


GOVERNMENT COLLEGE OF ENGINEERING, JALGAON
(An Autonomous Institute of Government of Maharashtra)

National Highway No.6, JALGAON - 425 002

Name of Examination : **Winter 2023**Course Code & Course Name : **CO304UC - Professional Elective-I- Software Engineering**Maximum Marks : **60**Duration : **3 Hrs**

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

1) Solve any two sub questions

- a) Explain in detail generic process model. [06]
 b) Define Software with its characteristics. [06]
 c) Write a short note on software myths. [06]

2) Solve any two sub questions

- a) Explain requirement engineering. [06]
 b) Draw a neat and clean use case diagram for Library management system. [06]
c) What is Control Flow model & Data Flow model. [06]

3) Solve any two sub questions

- a) What are the interface design principles? [06]
 b) What are the Shneiderman's Eight Golden Rules of Interface Design? [06]
c) What is an architectural style and explain data-centered architectures? [06]

4) Solve all sub questions

- a) Explain box structure specification of cleanroom software engineering. [06]
 b) Write a short note on Test-Driven development with example. [06]

5) Solve all sub questions

- a) What is agility and explain agile development? [06]
 b) Write a short note on Scrum. [06]

All the best!


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National Highway No.6, JALGAON - 425 002

Name of Examination : **Winter 2023**Course Code & Course Name : **CO302U - Database Management Systems**Maximum Marks : **60**Duration : **3 Hrs****Instructions:**

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

1) Solve any two sub questions

- a) Explain Client/Server architecture for DBMS. [06]
- b) Explain Characteristics of the Database Approach. [06]
- c) What are the phases for Database Design using high-level conceptual data models? [06]
- 2) Solve any two sub questions**
- a) Explain following database modification or update operations with example. [06]
- i) INSERT ii) UPDATE
- b) Consider the following relational database, where the primary keys are underlined. [06]

```

employee(person-name, street, city)
works(person-name, company-name, salary)
company ( company-name, city)
manages (person-name, manager-name)

```

Give an expression in the relational algebra to express each of the following queries:

- i. Find the names of all employees who work for First Bank Corporation.
 - ii. Find the names and cities of residence of all employees who work for First Bank Corporation.
 - iii. Find the names, street address, and cities of residence of all employees who work for First Bank Corporation and earn more than \$10,000 per annum.
- c) Consider the relational database of Q.2 b. Give a relational-algebra expression for each of the following queries: [06]
- i. Find the company with the most employees.
 - ii. Find the company with the smallest payroll.
 - iii. Find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.

3) Solve any two sub questions

- a) Explain the SELECT-FROM-WHERE structure of basic SQL queries. [06]
- b) What is normalization? Explain 1NF and 2NF with example. [06]

c) Write short note on XML database.

[06]

4)

Why are disks, not tapes, used to store online database files?

[06]

b) Explain ACID properties of transaction.

[06]

5)

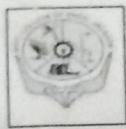
a) Explain Shadow Paging Recovery Technique.

[06]

b) Explain Hadoop with its architecture.

[06]

All the best!

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National Highway No.6, JALGAON - 425 002

Name of Examination : **Winter 2023**Course Code & Course Name : **CO301U - Computer Networks**Maximum Marks : **60**Duration : **3 Hrs**

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

- 1) Solve any two sub-question. [6]
 - a) What is meant by Fast Ethernet? [6]
 - b) What is Gigabit Ethernet? Explain its MAC Sublayer. [6]
 - c) Explain addressing mechanism of IEEE 802.11. [6]
- 2) Solve any two sub-question. [6]
 - a) Explain subnetting and supernetting. [6]
 - b) Explain logical addressing used in TCP/IP protocol suit. [6]
 - c) Draw and explain TCP/IP protocol suite. [6]
- 3) Solve any two sub-question. [6]
 - a) What are the limitations of classful IP addressing? [6]
 - b) What is RARP? [6]
 - c) What is ICMP? Explain its message format. [6]
- 4) a) Explain SCTP packate format. [6]
 - b) What is the function of the transport layer? [6]
- 5) a) What is firewall and how it works? [6]
 - b) What is the difference between local and remote login in TELNET? [6]

All the best!


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-  Name of Examination : **Winter 2023**
- Course Code & Course Name : **EE305UX - Open Elective I-Renewable Energy Technologies**
- Maximum Marks : **60** Duration : **3 Hrs**

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

1) Attempt the following:

- a) Which are the essential subsystems involved in solar energy conversion plant? Explain various subsystems involved in conversion of solar energy with reference to solar thermal energy conversion plant and solar photovoltaic plant with simple block diagram. [6] [CO1][L2]
- b) What is energy science and energy technology and their inter-relationship? Which are different steps considered in energy technology for the analysis of processes involved in energy transformations? [6] [CO1][L1]

2) Attempt the following:

- a) Voltage, current and power of solar cell are influenced by which parameters? Explain it with suitable circuit diagram and characteristics. Based on it, state how solar array parameter like MPP and efficiency of solar array can be computed. [6] [CO2][L5]
- b) Explain briefly how PV systems are classified with necessary diagrams and their general applications? Accordingly answer, which type of PV systems are generally preferred for rural areas and urban areas? [6] [CO2][L2]

3) Attempt any two of the following:

- a) How hydro geothermal deposits are classified? Discuss the extraction of liquid dominated geothermal resources with the simple diagram. [6] [CO3][L1]
- b) i. Determine the power of the wind if the wind speed is 20 m/s and blade length is 50 m, air density $\rho = 1.23 \text{ kg/m}^3$. [6] [CO3][L5]
- ii. Solar insolation on a rectangular module ($1.5 \text{ m} \times 2.0 \text{ m}$) of photovoltaic cells is 550 W/m^2 . If the efficiency of the cells is 12 %, what is the power output of the module? [CO2][L5]
- c) Discuss thermochemical combustion of biomass through gasification using pyrolysis with neat schematic diagram. [6] [CO5][L1]

4) Attempt any two of the following:

- a) What is the need of wood/wood-waste incineration co-generation plant? Explain in short processing of wood/wood-waste for feeding to the incineration cogeneration power plant. [6] [CO5][L2]

- b) What are homojunction and heterojunction PV cells? Explain in details different PV cell technologies with necessary distinct differences w.r.t. each other. [6][CO1][L1]
- c) Derive the expression for power extracted from the wind. [6][CO4][L3]
- 5) **Attempt any two of the following:**
- a) Define the following terms: [6]
- i. Geothermal Gradient [CO3][L3]
 - ii. Solar Constant [CO1][L3]
 - iii. Tip-speed Ratio [CO4][L3]
- b) Explain the constructional details of wind turbine generator units with detailed schematic diagram. [6][CO4][L2]
- c) Classify geothermal power plants on the basis of geothermal fluid used and thermodynamic cycle adopted. Discuss them briefly with simple block diagram. [6][CO2][L2]

All the best!

1

5]

6]



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Name of Examination : Winter 2023

Course Code & Course Name : CO303U - Formal Language and Automata Theory

Maximum Marks : 60

Duration : 3 Hrs

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data, if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

1) Solve any two sub questions

a) Design a Minimal FA on $\Sigma = \{a,b\}$ where number of a's in string is congruent to 2 mod 4 [6][CO2][L6]

b) Convert following NFA to DFA. [6][CO2][L6]

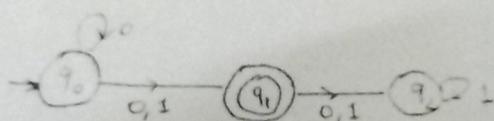


Fig. 1

c) Design Moore machine for following mealy machine. [6][CO2][L6]

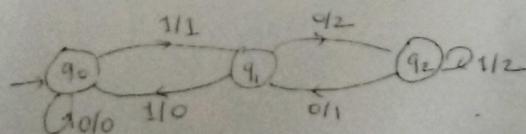


Fig. 2

2) Solve any two sub questions

a) Convert following regular expression to NFA with ϵ transition 1. $00(0+1)^*$ 2. $(0+1)^*01$

[6][CO2][L6]

b) Explain any 3 closure properties of Regular Language with examples

[6][CO4][L1]

c) Use pumping lemma to prove that the $L = \{ww^R \mid w \in \Sigma^*\}$ is not a regular language.

[6][CO4][L3]

3) Solve any two sub questions

a) Design right linear grammar for $L(aab^*a)$ by first drawing FA for it and converting it to grammar

[6][CO4][L6]

b) Convert following grammar to Greibach normal form $S \rightarrow AA \mid a \quad A \rightarrow SS \mid b$

[6][CO3][L3]

c) Describe Ambiguity in grammar with example

[6][CO2][L1]

4) a) Convert following CFG to PDA

[6][CO3][L6]

$I \rightarrow a|b|Ia|Ib|I0|I1$

$E \rightarrow I|E^*E|E+E|(E)$

b) Describe PDA. List and Explain types of PDA.

[6][CO2][L1]

5) a) Design a Turing machine for accepting strings of the language defined as $\{ww^R | w \in \{0+1\}^*\}$

[6][CO3][L6]

b) Describe Universal Turing Machine.

[6][CO3][L2]

All the best!

Government College of Engineering, Jalgaon

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Computer Department

MSE Question Paper

Class: T. Y. B. Tech.

Subject: CO303U FLAT

Duration: 2Hrs

NOTE: 1. Bloom's Taxonomy level is defined as per Revised 2001 model

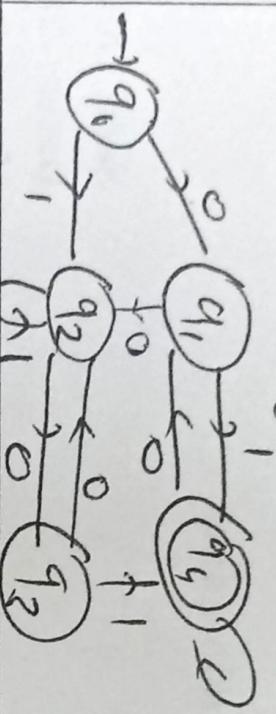
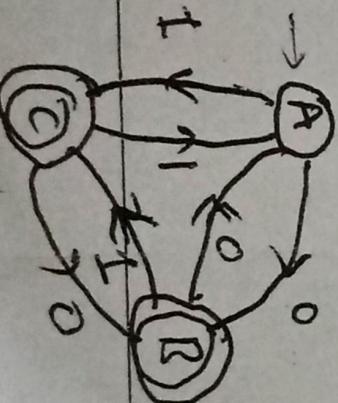
2. All Questions are as per course Outcomes
3. Assume suitable data wherever is required.

Course Outcomes:

1. Develop analytical thinking and intuition for problem solving situations in related areas of theory of computation
2. Understand and Design regular Grammar, Finite Automata, Context Free Grammar, Pushdown automaton, Turing machine
3. Simplify Context Free Grammar and then convert to CNF and DNF
4. Understand pumping lemma, properties of regular languages and context free languages.

Que. No.	Question	Max. Marks	CO Mapped	Blooms Taxonomy Level
1	Attempt any two:			
a	Write down 5 tuples for the Non deterministic finite automata	3	CO-2	Remember
b	Design the Minimal finite automata for the language on alphabets {a,b} where the strings of language ends with ab.	3	CO-1, CO-2	Create
c	State the principle of Pumping Lemma.	3	CO-1, CO-2	Understand

Attempt any one:

	Minimize the following DFA	6	CO1,CO-2	Create
a				
b	Design a regular expression for the a. language on alphabet {a,b} where every string ends with a b. language on same alphabet where every string starts and ends with different symbol.	6	CO1,CO-2	Create
3	Attempt all			
a	Construct epsilon NFA for RE $(11+0)^*(00+1)^*$	6	CO1,CO-2	Analyze
b	Design a moore machine for input integer strings represented as binary and give the output 0 for multiples of 2 and 1 for others.	6	CO1,CO-2	Create
c	Construct Regular expression for the following DFA <i>using orders them $\rightarrow A$</i>	6	CO1,CO-2	Create
				

Government College of Engineering, Jalgaon

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Computer Department
MSE Question Paper

Class: T. V. B. Tech.

Subject: CO 304UC Software Engineering

Duration: 2Hrs

Sem: Odd
Date: 30 / 10/ 2023

Marks: 30

NOTE: 1. Bloom's Taxonomy level is defined as per Revised 2001 model

2. All Questions are as per course Outcomes

3. Assume suitable data wherever is required.

Course Outcomes:

- Identify unique features of various software application domains and classify Software Applications.
- Apply an appropriate lifecycle model of software development.
- Identify user needs and formulate software specifications.
- Analyze software requirements by applying various modeling techniques.

Que. No.	Question	Max. Marks	CO Mapped	Bloom's Taxonomy Level
1	Attempt any two:			
a	Explain the concept of Data Objects.	3	CO 1	Comprehension
b	What is software? State any 3 characteristics of software.	3	CO 1	Comprehension
c	What are data attributes?	3	CO 1	Comprehension

2

Attempt any one:

a

Explain Quality Function Deployment in detail with three types of requirements that QFD identifies.

b

Explain negotiation and validation.

6	CO 3	Comprehension
6	CO 4	Comprehension

3

Attempt all

a

Explain software development Myths.

6	CO 3	Application
6	CO 2	Comprehension

b Explain Waterfall Model and Spiral Model state its drawbacks.

c Explain domain analysis with a proper diagram.

6	CO 1	Comprehension
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Government College of Engineering, Jalgaon
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Computer Department
MSE Question Paper

Class: T. Y. B. Tech

Sem: Odd

Subject: Computer Networks (CO301U)

Date: 26 /10/ 2023

Duration: 2Hrs

Marks: 30

NOTE: 1. Bloom's Taxonomy level is defined as per Revised 2001 model

2. All Questions are as per course Outcomes
3. Assume suitable data wherever is required.

Course Outcomes:

1. Learn general principles of network design and different network protocols.
2. Learn various addresses and formats.

Que No.	Question	Max Marks	CO Mapped	Blooms Taxonomy Level
1	Attempt any two:			
a)	Explain IEEE 802.11 addressing mechanism.	6	CO1	Understand
X b)	An IP packet of size 1600 bytes passes through network segment before it reaches its destination. The header size of this packet is 30 bytes. The maximum size of an IP packet in intermediate network (MTU) is 1400 bytes. How the IP packet would be fragmented in a router. Find all the information for each fragment.	6	CO2	Apply
c)	What is the difference between Subnetting and Supernetting.	6	CO2	Analyse
2	Attempt All			
a)	Find the class of each address. a. 11000001 10000011 00011011 11111111 b. 14.23.120.8 c. 252.5.15.111	3	CO2	Apply
b)	In an IPv4 packet, the value of HLEN is 5, and the value of the total length field is 0x0028. How many bytes of data are being carried by this packet?	3	CO2	Apply
c)	An IPv4 packet has arrived with the first 8 bits as shown: 01000010 The receiver discards the packet. Why?	3	CO2	Apply
d)	Define the type of the following destination addresses: a. 47:20:1B:2E:08:EE b. FF:FF:FF:FF:FF:c.4A:30:10:21:1O:1A	3	CO2	Remember
3	Attempt any one			
a)	Explain the structure of IPv6.	6	CO2	Understand
b)	List the Addresses in TCP/IP. Explain physical address with example.	6	CO2	Remember

Government College of Engineering, Jalgaon
Department of Computer Engineering
Mid Semester Examination

Course Code and Course Name: CO302U DATABASE MANAGEMENT SYSTEM

Academic Year: 2023-24

Semester: V Sem (Odd Sem)

Max. Marks: 30

Date: 27/10/2023

Note: 1) Solve any six questions

- 2) All questions are as per course outcomes
- 3) Assume suitable data whenever is required.

Course Outcomes:

1. Create a good database design.
2. Handle relational databases.
3. Use and explain the E-R model and apply normalization for a given specification of the requirement.
4. Illustrate understanding of indexing methods.

Q. No.	Questions (Solve any six)	Max. Mark	CO mapped	Blooms Taxonomy
1	What are Joins? Explain all the types of Joins with an Example.		CO1	Understanding
2	Explain Various Relational integrity Constraints with Example.	05	CO1	Understanding
3	Summarize the steps involved in converting the ER constructs to corresponding relational tables.	05	CO3	Analyzing
4	Consider the following COMPANY database EMP(Name,SSN,Salary,SuperSSN,Gender,Dno) DEPT(DNum,Dname,MgrSSN,Dno) DEPT_LOC(Dnum,Dlocation) DEPENDENT(ESSN,Dep_name,Sex) WORKS_ON(ESSN,Pno,Hours) PROJECT(Pname,Pnumber,Plocation,Dnum) Write the relational algebra queries for the following (i) Retrieve the name, address, salary of employees who work for the Research department. (ii) find the names of employees who work on all projects controlled by department number 4. (iii) Retrieve the SSN of all employees who either in department no :4 or directly supervise an employee who work in department number :4 (iv) Retrieve the names of employees who have no dependents (v) Retrieve each department number, the number of employees in the department and their average salary.	05	CO2	Applying

5	Define the following terms with an example. i) Key ii) Super key iii) Candidate key iv) Primary key v) foreign key	05	CO2	Applying
6	Explain the Various Clauses Which Can be applied to Select statements with Example of each.	05	CO2	Remembering
7	Write A Short note on with Example. 1. Relational Data Model 2. Network Data Model 3. Hierarchical Data Model	05	C01	Understanding
8	Consider the following relation schema Works(Pname,Cname,salary) Lives(Pname,Street,City) located_in (Cname, city) Manager(Pname,Mgrname) Write the SQL queries for the following i) Find the names of all persons who live in the city Jalgaon. ii) Retrieve the names of all person of " Infosys" whose salary is between Rs .50000 iii)Find the names of all persons who lives and work in the same city . iv)List the names of the people who work for "Tech M" along with the cities they live in. v)Find the average salary of "Infosys" persons	05	CO2	Applying

Government College of Engineering, Jalgaon

Name of Examination: MSE Winter - 23

Course Code & Course Name: EE305U A – Renewable Energy Systems

Maximum Marks: 30

Date :25/10/2023

Time : 11:00 – 1:00 PM

Course Outcomes:

1. explain the concept solar energy and choose solar collectors for different use
2. differentiate solar panels for various applications
3. identify geothermal energy resources
4. analyze the wind energy generation and its connection to grid system
5. use the biomass energy processes from different wastes

Q. No.	Sub-question	<i>Questions</i>	Max.Marks	Cos Mapped	
				Bloom's Taxonomy	
Q.1		3 Attempt any Four(4 marks each):	12		
	a)	Define: i.Clarity Index ii. Extra-terrestrial Radiation	04	CO1	L2
	b)	What is energy science and energy technology and their inter-relationship? Which are different steps considered in energy technology for the analysis of processes involved in energy transformations?	04	CO1	L2
	c)	How power density varies for various wavelengths of sunlight? Illustrate it neatly with spectral irradiance curve.	04	CO1	L2
	d)	How the solar incident radiation reaches to collector surface? Explain it briefly with simple diagram.	04	CO1	L3
Q.2		Attempt any one (6 Marks Each):	12		
	a)	Voltage, current and power of solar cell are influenced by which parameters? Explain it with suitable circuit diagram and characteristics. Based on it, state how solar array parameter like MPP and efficiency of solar array can be computed.	06	CO2	L4
	b)	Solve the following :	06		
	i.	Calculate the fill factor from the given data of a solar cell: $V_{oc} = 0.2 \text{ V}$, $I_{sc} = -5.5 \text{ A}$, $V_{max} = 0.125 \text{ V}$, $I_{max} = -3 \text{ A}$	03	CO2	L3
	ii.	Explain the term Solar Constant briefly with diagram.	03	CO1	L2
Q. 3		Attempt the following (4 marks each):	12		
	a)	What is the principle of photovoltaics? With necessary figures, explain construction and working of solar PV cell in detail.	04	CO2	L2
	b)	State important characteristics features considered in solar collector system and then explain different types of solar collectors very briefly with necessary features and schematics.	04	CO1	L2
	c)	Explain various subsystems involved in conversion of solar energy with reference to solar thermal energy conversion plant and solar photovoltaic plant with necessary figures.	04	CO1	L2