PRN: 2141027

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 : **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.

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.

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.

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 : **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)

a) 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]

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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 ∑= {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]

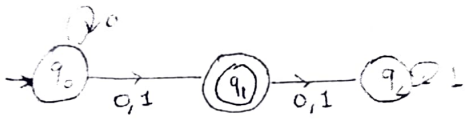

Fig. 1

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

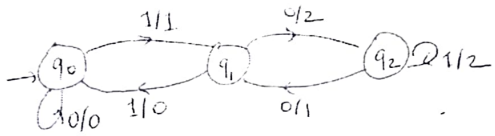

Fig. 2

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| w€ ∑*} 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->AA|a A->SS|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->a|b|Ia|Ib|I0|I1

E->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!

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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 [06]

a) Explain in detail generic process model. [06]

b) Define Software with its characteristics. [06]

c) Write a short note on software myths.

2) Solve any two sub questions [06]

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.

3) Solve any two sub questions [06]

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?

4) Solve all sub questions [06]

a) Explain box structure specification of cleanroom software engineering. [06]

b) Write a short note on Test-Driven development with example.

5) Solve all sub questions [06]

a) What is agility and explain agile development? [06]

b) Write a short note on Scrum.

All the best!

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Name of Examination : **Winter 2023**

Course Code & Course Name : **EE305UY - Open Elective - I- Wind And Solar Power 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 FOUR** of the following

a) What are the various essential sub-systems in solar thermal energy plant? [6]

b) Explain different parts of wind turbine. [6]

c) Distinguish between mono crystalline, poly crystalline and thin film PV cell technology. [6]

d) Write short note on solar insolation at various geographical locations. [6]

e) What is MPPT Technique and elaborate how it works? [6]

2) Solve **ANY FOUR** of the following

a) Differentiate between Horizontal and Vertical axis wind turbines. [6]

b) Explain the construction and working of solar water heater system. [6]

c) Give the mathematical expression for governing wind power density. [6]

d) State different operating characteristics of wind turbine. [6]

e) Write a short note on wind power topology. [6]

3) Solve **ANY TWO** of the following

a) Illustrate any three power electronic converter topology used in wind turbine applications [6]

b) Define the following [6]

i. Tilt Angle

ii. Global Radiation

iii. Elliptical Plane

iv. Solar Spectrum

v. Declination Angle

vi. Zenith Angle

c) State merits and demerits of solar PV system. [6]

All the best!