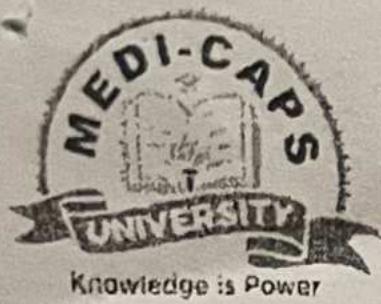
	Marks	BL	CO	PO	PS O
Q.1 i. Which of the following is false (a) $\Sigma^* \cup \Sigma' = \Sigma^*$ (b) $\Sigma' \subseteq \Sigma^*$ (c) $\Sigma^* \cap \Sigma' = \Sigma'$ (d) $\Sigma \cdot \Sigma' = \Sigma' \cdot \Sigma'$	1	BL ₀₁	CO ₀₂	PO ₀₁	
ii. Choose the correct statement from the following (a) Every non RL is infinite (b) Every non RL is finite (c) Every RL is infinite (d) Every RL is finite	1	BL ₀₁	CO ₀₁	PO ₀₁	
iii. Which two of the following out of four regular expressions(RE) are equivalent (I) $(00)^*(\epsilon+0)$ (II) $(00)^*$ (III) 0^* (IV) $0(00)^*$ (a) I & II (b) II & III (c) III & IV (d) I & III	1	BL ₀₁	CO ₀₃	PO ₀₁	
iv. If we convert from NFA to DFA then number of states always: (a) Increase (b) Decrease (c) Dependence on Automata (d) None of these	1	BL ₀₁	CO ₀₁	PO ₀₂	
v. Myhill-Nerode theorem is used for: (a) Providing regular or non-regular (b) Minimization of FA (c) Finding equivalent classes (d) All of these	1	BL ₀₂	CO ₀₁	PO ₀₁	

- vi. Which of the following statement is correct
- NFA is more powerful than DFA
 - NFA and DFA are equivalent in power
 - NFA can accept more no of Languages compared to DFA
 - Only I is correct
 - Only II is correct
 - Only III is correct
 - Above all are correct

I BL₀₁ CO₀₁ PO₀₁

- Q.2 i. What is Finite Automata with tuples? 2 BL₀₁ CO₀₁ PO₀₁
- ii. Explain regular expression with example. 2 BL₀₁ CO₀₂ PO₀₂
- iii. Construct FSA for the following language over $\Sigma = \{a, b\}$ 3 BL₀₃ CO₀₃ PO₀₃
- (a) $L = \{(ab^*)^*\}$ (b) $L = \{b^*a + b^*\}$
- iv. Explain different closure properties of regular language. 5 BL₀₁ CO₀₃ PO₀₁
- OR v. Write Difference between Mealy and Moore machine. 5 BL₀₂ CO₀₁ PO₀₃
- Q.3 i. What is Arden's theorem? 2 BL₀₁ CO₀₁ PO₀₁
- ii. Explain (ϵ) - NDFA. 4 BL₀₁ CO₀₂ PO₀₁
- iii. What are the difference between DFA & NFA 6 BL₀₁ CO₀₄ PO₀₂
- OR iv. State pumping lemma for regular languages. Also proof that $L = \{a^n / n \text{ is a prime number}\}$ is not regular language. 6 BL₀₃ CO₀₃ PO₀₃

Total No. of Questions: 3



Enrollment No.....

Faculty of Engineering

Mid Sem II Examination April -2023

CS3CO38 Theory of Computation

Programme: B.Tech.

Branch/Specialisation: CS-AII

Duration: 1.5 Hrs.

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

		Marks	BL	CO	PO	PSO
Q.1	i. Which of the following Language is Context free	1	BL ₀₁	CO ₀₃	PO3	PSO3
	a. L= a ⁿ , n is prime number					
	b. L= a ⁿ b ^m c ^m , n,m >=0 & n<=m					
	c. L= a ⁿ b ⁿ n>=0					
	d. All of the above					
ii.	Context free language is not closed under which operation	1	BL ₀₂	CO ₀₃	PO3	PSO3
	a. Union	b. Intersection				
	c. Complement	d. Reverse				
iii.	Which of the following production rule violates the condition of GNF	1	BL ₀₃	CO ₀₃	PO3	PSO3
	a. A->AB	b. A->aBDG				
	c. A->a	d. A->bB				
iv.	Consider the following statement	1	BL ₀₂	CO ₀₄	PO2	
I.	CYK is a membership algorithm applied only on a grammar in CNF form.					
II.	If a grammar G is ambiguous than language generated by G will also be ambiguous.					
III.	There exist a deterministic PDA for every context free language					
IV.	One of the applications of context free grammar exists in compilation of source programs from high level to low level language.					

Select the correct statement-

- | | |
|-----------|--------------|
| a. I & II | b. II & III |
| c. I & IV | d. I,II & IV |

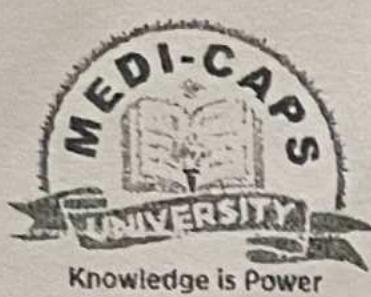
- v. Select the correct statement
- Each NPDA can be converted into equivalent DPDA
 - Push down automata is equivalent to finite automata with memory in the form of input tape.
 - NPDA is more powerful than DPDA
 - None of the above
- vi. Which of the following is not a context free language
- WcW , W is any string over a and b .
 - WcW^r , W is any string over a and b , r denotes the reverse.
 - WW^r , W is any string over a and b , r denotes the reverse.
 - Language only contains the strings with balanced parentheses.

I BL₀₂ CO₀₄ PO2

I BL₀₂ CO₀₄ PO2

- Q.2 i. State whether the given context free grammar is ambiguous or unambiguous,
 $S \rightarrow A/B, A \rightarrow aAb/ab, B \rightarrow abB/\epsilon$ 3 BL₀₂ CO₀₃ PO3 PSO3
- ii. Remove the unit production and null production rule from the given grammar
 $S \rightarrow AaB/AB/A$
 $A \rightarrow aA/a$ 4 BL₀₃ CO₀₃ PO3 PSO3
- iii. Explain the CYK algorithm with example? 5 BL₀₂ CO₀₃ PO3
- OR iv. Explain the closure properties of context free language. 5 BL₀₂ CO₀₃ PO3
- Q.3 i. Explain the notion of acceptance in push down automata 3 BL₀₁ CO₀₄ PO2
- ii. Define PDA with Tuples. 4 BL₀₂ CO₀₄ PO2
- iii. Explain the conversion of context free grammar in to equivalent push down automata using below CFG
 $S \rightarrow aAB$
 $A \rightarrow a$
 $B \rightarrow bB/b$ 5 BL₀₃ CO₀₄ PO2
- OR iv. Explain the pumping lemma for context free language with example 5 BL₀₂ CO₀₄ PO2

Total No. of Questions: 3



Enrollment No. EN21CS301678

Faculty of Engineering

Mid Sem I Examination March - 2023

CS3CO35 Microprocessor & Interfacing

Programme: B.Tech.

Branch/Specialisation: CSE

Duration: 1.5 Hrs.

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

	Marks	BL	CO	PO	PSO
Q.1 i. What is maximum address capacity of 8085 Microprocessor?	1	BL02	CO1	PO3, PO11	
a. 64KB b. 1 MB c. 4 KB d. 32KB					
ii. There are _____ general purpose registers in 8085 processor	1	BL01	CO1	PO3, PO11	
a. 5 b. 6 c. 7 d. 8					
iii. Which of the following interrupt is non-vectored in 8085?	1	BL02	CO1	PO3, PO11	
a. RST 7.5 b. RST 6.5 c. TRAP d. INTR					
iv. What is stored in the H & L general-purpose register?	1	BL01	CO2	PO3, PO5, PO11	
a. Opcode b. Address of memory c. Address of next instruction d. Temporary data					
v. Which of the following is a 2-byte instruction?	1	BL02	CO2	PO3, PO5, PO11	
a. LDA 2500H b. MOV A, B c. IN 01H d. JMP 2085H					

- vi. Which addressing mode execute its instructions within CPU without the necessity of reference memory for operands?
a. Implied Mode b. Immediate Mode
c. Direct Mode d. Register Mode

- Q.2 i. What do you mean by interrupt? **2** ii. Explain features of DMA operation. **2**
iii. What is demultiplexing of Address/ Data lines in 8085 Microprocessor, why it is needed. **3**
iv. Draw and explain architecture of 8085 Microprocessor. **5**

OR v. Explain these PINs of 8085 Microprocessor:
READY, ALE, TRAP, HOLD, RESET

- Q.3 i. What is instruction set? explain. **2**

- ii. What is subroutine? explain with example. **1** BL01 CO1

- iii. Explain addressing modes of 80 microprocessor with examples. **5** BL02 CO2

- OR iv. Explain these instructions with example:
ADD, LXI, MOV, PUSH, XCHG, INX **2**

Total No. of Questions: 3



Enrollment No. EN21CS3D1678

Faculty of Engineering

Mid Sem II Examination April - 2023

CS3CO35 Microprocessor & Interfacing

Programme: B.Tech.

Branch/Specialisation: CS-All

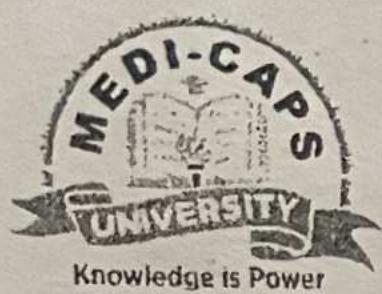
Duration: 1.5 Hrs.

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

vi.	Which of the following is non vectored interrupt? a. RST 7.5 c. RST 4.5	1	BL02	CO4	PO3, PO5, PO11
	b) INTR d. TRAP				
Q.2	i. What do you mean by memory interfacing? Give an example.	2	BL02	CO3	PO3
	ii. Differentiate between Memory mapped I/O interfacing and I/O mapped I/O interfacing techniques.	4	BL02	CO3	PO3, PO11
	iii. Draw the interfacing of 4K RAM having starting address of 7000H with 8085 Microprocessor. Use demultiplexed address/data lines and 3:8 decoder.	6	BL02	CO3	PO3, PO11
OR	iv. Draw and explain the programmable timer interface (Intel 8253/54) with 8085.	6	BL02	CO3	PO3, PO11
Q.3	i. What is a machine cycle? Give an example.	2	BL02	CO4	PO3, PO11, PO5
	ii. Explain maskable and non maskable interrupts with examples.	4	BL01	CO4	PO3, PO11, PO5
	iii. Draw the timing diagram for Memory Read Operation in 8085.	6	BL02	CO4	PO3, PO11, PO5
OR	iv. Draw the timing diagram for MOV A, B Instruction in 8085.	6	BL03	CO4	PO3, PO11, PO5

Total No. of Questions: 3



Enrollment No. EN21CS301678

Faculty of Engineering

Mid Sem I Examination March - 2023

CS3CO37 Advanced Java Programming

Programme: B.Tech.

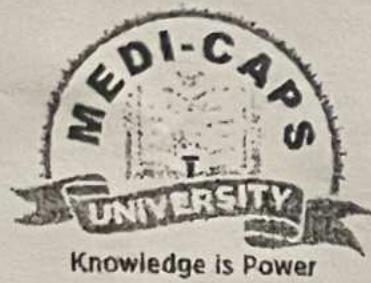
Branch/Specialisation: CSE

Duration: 1.5 Hrs.

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

	Marks	BL	CO	PO	PSO
Q.1 i. Which of the following cannot be Type parameterized?	1	BL1	CO1	PO2	
a) Overloaded Methods b) Generic methods c) Class methods d) Overriding methods					
ii. Which of this type of parameters is used for a generic class to return and accept any type of object?	1	BL1	CO1	PO2	
a) K b) N c) T d) V					
iii. What is meant by the term generics?	1	BL1	CO1	PO1	
a) Class b) Structure c) Interface d) Parameterized types					
iv. Servlet are used to program which component in a web application?	1	BL2	CO2	PO4	
a) client b) server c) tomcat d) applet					



Enrollment No.....

Faculty of Engineering

Mid Sem II Examination April -2023

CS3CO37 Advanced Java Programming

Programme: B.Tech.

Branch/Specialisation: CS-AII

Duration: 1.5Hrs.

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

	Marks	BL	CO	PO	PSO
Q.1 i. What are the major components of the JDBC?	1	BL2	CO3	PO1	
a. DriverManager, Driver, Connection, Statement, and ResultSet					
b. DriverManager, Driver, Connection, and Statement					
c. DriverManager, Statement, and ResultSet					
d. DriverManager, Connection, Statement, and ResultSet.					
ii. Java code is embedded under which tag in JSP?	1	BL1	CO3	PO1	
a. Declaration b. Scriptlet					
c. Expression d. Comment					
iii. JSP uses server-side scripting that is translated into ... and compiled before they are run.	1	BL1	CO3	PO1	
a. Applet b. Servlets					
c. HTML d. JavaScript					
iv. What is the main purpose of the Spring Framework?	1	BL1	CO4	PO1	
a. To provide a comprehensive programming and configuration model for Java-based enterprise applications.					
b. To provide a comprehensive programming and configuration model for JavaScript-based web applications.					
c. To provide a comprehensive programming and configuration model for PHP-based web applications.					
d. To provide a comprehensive programming and configuration model for Python-based web applications.					

v. Which interface out of the following options will you use to perform destruction of beans in the context of the life cycle methods? 1 BL1 CO4 PO2

- a. Initializing Bean
- b. Post Construct
- c. Disposable Bean
- d. Pre Destroy

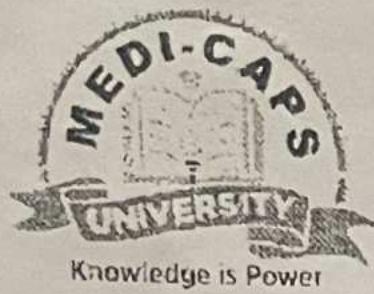
vi. Spring is a _____ framework? 1 BL1 CO4 PO1

- a. free
- b. open source
- c. under license
- d. proprietary

Q.2 i. What do you mean by API ? 2 BL1 CO3 PO1
ii. Explain JSP building blocks in detail? 4 BL1 CO3 PO1
iii. Write all the steps of java application with Database. 6 BL3 CO3 PO3

OR iv. Explain any five implicit object of JSP with HTML and JSP tag. 6 BL3 CO3 PO1

Q.3 i. What do you mean by spring framework? 2 BL1 CO4 PO1
ii. What is the importance of the Container class in Java? 4 BL1 CO4 PO1
iii. What do you mean by dependency injection? 6 BL1 CO4 PO2
OR iv. Write the Difference between POJO and Bean. 6 BL2 CO4 PO2



Enrollment No.....

Faculty of Engineering

Mid Sem I Examination March - 2023
CS3CO39 Database Management System

Programme: B.Tech.

Branch/Specialisation: CSE

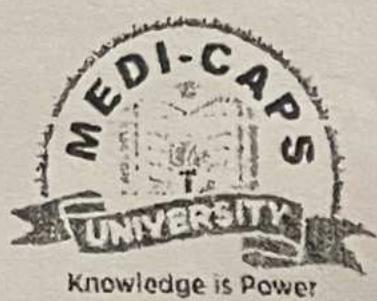
Duration: 1.5 Hrs.

Maximum Marks: 30

		Marks	BL	CO	PO	PSO
Q.1	i. Who created the first DBMS?	1	BL1	CO1	PO1	
	a) Edgar Frank Codd					
	b) Charles Bachman					
	c) Charles Babbage					
	d) Sharon B. Codd					
	ii. Which type of data can be stored in the database?	1	BL2	CO1	PO1	
	a) Image oriented data					
	b) Text, files containing data					
	c) Data in the form of audio or video					
	d) All of the above					
	iii. Which of the following is not a type of database?	1	BL2	CO1	PO1	
	a) Hierarchical					
	b) Network					
	c) Distributed					
	d) Decentralized					
	iv. Which of the following is used to denote the selection operation in relational algebra?	1	BL1	CO2	PO1	
	a) Pi (Greek)					
	b) Sigma (Greek)					
	c) Lambda (Greek)					
	d) Omega (Greek)					

	v.	Which is a join condition contains an equality operator: a) Equijoins b) Cartesian c) Natural d) Left	1	BL1	CO2	PO3
	vi.	Which is a unary operation: a) Selection operation b) Primitive operation c) Projection operation d) Generalized selection	1	BL1	CO2	PO1
Q.2	i.	Write any four differences between the data and information.	2	BL4	CO1	PO2
	ii.	Explain the two tier and three tier architecture of DBMS in detail with a suitable diagram.	4	BL4	CO1	PO3
	iii.	Write any six differences between conventional file systems and database management systems.	6	BL5	CO1	PO2
OR	iv.	Explain entity relationship model in detail with suitable examples.	6	BL6	CO1	PO3
Q.3	i.	Define the relational algebra. Also write the types of operations of relational algebra.	2	BL4	CO2	PO2
	ii.	Explain the inner join and its types in detail with examples.	4	BL4	CO2	PO2
	iii.	Explain the SQL. Also explain the languages of SQL (DDL, DML, DCL) in detail with examples.	6	BL6	CO2	PO3
OR	iv.	Explain the basic operations of relational algebra with examples.	6	BL4	CO2	PO2

Total No. of Questions: 3



Enrollment No. EN21CS301678

Faculty of Engineering

Mid Sem II Examination April -2023

CS3CO39 Database Management System

Programme: B.Tech.

Branch/Specialisation: CS-All

Duration: 1.5Hrs.

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

	Marks	BL	CO	PO	PSO
Q.1 i. 4NF is designed to cope up with :	1	BL01	CO3	PO01	
a) Transitive dependency b) Join dependency c) Multi valued dependency d) None of these					
ii. 5NF should restrict the..... :	1	BL01	CO3	PO01	
a) Transitive dependency b) Join dependency c) Multi valued dependency d) None of these					
iii. Data that causes inconsistency leads to:	1	BL01	CO3	PO01	
a) Data integrity b) Data redundancy c) Data anomaly d) Good data					
iv. Transaction enters into its _____ state when it finishes the final statement.	1	BL01	CO4	PO01	
a) Abort state b) Partially committed state c) Committed state d) Active state					
v. In locking Protocols what exclusive mode defines.	1	BL01	CO4	PO01	
a) Read only b) Write only c) Read and Write both d) None					

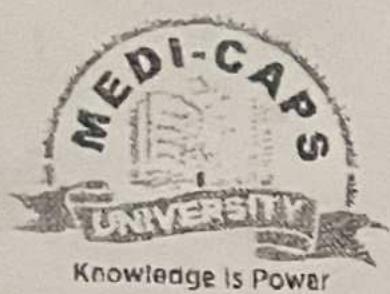
- vi. A system is in a _____ state if there exists a set of transactions such that every transaction in the set is waiting for another transaction in the set.
- Idle
 - Waiting
 - Deadlock
 - Ready

1 BL01 CO4 PO01

- Q.2 i. Discuss problems caused by redundancy and the purpose of normalization. 2 BL02 CO3 PO02
- ii. Define functional dependency and explain its uses in database design. 2 BL02 CO3 PO02
- iii. What is key ? Explain the following keys with example : 3 BL03 CO3 PO02
- Candidate Key
 - Primary Key
 - Foreign Key
- iv. Find all CANDIDATE KEYS and Prime and non-Prime attributes in the following relation:
- $R(ABCDEFHI)$
- FD: $CH \rightarrow G, A \rightarrow BC, B \rightarrow CFH, E \rightarrow A, F \rightarrow EG$
- OR v. Find the all CANDIDATE KEY of the following: 5 BL03 CO3 PO03
- $R(A,B,C,D)$ and
FD= $\{A \rightarrow B, B \rightarrow C, C \rightarrow D\}$
 - $R(A,B,C,D)$ and
FD= $\{A \rightarrow B, B \rightarrow C, C \rightarrow D, D \rightarrow A\}$

- Q.3 i. Define a Transaction? List the properties of transactions and explain them. 3 BL01 CO4 PO01
- ii. Draw a transaction state diagram and describe each state that a transaction goes through during its execution. 4 BL03 CO4 PO01
- iii. What is the 2-phase locking protocol? How does it guarantee serializability? 5 BL02 CO4 PO03
- OR iv. Explain the different types of failures in DBMS. 5 BL01 CO4 PO01

Total No. of Questions: 3



Enrollment No. EN21CS301678.....

Faculty of Engineering
Mid Sem I Examination March - 2023
CS3EL11 Statistical Analysis

Programme: B.Tech.

Duration: 1.5 Hrs.

Branch/Specialisation: CSE

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

	Marks	BL	CO	PO	PSO
Q.1 i. Relation between Mean, Median and Mode for symmetric distribution is given by	1	BL ₁	CO ₀₁	PO ₀₁	PSO ₀₁
a) Mean = Median = Mode					
b) Mean = Median + Mode					
c) Mean > Median > Mode					
d) None of these.					
ii. Relationship among the Arithmetic Mean (AM), Geometric Mean (GM) and Harmonic Mean (HM) can be represented by the formula	1	BL ₁	CO ₀₁	PO ₀₁	PSO ₀₁
a) $AM \times HM = GM$					
b) $AM^2 = HM \times GM$					
c) $AM \times HM = GM^2$					
d) None of these.					
iii. The algebraic sum of the deviations of all the variates from their arithmetic mean is equal to the	1	BL ₁	CO ₀₁	PO ₀₁	PSO ₀₁
a) zero					
b) arithmetic mean					
c) sum of the variates					
d) None of these.					

159
160
161
162
163
164
165
166
Total

iv. A variate which can take infinite number of values in a given interval $a \leq x \leq b$ is called -

- a) Discrete random variate
- b) Continuous random variate
- c) General random variate
- d) None of these.

v. Let x be a continuous random variable with probability density function $f(x)$, then mathematical expectation $E(x)$ of x with certain restrictions is given by

a) $E(x) = \int xf(x)dx$

b) $E(x) = \int f(x)dx$

c) $E(x) = \int xdx$

- d) None of these.

vi. The conditional probability for the event E_1 when the event E_2 has already happened denoted by-

- a) $P(E_2/E_1)$
- b) $P(E_1 * E_2)$
- c) $P(E_1/E_2)$
- d) None of these.

- Q.2 i. Write the formula to calculate the mode for a frequency distribution of continuous series.
- ii. From the following table giving the heights of students calculate the quartile range, semi quartile range and coefficient of quartile deviation:

Height (c.m.)	Number of students
158	21

1 BL₁ CO₀₁ PO₀₁ PSO₀₁

1 BL₁ CO₀₁ PO₀₁ PSO₀₁

iii. Find the following

46.

1 BL₁ CO₀₁ PO₀₁ PSO₀₁

OR iv. The follow
by two tea
season. Fin
consistent in

2 BL₂ CO₀₁ PO₀₁ PSO₀₁

4 BL₂ CO₀₁ PO₀₁ PSO₀₁

Number of goals scored
0
1
2
3
4

PSO₀₁PSO₀₂PSO₀₃PSO₀₄PSO₀₅

159	25
160	28
161	18
162	20
163	22
164	24
165	23
166	18
Total	199

- iii. Find the missing frequencies of the following distribution whose median is 46.

Variable	Frequency
10-20	12
20-30	30
30-40	?
40-50	65
50-60	?
60-70	25
70-80	18
Total	229

- OR iv. The following table gives goal scored by two teams A and B in a football season. Find the team which is more consistent in its performance

Number of goals scored	Number of football matches played	
	Team A	Team B
0	27	17
1	9	9
2	8	6
3	5	5
4	4	3

6 BL₀₁ CO₀₂ PO₀₁ PSO₀₃6 BL₀₁ CO₀₂ PO₀₁ PSO₀₃

Q.3 i. A drawer contains 50 bolts and 150 nuts. Half of the bolts and half of the nuts are rusted. If one item is chosen at random, what is the probability that it is rusted or is a bolt?

2 BL₂ CO₀₁ PO₀₁ PSO₀₁

ii. Define probability density function (p.d.f.). Is the function $f(x) = \begin{cases} 3(3-x) & 0 < x < 3 \\ 0 & \text{otherwise} \end{cases}$ p.d.f. or not?

4 BL₂ CO₀₁ PO₀₁ PSO₀₁

iii. Define cumulative distribution function. If $f(x) = \frac{c}{1+x^2}, -\infty < x < \infty$, then find c and obtain corresponding distribution function.

6 BL₃ CO₀₃ PO₀₃ PSO₀₃

OR iv. Define expectation for Discrete random variable. Calculate the expected value of the number of points that will be obtained in a single throw with an ordinary die. Find variance also.

6 BL₃ CO₀₃ PO₀₂ PSO₀₁

Total No. of Questions: 3



Enrollment No. EN21CS301678

Faculty of Engineering

Mid Sem II Examination April -2023

CS3EL11/IT3CO29 Statistical Analysis/Computational Statistics

Programme: B.Tech.

Branch/Specialisation: CS-AII/IT

Maximum Marks: 30

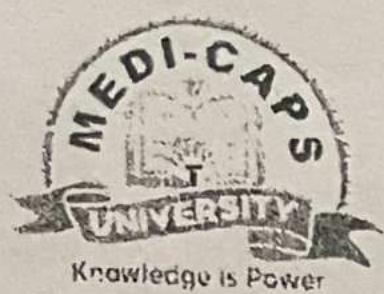
Maximum Marks: 30

- vi. The normal equation for fitting of a straight line $y = ax + b$ is $\sum xy = \underline{\quad}$
 a. $a \sum x + b \sum y$ b. $ma + b \sum x$
 c. $a \sum x + b \sum x^2$ d. None of these.
- Q.2 i. Explain exponential distribution. 1 BL₀₁, CO₀₁, PO₀₁, PSO₀₁
 ii. Six dice are thrown 729 times. How many times do you expect at least three dice to show a five or six? 2 BL_{01,2}, CO₀₁, PO₀₁, PSO₀₂
 iii. Find the first and second moment about origin for poisson distribution. 3 BL₀₂, CO₀₁, PO_{01,05}, PSO₀₂
 OR iv. In a test on 2000 electric bulbs, it was found that the life of a particular make was normally distributed with an average life of 2040 hours and standard deviation of 60 hours. Estimate the number of bulbs likely to burn for
 a. more than 2150 hours 7 BL₀₃, CO₀₂, PO_{01,05}, PSO₀₃
 b. less than 1950 hours.
- Q.3 i. Write the equations of regression line. 2 BL_{01,2}, CO₀₂, PO₀₁, PSO₀₂
 ii. Show that the coefficient of correlation is the geometric mean of the coefficient of regression. 3 BL₀₃, CO₀₂, PO₀₁, PSO₀₂
 iii. Find the rank correlation coefficient for the following data:

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

 OR iv. Fit second degree parabola to the following data regarding x as an independent variable:

x:	0	1	2	3	4
y:	1	5	10	22	38



Faculty of Engineering

Mid Sem II Examination April -2023

CS3CO36 Operating System

Programme: B.Tech.

Branch/Specialisation: CS-All

Duration: 1.5Hrs.

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- vi Memory allocation and deallocation is managed by
 a) CPU b) MMU c) GPR d) None

1 BL₀₁ CO₀₃ PO₀₃ PSO₁₀

- Q.2**
- i. Define fixed and dynamic partition of memory with example.
 - ii. Write down the difference between logical address space and physical address.
 - iii. Differentiate Paging and Segmentation.
 - iv. Consider six memory partitions of size 200 KB, 400 KB, 600 KB, 500 KB, 300 KB and 250 KB. These partitions need to be allocated to four processes of sizes 357 KB, 210 KB, 468 KB and 491 KB in that order. Perform the allocation of processes using first fit, best fit and worst fit algorithm.
- OR**
- v. Explain the concept of paging with segmentation using suitable example.

2 BL₀₁ CO₀₂ PO₀₂ PSO₀₈

2 BL₀₂ CO₀₂ PO₀₁ PSO₀₅

3 BL₀₂ CO₀₂ PO₀₃ PSO₁₀

5 BL₀₃ CO₀₂ PO₀₁ PSO₁₀

5 BL₀₂ CO₀₂ PO₀₂ PSO₀₈

- Q.3**
- i. What is demand paging.
 - ii. Explain the concept of Virtual Memory.
 - iii. Explain Belady's Anomaly with example. Which algorithm suffers from this problem.

2 BL₀₁ CO₀₃ PO₀₁ PSO₁₁

4 BL₀₂ CO₀₃ PO₀₃ PSO₁₂

6 BL₀₂ CO₀₃ PO₀₃ PSO₁₃

- OR**
- iv. Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3. Find out the number of page faults using FIFO, LRU and Optimal page replacement algorithm.
