2022IMSCS015

CENTRAL UNIVERSITY OF RAJASTHAN

Semester-III/V, End-Semester Examination (ESE), Dec - 2024

Course Code: CSE203/CSC302 Title of the Course: Theory of Computation

Time: 3 hours Max. Marks: 60

General Instructions: *All questions are compulsory.*

1 (a) Find min no's of state of DFA for the L = $\{ a^{nk} \mid k>0,$ n is any positive constant $\}$ [4]

(b) Consider the following scenario.

Take your full name (example = spars pottr). Calculate occurrences of each letter of your name (here by using example it would be; s=2, p=2, a=1, r=2, o=1, t=2). Convert your name in form of string by assuming each occurrence as power of that letter (here by using example it would be $L = s^2p^2a^1r^2o^1t^2$). Now draw DFA for L. So as per your name and by using mentioned above procedure, draw suitable DFA of your own full name. [6]

OR

(a) How many max. no. of moore machine are possible with 2 states x & y over input alphabet a, b & output 0,1. [4]

(b) Construct the mealy machine that takes all strings of a's and b's as input and produces 1 as output if the last two symbols in the input are same otherwise, produces 0 as output. [6]

2. Find Reguler Expression for, [10]

(a) Language L={1,2,4,8,.....}, all these no's are in binary.

(b) Language L={1,2,4,8,.....}, all these no's are in unary.

OR

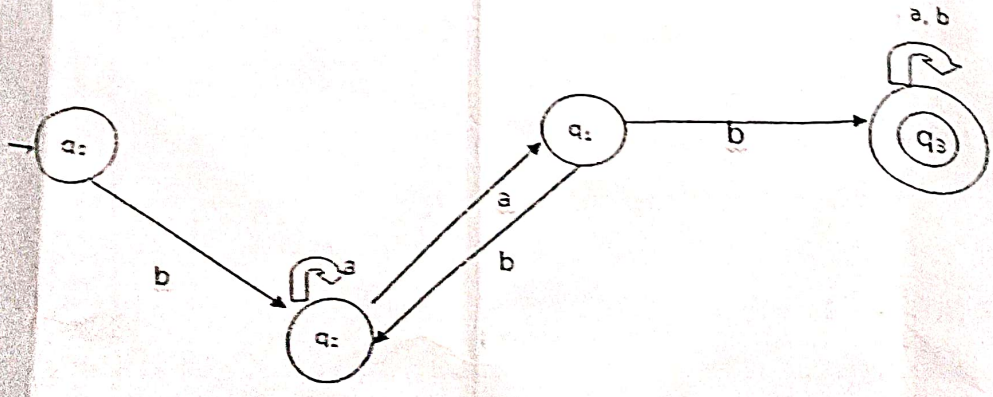
Generate Leftmost derivation and derivation tree for ab+*- using following grammar. [10]

S→ SS÷ | SS* | SS- | a | b | Λ (Λ is null symbol)

3 Assume a suitable finite automata M (having at-least 07 states and 02 inputs). Convert M into an equivalent minimum state automata M' such that, M' should have 04 states. [10]

OR

Find the regular expression for the given transition system using Arden's theorem. [10]



4.(a) Find a grammar for set of all odd palindrome strings of English language. [5]

(b) Generate CNF equivalent to the grammar [5]

$S \rightarrow - S / [S \uparrow S] / a / b$ (S being the only variable)

OR

Consider the following table. Write *Yes or No* for the given languages under different operations with valid reason. [10]

S.No	Operation	DCFL	CFL	Recursive Enumerable
1	Concatenation			
2	Intersection			
3	Compliment			
4	Set difference with regular language			

5. Convert the following grammar to the GNF. [10]

S → a | CD | CS

A → a | b | SS

C → a

D → AS

OR

Is the language $L = \{ a^n b^n : n \geq 1 \} \cup \{a\}$ deterministic? Design suitable PDA (if exists). [10]

6. (a) Design a TM, which accepts **L= {w : |w| is even } over the language on {a, b}.** [6]

(b) Validate the following [4]

(i) Recursively languages are NOT closed under complementation.

(ii) If L and $\bar{L}$ are both recursively enumerable then L is recursive.

OR

Design a TM, which accepts **L= {ww^r : w ∈ {a,b}$^+$}** , where w^r is the reverse string of w.

Example:- if **w is abb, then w^r is bba.** [10]

CENTRAL UNIVERSITY OF RAJASTHAN

Semester-V, End-Semester Examination (ESE), December 2024

Course Code: CSC 303 **Title of the Course: Software Engineering**

Time: 3 hours **Max. Marks: 60**

General Instructions: *All questions are compulsory.*

1. (a) What do you mean by the abbreviation SDLC, which stands for "software development life cycle model"? What obstacles may a software development company face if it does not follow any specific SDLC while developing a large-scale software application? [5]

(b) What is software design? How will you convert the analytical model to the design model? Also, discuss the design concepts briefly. [5]

OR

(a) What does the term "Meta Model" refer to, and why is the Spiral Model referred to as such? Please illustrate its most appropriate use. [5]

(b) What are the four Spiral Model waves, and why should they be used? Give at least two examples. [5]

2. (a) Determine the primary rationale and aims for the development of the RAD model. How does the model contribute to the achievement of the defined goals? [6]

(b) Which software development approach should be used by an organization if it is trying to design a system for an application, the needs of which are neither entirely evident to the business nor understood to the organization? [4]

OR

(a) Explain how the natural language methodology of requirement elicitation works, including its benefits and drawbacks, and describe the methodologies that are employed in it. [6]

(b) What goes into a feasibility study, and what does it find? What kind of suggestions are produced because of it, and what kinds of data are utilized to formulate them? [4]

3. (a) What are the most important benefits of developing genuine software by creating a prototype that is already functional? What are some of the drawbacks of adopting this strategy? [5]

(b) What are the purposes of Data Flow diagrams & Entity-Relationship diagrams? Explain with a diagram of each. [5]

OR

(a) When comparing functional and non-functional requirements, what are the key distinctions? [5]

(b) If a customer proposes a modification to an existing requirement, what three steps must be taken before the proposed adjustment may be approved or rejected? [5]

4. (a) To clarify, what do you mean by "risk management"? When there are multiple options for mitigating a given risk, how does one choose the most effective strategy? [6]

(b) Can you explain the dissimilarities between project planning and software development? What gives? [4]

OR

(a) Give a brief explanation of the terms used in reliability and the methods used to improve system dependability. [6]

(b) Discuss the COCOMO models (basic, Intermediate, and Detailed) for cost estimation. [4]

5. (a) Who should take part in the evaluation of the requirements? Create a process model that illustrates how the requirements review may possibly be structured. [5]

(b) Draw the complete DFD at least up to 2-levels for a library management system. [5]

OR

(a) Define Software architecture. Justify the need to build the system architecture before the requirements, assuming such is the case. Examine the differences between function-oriented and object-oriented layouts. [5]

(b) State the advantages and disadvantages of LOC-based Cost Estimation. [5]

6. (a) In software engineering, what do you understand by the phrase's cohesion and coupling? To what extent do these ideas help in developing a functional system layout? [6]

(b) Defend the role of the Use Case diagram as a supplement to the scenario creation template for elucidating requirements. [4]

OR

(a) Write short note on Requirement Specification and Requirement Validation. [6]

(b) What are the actions performed during software testing? Schematically represent these actions. Which of these activities requires the most effort? [4]

022IMSCS013

CENTRAL UNIVERSITY OF RAJASTHAN

Semester-V, End-Semester Examination (ESE), December 2024

Course Code: CSC 333 **Title of the Course: E-commerce**

Time: 3 hours **Max. Marks: 60**

General Instructions: *All questions are compulsory.*

1. (a) Impact of standardization on EDI in B2B development- Elaborate. [5]

(b) Draw an e-commerce architecture and contrast it with traditional business. [5]

OR

(a) What is the function of certifying bodies in the e-commerce environment? How do two parties engage into a legally binding contract in an internet commerce environment? [5]

(b) For e-commerce, why is network dependability so crucial? What elements lead to issues with network reliability? [5]

2. (a) Which kinds of businesses are more likely to keep up their own private network? What benefits can a private network offer? [6]

(b) Explain in detail how the Internet and the World Wide Web have contributed to the expansion of e-commerce. [4]

OR

(a) Describe the supply chain concept in e-commerce. [6]

(b) The Client-Server model is the backbone of the E-commerce applications. Are there any security threats to it? If any, discuss. [4]

3. (a) Discuss the challenges that developing nations face with E-Commerce and its influence on customers. Explain the taxation and encryption policies in E-commerce. [5]

(b) What is an EDI? Describe how a commercial transaction can take place using EDI. What qualities distinguish internet-based EDI? [5]

OR

(a) What is cryptography? Explain different type of security measures apply in E-commerce. [5]

(b) Consider developing a gateway for a retail business. Discuss the many technologies, tools, and components used in its design. [5]

4. (a) Describe the Secure Electronic Transaction (SET) system. Why is SET necessary? What characteristics does SET list? [6]

(b) What is a payment gateway? Discuss the numerous challenges that arise with the Electronic Payment System. [4]

OR

(a) What is the encryption scheme using public keys? How can it be applied to e-commerce to provide authentication? Give appropriate instances to illustrate it. [6]

(b) Explain various emerging tools that are available in Electronic Commerce for Consumer Data Interface. [4]

5. (a) Discuss briefly the web's security challenges, including the major network security risks and their solutions. Discuss. [5]

(b) Talk about the function, significance, and design considerations of firewalls. [5]

OR

(a) Consider an online banking system and examine the security and privacy concerns associated with electronic cash. [5]

(b) Explain the legal issue and ethical issues related to E-Commerce. [5]

6. (a). Discuss the objectives and advantages of websites in detail. How can businesses utilize these advantages effectively? [5]

(b). Create a basic HTML code for a web page that includes a header, a paragraph, and a hyperlink to another webpage. Explain the significance of each tag used. [5]

OR

(a). What are the key differences between static and dynamic websites? Explain with examples how dynamic websites enhance user experience. [5]

(b). What are JavaScript functions? Write a function that takes two numbers as input and returns their multiplication. [5]

Computer Networks
Time: 3 Hour

Paper Code: CSC-301
Maximum Marks: 60

Note: **This question paper contains Section A and Section B. Attempt both the sections as per the instructions given therein.**

Section A

Note: **This section contains short answer questions (about 40 words). Attempt any six. Each question carries equal marks. (2*6=12)**

Q1.

a) Identify the five components of a data communications system.
b) For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology?
c) When a person makes a local telephone call to another person, is this a point-to-point or multipoint connection? Justify your answer.
d) If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?
e) What do you mean by bandwidth-delay product and jitter?
f) What do you mean by Protocol? Why are protocols needed?
g) Name the basic network topologies, and mention an advantage of each type.
h) What are the three domains of the domain name space? Give examples.

1000 b/s
1×10^{-3} s

Section B

Note: **This section contains long answer questions (150 words). Attempt any four. Each question carries equal marks. (12*4=48)**

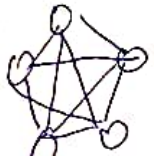
Q2.

a) What is the purpose of cladding in an optical fiber? Discuss. Name the advantages o optical fiber over twisted-pair and coaxial cable. (3+3)
b) What are the three measures essential for an effective and efficient computer network Discuss with suitable examples. (6)

Q3.

a) Discuss the different ways to measure the performance of the network with suitabl examples. (6)

$\frac{5 \times 4}{2} = 10$



b) What do you meant by delay? What are the propagation time and the transmission time for a 5-Mbyte message (an image) if the bandwidth of the network is 1 Mbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4 x 108 m/s. (2+4)

Q4.

a) How does a single-bit error differ from a burst error? Which of the following g(x) values guarantees that a single-bit error is caught? For each case, what is the error that cannot be caught?

(i) x + 1

(ii) x3

(iii) 1 (1.5+4.5=6)

b) A sender needs to send the five data items 7, 11, 12, 0, 6. Answer the following:

(i) Find the checksum at the sender site.

(ii) Find the checksum at the receiver site if there is no error.

(iii) Find the checksum at the receiver site if the second data item is changed to 10.

(iv) Find the checksum at the receiver site if the second data item is changed to 6 and the fifth data item is changed to 11. (1.5*4=6)

Q5.

a) An address space has a total of 1024 addresses. How many bits are needed to represent an address? In a block of addresses, we know the IP address of one host is 25.34.12.56/16. What are the first address and the last address in this block? Also find the size of the address space. (1.5+4.5=6)

b) What are the differences between classful addressing and classless addressing in IPv4? List the classes in classful addressing and define the application of each class (unicast, multicast, broadcast, or reserve).(2+4)

Q6.

a) Compare and contrast byte-stuffing and bit-stuffing. Explain the reason for moving from the Stop-and-Wait ARQ Protocol to the Go-Back-N-ARQ Protocol. (2+2)

b) List the different responsibilities of the transport layer? Discuss the working of SMTP protocol. (2+2)

c) What are security and protection in computer network? Discuss the different aspects of network security. (2+2)

Time: 3 Hour

December 2023

Paper Code: CSC-301
Maximum Marks: 60

Note: **This question paper contains Section A and Section B. Attempt both the sections as per the instructions given therein.**

Section A

Note: **This section contains short answer questions (about 40 words). Attempt any six. Each question carries equal marks. (2*6=12)**

Q1.

a) Identify the five components of a data communications system.
b) For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology?
c) When a person makes a local telephone call to another person, is this a point-to-point or multipoint connection? Justify your answer.
d) If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?
e) What do you mean by bandwidth-delay product and jitter?
f) What do you mean by Protocol? Why are protocols needed?
g) Name the basic network topologies, and mention an advantage of each type.
h) What are the three domains of the domain name space? Give examples.

1000 b/s
1×10^{-3} s

Section B

Note: **This section contains long answer questions (150 words). Attempt any four. Each question carries equal marks. (12*4=48)**

Q2.

a) What is the purpose of cladding in an optical fiber? Discuss. Name the advantages o optical fiber over twisted-pair and coaxial cable. (3+3)
b) What are the three measures essential for an effective and efficient computer network Discuss with suitable examples. (6)

Q3.

a) Discuss the different ways to measure the performance of the network with suitabl examples. (6)

$\frac{5 \times 4}{2} = 10$

Intg. M.Sc. Vth Semester, CIA-II, December 2023

Paper Name: Computer Networks
Time: 1Hour

Paper Code: CSC-301
Maximum Marks: 20

Note: This question paper contains Section A and Section B. Attempt both the sections as per the instructions given therein.

Section A

Note: This section contains short answer questions (about 40 words). Attempt any four. Each question carries equal marks. (1.5*4=6)

Q1.

(i) Can the value of a checksum be all 0s (in binary)? Defend your answer. Can the value be all 1s (in binary)? Defend your answer.
(ii) Discuss the concept of redundancy in error detection and correction.
(iii) Define framing and the reason for its need.
(iv) What are the reasons of transmission impairment?
(v) List the advantages of optical fiber over twisted-pair and coaxial cable.
(vi) What are the differences between parallel and serial transmission?

Section B

Note: This section contains long answer questions (150 words). Attempt any two. Each question carries equal marks. (6*2=48)

Q2. a) Discuss the two major categories of transmission media with suitable examples. What is the significance of the twisting in twisted-pair cable? (1.5+1.5)

b) In CRC, show the relationship between the following entities (size means the number of bits):
(i) The size of the dataword and the size of the codeword
(ii) The size of the divisor and the remainder
(iii) The degree of the polynomial generator and the size of the divisor
(iv) The degree of the polynomial generator and the size of the remainder (3)

Q3. a) A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/26. What are first address, last address and number of addresses? (3)

b) A sender needs to send the four data items 12, 8, 4, 6. Answer the following:
(i) Find the checksum at the sender site.
(ii) Find the checksum at the receiver site if there is no error.
(iii) Find the checksum at the receiver site if the second data item is changed to 10.
(iv) Find the checksum at the receiver site if the second data item is changed to 6 and the third data item is changed to 10. (3)

Q4. a) Discuss the working of Stop-and-Wait ARQ protocol with suitable example. (3)

b) Compare and contrast byte-stuffing and bit-stuffing. Which technique is used in byte-oriented protocols? (2+1)

Intg. M.Sc. Vth Semester, ESE, December 2023

Computer Networks
Time: 3 Hour

Paper Code: CSC-301
Maximum Marks: 60

Note: **This question paper contains Section A and Section B. Attempt both the sections as per the instructions given therein.**

Section A

Note: **This section contains short answer questions (about 40 words). Attempt any six. Each question carries equal marks. (2*6=12)**

Q1.

a) Identify the five components of a data communications system.
b) For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology?
c) When a person makes a local telephone call to another person, is this a point-to-point or multipoint connection? Justify your answer.
d) If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?
e) What do you mean by bandwidth-delay product and jitter?
f) What do you mean by Protocol? Why are protocols needed?
g) Name the basic network topologies, and mention an advantage of each type.
h) What are the three domains of the domain name space? Give examples.

Section B

Note: **This section contains long answer questions (150 words). Attempt any four. Each question carries equal marks. (12*4=48)**

Q2.

a) What is the purpose of cladding in an optical fiber? Discuss. Name the advantages of optical fiber over twisted-pair and coaxial cable. (3+3)
b) What are the three measures essential for an effective and efficient computer network? Discuss with suitable examples. (6)

Q3.

a) Discuss the different ways to measure the performance of the network with suitable examples. (6)

P.T.O.

2020MSCS010

SET-B

CENTRAL UNIVERSITY OF RAJASTHAN

Semester- V, End-Semester Examination (ESE), November 2022

Course Code: CSC-301

Title of the Course: Computer Networks

Time: 3 hours **Max. Marks: 60**

General Instructions: All questions are compulsory.

Q1.

a) Identify the five components of a data communications system. Discuss. (5)

b) Name the four basic network topologies, and cite an advantage of each type. (5)

OR

a) What is the difference between network layer delivery and transport layer delivery? (5)

b) Match the following to one or more layers of the OSI model:

(i) Communicates directly with user's application program

(ii) Error correction and retransmission

(iii)Mechanical, electrical, and functional interface

(iv)Responsibility for carrying frames between adjacent nodes (5)

OR

Q2.

a) Discuss throughput and bandwidth with suitable examples. A device is sending out data at the rate of 1000 bps.

(i) How long does it take to send out 10 bits?

(ii) How long does it take to send out a single character (8 bits)?

(iii)How long does it take to send a file of 100,000 characters? (2+3)

b) What are the different types of cables? List the advantages of optical fiber over twisted-pair and coaxial cable. (3+2)

OR

a) What are the types of transmission? Discuss with suitable examples. (3+2)

b) What are the three domains of the domain name space? What is the purpose of the inverse domain? (3+2)

Q3.

a) Give the two major categories of transmission media with suitable examples. What is the significance of the twisting in twisted-pair cable? (3+2)

b) Why do we need a DNS system when we can directly use an IP address? Discuss with suitable examples. (5)

OR

a) Discuss the different parameter to measure the performance of the network with suitable examples. (5)

b) Compute the propagation time and the transmission time for a 2.5-kbyte message (an e-mail) if the bandwidth of the network is 2 Gbps? Assume that the distance between the sender and the receiver is 6,000 km and that light travels at 2.4 x 108 mls. (5)

2020MSCS010

SET-B

CENTRAL UNIVERSITY OF RAJASTHAN

Semester- V, End-Semester Examination (ESE), November 2022

Course Code: CSC-301

Title of the Course: Computer Networks

Time: 3 hours **Max. Marks: 60**

General Instructions: All questions are compulsory.

Q1.

a) Identify the five components of a data communications system. Discuss. (5)

b) Name the four basic network topologies, and cite an advantage of each type. (5)

OR

a) What is the difference between network layer delivery and transport layer delivery? (5)

b) Match the following to one or more layers of the OSI model:

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(iii)Mechanical, electrical, and functional interface

(iv)Responsibility for carrying frames between adjacent nodes (5)

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a) Discuss throughput and bandwidth with suitable examples. A device is sending out data at the rate of 1000 bps.

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b) What are the different types of cables? List the advantages of optical fiber over twisted-pair and coaxial cable. (3+2)

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a) What are the types of transmission? Discuss with suitable examples. (3+2)

b) What are the three domains of the domain name space? What is the purpose of the inverse domain? (3+2)

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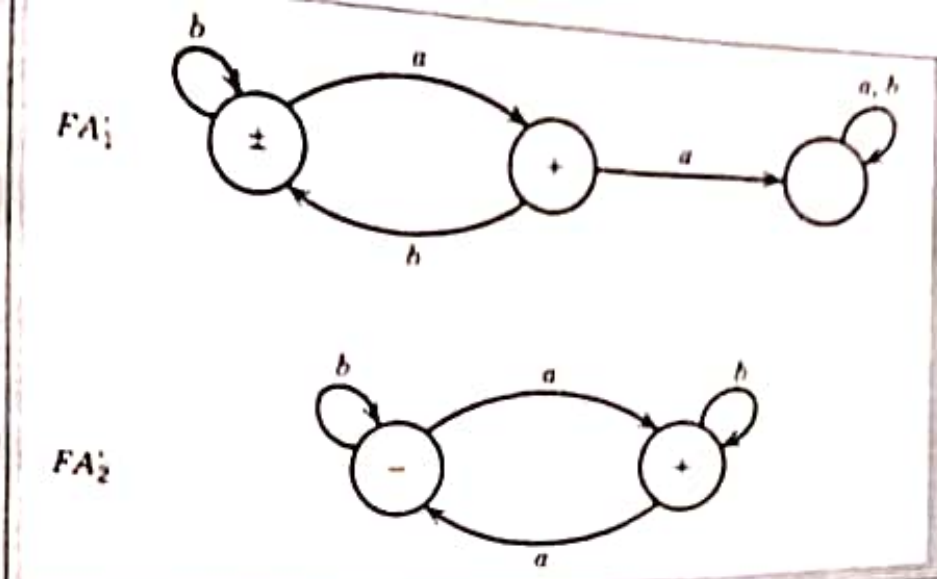
b) Compute the propagation time and the transmission time for a 2.5-kbyte message (an e-mail) if the bandwidth of the network is 2 Gbps? Assume that the distance between the sender and the receiver is 6,000 km and that light travels at 2.4 x 108 mls. (5)



4.	(a)	Describe the kind of language the CFG generates. $S \rightarrow AA$ $A \rightarrow AAA$ $A \rightarrow bA \mid Ab \mid a$	[3]
	(b)	Convert following CFG into CNF. $S \rightarrow aXX$ $X \rightarrow aS \mid bS \mid a$	[3]
	(c)	Kill null and unit-productions in the following CFG. $S \rightarrow AA$ $A \rightarrow B \mid BB$ $B \rightarrow abB \mid Bb \mid \Lambda$	[4]
		OR	
	(a)	Make CFG for the language of words $a^n ab^n b$, n = 0, 1, 2, ...	[3]
	(b)	Find the left-most derivation for the word abba in the CFG. $S \rightarrow AA$ $A \rightarrow aB$ $B \rightarrow bB \mid \Lambda$	[3]
	(c)	Show that following CFG is ambiguous $S \rightarrow aaS \mid aaaS \mid a$	[4]
5.	(a)	Language1 is PALINDROME. Language 2 = $aa^*bb^*aa^*$. (i) Describe the language obtained by intersection of Language1 and Language2. (ii) Make CFG of the obtained language (iii)Make PDA of the obtained language.	[1+1.5+2.5=5]

(b) Draw the complete DFD at least up to 2-levels for a library management system. [5]

OR

(a) Define Software architecture. Justify the need to build the system architecture before the requirements, assuming such is the case. Examine the differences between function-oriented and object-oriented layouts. [5]

(b) State the advantages and disadvantages of LOC-based Cost Estimation. [5]

6. (a) In software engineering, what do you understand by the phrase's cohesion and coupling? To what extent do these ideas help in developing a functional system layout? [6]

(b) Defend the role of the Use Case diagram as a supplement to the scenario creation template for elucidating requirements. [4]

OR

(a) Learn the difference between a mistake and a total failure. Which one can be identified by testing? Justify. [6]

(b) What are the activities carried out during software testing? Schematically represent these activities. Which one of these activities takes the maximum effort? [4]

Section B

Note: **This section contains long answer questions (150 words). Attempt any two. Each question carries equal marks. (10)**

Q6. a) Differentiate between half-duplex and full-duplex transmission modes with suitable examples. (5)

b) For each of the following four networks with five devices-

(i) With mesh topology

(ii) With star topology (not counting the hub)

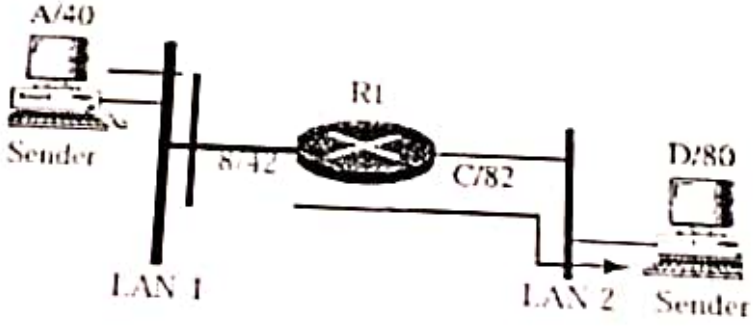
(iii) With bus topology

(iv) With ring topology

Discuss the consequences if a connection fails. (5)

Q7. a) What are headers and trailers, and how do they get added and removed? Give suitable examples. (5)

b) In the following figure, consider that the communication is between a process running at computer A with port address *x* and a process running at computer D with port address *y*. Show the contents of packets and frames at the network, data link, and transport layer for each hop. (5)



CENTRAL UNIVERSITY OF RAJASTHAN

Semester-V, End-Semester Examination (ESE), November 2022

Course Code: CSC 303 **Title of the Course: Software Engineering**

Time: 3 hours **Max. Marks: 60**

General Instructions: *All questions are compulsory.*

1. (a) What exactly do you comprehend by the acronym SDLC, which stands for "software development life cycle model"? What challenges may a software development organization encounter if it does not adhere to any certain SDLC while creating a large-scale software application? [5]

(b) What is software design? How will you translate the analysis model into the design model? Also, explain the design principles in brief. [5]

OR

(a) What does the term "Meta Model" refer to, and why is the Spiral Model referred to as such? Please illustrate its most appropriate use. [5]

(b) What are the four Spiral Model waves, and why should they be used? Give at least two examples. [5]

2. (a) Identify the main motivation and goals behind the development of the RAD model. How does the model help achieve the identified goals? [6]

(b) Which software development approach should be used by an organization if it is trying to design a system for an application, the needs of which are neither entirely evident to the business nor understood to the organization? [4]

OR

(a) Explain how the natural language methodology of requirement elicitation works, including its benefits and drawbacks, and describe the methodologies that are employed in it. [6]

(b) What goes into a feasibility study, and what does it find? What kind of suggestions are produced as a result of it, and what kinds of data are utilized to formulate them? [4]

3. (a) What are the most important benefits of developing genuine software by creating a prototype that is already functional? What are some of the drawbacks of adopting this strategy? [5]

(b) What are the purposes of Data Flow diagrams & Entity-Relationship diagrams? Explain with a diagram of each. [5]

OR

(a) When comparing functional and non-functional requirements, what are the key distinctions? [5]

(b) If a customer proposes a modification to an existing requirement, what three steps must be taken before the proposed adjustment may be approved or rejected? [5]

4. (a) To clarify, what do you mean by "risk management"? When there are multiple options for mitigating a given risk, how does one choose the most effective strategy? [6]

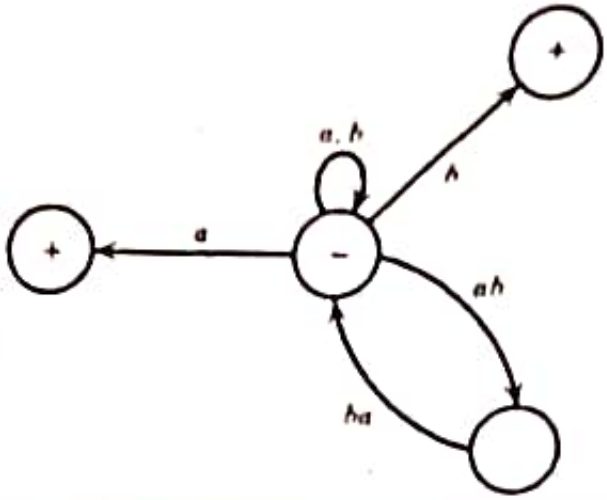
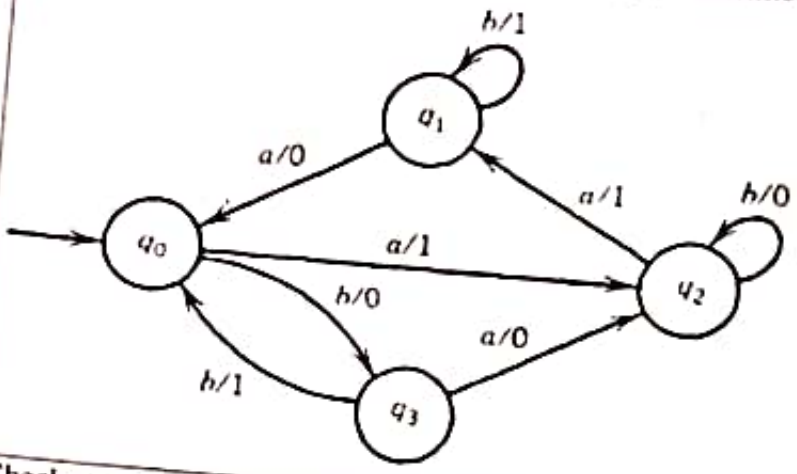
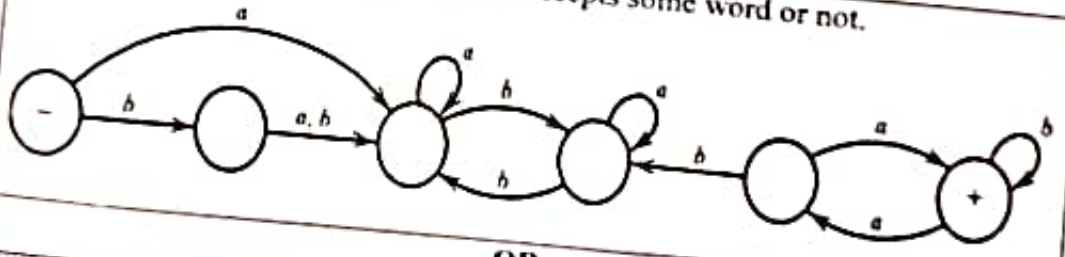
(b) Can you explain the dissimilarities between project planning and software development? What gives? [4]

OR

(a) Briefly discuss the reliability terminologies and mention the approaches to system reliability enhancement. [6]

(b) Discuss the COCOMO models (basic, Intermediate, and Detailed) for cost estimation. [4]

5. (a) Who should take part in the evaluation of the requirements? Create a process model that illustrates how the requirements review may possibly be structured. [5]

	(b)	Convert the following Transition Graph into an equivalent regular expre Show stepwise conversion.  	
		OR	
	(a)	Draw Mealy machine to increment a binary number by 1.	
	(b)	Make finite automata FA1 for the language of words of odd length. Make finite automata FA2 for the language of words having aa. Perform FA1.FA2 and draw the resultant finite automata.	
3.	(a)	Convert the following Mealy machine into Moore machine.  	
	(b)	Check stepwise whether following FA accepts some word or not.  	[4]
		OR	
		Find Intersection of following two FAs and draw the resulting FA.	[10]

Intg. M.Sc. Vth Semester, October 2023
Ist Internal Assessment
Computer Networks
Paper Code: CSC-301

Time: 1 Hour **Maximum marks: 20**

Note: **This question paper contains two sections A and B. Attempt both the sections as per the instructions given therein.**

Section A

Note: **This section contains short answer questions (about 40 words). Attempt any four. Each question carries equal marks. (2.5*4=10)**

Q1. Suppose six devices are required to organize in a network. How many cables are required in case of mesh, ring, bus, and star topology?

Q2. What are the three measures essential for an effective and efficient computer network?

Q3. Performance is inversely related to delay. When you use the Internet, which of the following applications are more sensitive to delay and why?

(i) Sending an e-mail
(ii) Copying a file
(iii) Surfing the Internet
(iv) Watching movie online

Q4. Differentiate between a port address, a logical address, and a physical address with suitable examples.

Q5. Find the correct match of the following with one or more layers of the OSI model:

(i) Format and code conversion services
(ii) Establishes, manages, and terminates sessions
(iii) Log-in and log-out procedures
(iv) Provides independence from differences in data representation

CENTRAL UNIVERSITY OF RAJASTHAN

Semester-V, End-Semester Examination (ESE), November 2022

Course Code: CSC 333 **Title of the Course: E-commerce**

Time: 3 hours **Max. Marks: 60**

General Instructions: *All questions are compulsory.*

1. (a) Define E-Commerce and various issues related to E-commerce. [5]

(b)Compare E-commerce over traditional business and draw e-commerce architecture. [5]

OR

(a) what is the role of certification authorities in e-commerce environment? How can two parties enter anon-repudiable legal contract in electronic commerce environment? [5]

(b) Why is network reliability very important for e-commerce? What factors cause problem for network reliability? [5]

2. (a) which types of organizations prefer to maintain their own private network? What are the advantages of a private network? [6]

(b) Explain in detail the role of Internet and WWW in the growth of E-commerce. [4]

OR

(a) Mention some protocols used in web services. [6]

(b) What is the likely impact of e-commerce on economic structures like manufactures, dealers, channel partners and consumers? [4]

3. (a) Discuss about the issues for developing countries related to E-Commerce and its impact on consumers. [3]

(b) What is an EDI? Explain how business transaction can take place in an EDI. What are the characteristics of internet-based EDI? [7]

OR

(a) What is meant by information brokers? State why their services are needed in e-commerce? [5]

(b) Consider the development of a portal for a Retailer shop. Discuss the various technologies, tools and components involved in designing the same. [5]

4. (a) Explain Secure Electronic Transaction (SET). What is the need for SET? What are the features does SET specify? [6]

(b) what is payment gateway? Discuss the various issues that are involved in Electronic Payment System (EPS). [4]

OR

(a) What is the public key encryption system? How can it be used for providing authentication in e-commerce? Use suitable examples to explain it. [6]

(b) Discuss the credit card based electronic payment system. What are third party processors and online credit card processors? Describe the risks involved in electronic payment system? [4]

5. (a) Discuss in brief the security issues on the web what are the various network security threats and their remedies? Discuss. [5]

(b) Discuss the role of firewall, importance and factors considered in firewall design. [5]

OR

(a) Consider an online banking system; discuss the security and privacy issues relating to electronic cash. [5]

(b) How will you secure E-Commerce by building the infrastructure for Digital signature? [5]

6. (a) Define computer network and write short note on the following types of computer network: LAN MAN, WAN. [5

(b) what is the need of secure transaction in e-commerce? When a message is sent by A to B on the Internet, what are the types of security problems which may be encountered. [5]

OR

(a) In reference to HTML, explain the followings: [10]

i. What is HTML?

ii. How to align text in HTML?

iii. How to create a table in HTML?

iv. How to change text color in HTML?

v. How to change font color in HTML?

vi. How to change background color in HTML?

vii. How to give space in HTML?

viii. How to comment in HTML?

ix. How to set background image in HTML?

x. How to insert an image in HTML?

CENTRAL UNIVERSITY OF RAJASTHAN

School of Mathematics, Statistics & Computational Sciences

Department of Computer Science

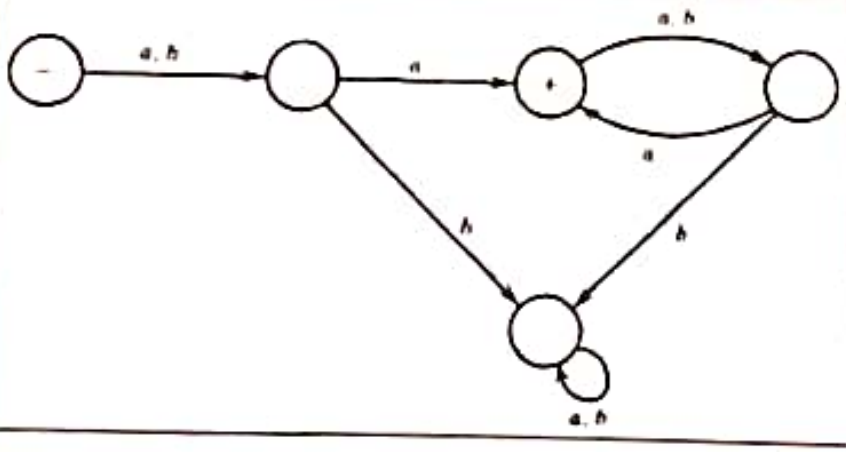
End Semester Examination, Session 2023-24

Programme : Integrated MSc
Course Code : CSC-305
Course Title : Theory of Computations
Course Credit : 3

Semester : 6
Maximum Marks : 60
Time Allowed : 3 Hrs
Total Printed Pages : 4

Instructions to Candidates: (If required)

1. In the questions, where alphabet is not defined, consider alphabet $\sum = \{a, b\}$.

Q.No.			Marks
1.	(a)	Consider the language S^*, where $S = \{a, b\}$. How many words does this language have of length 2? of length 3? of length n?	[5]
	(b)	Make regular expression for the language of containing all strings in which total no of a's are divisible by 3.	[2]
	(c)	Make finite automata of the language that accepts only those words that have fewer than 4 letters.	[3]
		OR	
	(a)	Consider the language S^*, where $S = \{ab, ba\}$. Write all the words in S^* that have seven of fewer letters. Can any word in this language contain the substrings aaa or bbb? What is the smallest word that is not in this language	[5]
	(b)	Describe in English phrase the language associated with the following regular expression. $(a+b)^*a(A+bbbb)$	[2]
	(c)	Describe the language accepted by the following FA. 	[3]
2.	(a)	Build a TG that accepts the language L of all words that begin and end with the same double letter.	[2]

CENTRAL UNIVERSITY OF RAJASTHAN

School of Mathematics, Statistics and Computational Sciences

Department of Computer Science

End Semester Examination, Session 2023-24

Programme	: Integrated M.Sc.	Semester	: V
Course Code	: CSC-303	Maximum Marks	: 60
Course Title	: Software Engineering	Time Allowed	: 3 Hrs
Course Credit	: 4	Total Printed Pages	: 1

Instructions to Candidates:

1. All Questions are Compulsory. Each Question carries equal marks.

Que 1. Define following terms

(i) Software Measures,
(ii) Software Metrics
(iii) Software Measurement
(iv) Product and Process
(v) Productivity and Effort **[10]**

OR

Explain the challenges faced in software engineering. How would you delineate the distinctions between CMMI and Agile methodologies? **[10]**

Que 2. Illustrate Capability Maturity Model with suitable diagram and explain each step. **[10]**

OR

Explain the Spiral model used in the Software Development Life Cycle and describe its primary phases. **[10]**

Que 3. Develop a comprehensive Data Flow Diagram (DFD) for a Hospital Management System. **[10]**

OR

Draw a detailed Data Flow Diagram (DFD) for a University ERP System. **[10]**

Que 4. Define Module Coupling and its all its types with example. How can we achieve good coupling. **[10]**

OR

Define Module Cohesion and it's all its types with example. How can we achieve good cohesion. **[10]**

Que 5. Explain the concept of Reverse Engineering with scope and tasks. Also explain the levels of Reverse Engineering. **[10]**

OR

Explain the Agile Process. How can we use this in software industry. Write the advantage and disadvantages of Agile Process. **[10]**

Que 6. What is Testing? Why should We Test? Explain Alpha, Beta and Acceptance Testing **[10]**

OR

Consider a program for the determination of the nature of roots of a quadratic equation. Its input is a triple of positive integers (say a, b, c) and values may be from interval [0,100]. The program output may have one of the following words.
[Not a quadratic equation; Real roots; Imaginary roots; Equal roots] Design the boundary value test cases. **[10]**

(b) what is the need of secure transaction in e-commerce? When a message is sent by A to B on the Internet, what are the types of security problems which may be encountered. [5]

OR

(a) In reference to HTML, explain the followings: [10]

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x. How to insert an image in HTML?

CENTRAL UNIVERSITY OF RAJASTHAN

Semester-V, End-Semester Examination (ESE), November 2022

Course Code: CSC 333 **Title of the Course: E-commerce**

Time: 3 hours **Max. Marks: 60**

General Instructions: *All questions are compulsory.*

1. (a) Define E-Commerce and various issues related to E-commerce. [5]

(b)Compare E-commerce over traditional business and draw e-commerce architecture. [5]

OR

(a) what is the role of certification authorities in e-commerce environment? How can two parties enter anon-repudiable legal contract in electronic commerce environment? [5]

(b) Why is network reliability very important for e-commerce? What factors cause problem for network reliability? [5]

2. (a) which types of organizations prefer to maintain their own private network? What are the advantages of a private network? [6]

(b) Explain in detail the role of Internet and WWW in the growth of E-commerce. [4]

OR

(a) Mention some protocols used in web services. [6]

(b) What is the likely impact of e-commerce on economic structures like manufactures, dealers, channel partners and consumers? [4]

3. (a) Discuss about the issues for developing countries related to E-Commerce and its impact on consumers. [3]

(b) What is an EDI? Explain how business transaction can take place in an EDI. What are the characteristics of internet-based EDI? [7]

OR

(a) What is meant by information brokers? State why their services are needed in e-commerce? [5]

(b) Consider the development of a portal for a Retailer shop. Discuss the various technologies, tools and components involved in designing the same. [5]

4. (a) Explain Secure Electronic Transaction (SET). What is the need for SET? What are the features does SET specify? [6]

(b) what is payment gateway? Discuss the various issues that are involved in Electronic Payment System (EPS). [4]

OR

(a) What is the public key encryption system? How can it be used for providing authentication in e-commerce? Use suitable examples to explain it. [6]

(b) Discuss the credit card based electronic payment system. What are third party processors and online credit card processors? Describe the risks involved in electronic payment system? [4]

5. (a) Discuss in brief the security issues on the web what are the various network security threats and their remedies? Discuss. [5]

(b) Discuss the role of firewall, importance and factors considered in firewall design. [5]

OR

(a) Consider an online banking system; discuss the security and privacy issues relating to electronic cash. [5]

(b) How will you secure E-Commerce by building the infrastructure for Digital signature? [5]

6. (a) Define computer network and write short note on the following types of computer network: LAN MAN, WAN. [5

(b) Draw the complete DFD at least up to 2-levels for a library management system. [5]

OR

(a) Define Software architecture. Justify the need to build the system architecture before the requirements, assuming such is the case. Examine the differences between function-oriented and object-oriented layouts. [5]

(b) State the advantages and disadvantages of LOC-based Cost Estimation. [5]

6. (a) In software engineering, what do you understand by the phrase's cohesion and coupling? To what extent do these ideas help in developing a functional system layout? [6]

(b) Defend the role of the Use Case diagram as a supplement to the scenario creation template for elucidating requirements. [4]

OR

(a) Learn the difference between a mistake and a total failure. Which one can be identified by testing? Justify. [6]

(b) What are the activities carried out during software testing? Schematically represent these activities. Which one of these activities takes the maximum effort? [4]

CENTRAL UNIVERSITY OF RAJASTHAN

Semester-V, End-Semester Examination (ESE), November 2022

Course Code: CSC 303 **Title of the Course: Software Engineering**

Time: 3 hours **Max. Marks: 60**

General Instructions: *All questions are compulsory.*

1. (a) What exactly do you comprehend by the acronym SDLC, which stands for "software development life cycle model"? What challenges may a software development organization encounter if it does not adhere to any certain SDLC while creating a large-scale software application? [5]

(b) What is software design? How will you translate the analysis model into the design model? Also, explain the design principles in brief. [5]

OR

(a) What does the term "Meta Model" refer to, and why is the Spiral Model referred to as such? Please illustrate its most appropriate use. [5]

(b) What are the four Spiral Model waves, and why should they be used? Give at least two examples. [5]

2. (a) Identify the main motivation and goals behind the development of the RAD model. How does the model help achieve the identified goals? [6]

(b) Which software development approach should be used by an organization if it is trying to design a system for an application, the needs of which are neither entirely evident to the business nor understood to the organization? [4]

OR

(a) Explain how the natural language methodology of requirement elicitation works, including its benefits and drawbacks, and describe the methodologies that are employed in it. [6]

(b) What goes into a feasibility study, and what does it find? What kind of suggestions are produced as a result of it, and what kinds of data are utilized to formulate them? [4]

3. (a) What are the most important benefits of developing genuine software by creating a prototype that is already functional? What are some of the drawbacks of adopting this strategy? [5]

(b) What are the purposes of Data Flow diagrams & Entity-Relationship diagrams? Explain with a diagram of each. [5]

OR

(a) When comparing functional and non-functional requirements, what are the key distinctions? [5]

(b) If a customer proposes a modification to an existing requirement, what three steps must be taken before the proposed adjustment may be approved or rejected? [5]

4. (a) To clarify, what do you mean by "risk management"? When there are multiple options for mitigating a given risk, how does one choose the most effective strategy? [6]

(b) Can you explain the dissimilarities between project planning and software development? What gives? [4]

OR

(a) Briefly discuss the reliability terminologies and mention the approaches to system reliability enhancement. [6]

(b) Discuss the COCOMO models (basic, Intermediate, and Detailed) for cost estimation. [4]

5. (a) Who should take part in the evaluation of the requirements? Create a process model that illustrates how the requirements review may possibly be structured. [5]

(b) Draw the complete DFD at least up to 2-levels for a library management system. [5]

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(a) Learn the difference between a mistake and a total failure. Which one can be identified by testing? Justify. [6]

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CENTRAL UNIVERSITY OF RAJASTHAN

Semester-V, End-Semester Examination (ESE), November 2022

Course Code: CSC 303 **Title of the Course: Software Engineering**

Time: 3 hours **Max. Marks: 60**

General Instructions: *All questions are compulsory.*

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(b) What is software design? How will you translate the analysis model into the design model? Also, explain the design principles in brief. [5]

OR

(a) What does the term "Meta Model" refer to, and why is the Spiral Model referred to as such? Please illustrate its most appropriate use. [5]

(b) What are the four Spiral Model waves, and why should they be used? Give at least two examples. [5]

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(b) What are the purposes of Data Flow diagrams & Entity-Relationship diagrams? Explain with a diagram of each. [5]

OR

(a) When comparing functional and non-functional requirements, what are the key distinctions? [5]

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(a) Briefly discuss the reliability terminologies and mention the approaches to system reliability enhancement. [6]

(b) Discuss the COCOMO models (basic, Intermediate, and Detailed) for cost estimation. [4]

5. (a) Who should take part in the evaluation of the requirements? Create a process model that illustrates how the requirements review may possibly be structured. [5]

(iii) The deg... of the polynomial ...

Intg. M.Sc. Vth Semester, October 2023
Ist Internal Assessment
Computer Networks
Paper Code: CSC-301

Time: 1 Hour

Maximum marks: 20

Note: **This question paper contains two sections A and B. Attempt both the sections as per the instructions given therein.**

Section A

Note: **This section contains short answer questions (about 40 words). Attempt any four. Each question carries equal marks. (2.5*4=10)**

Q1. Suppose six devices are required to organize in a network. How many cables are required in case of mesh, ring, bus, and star topology?

Q2. What are the three measures essential for an effective and efficient computer network?

Q3. Performance is inversely related to delay. When you use the Internet, which of the following applications are more sensitive to delay and why?

(i) Sending an e-mail
(ii) Copying a file
(iii) Surfing the Internet
(iv) Watching movie online

Q4. Differentiate between a port address, a logical address, and a physical address with suitable examples.

Q5. Find the correct match of the following with one or more layers of the OSI model:

(i) Format and code conversion services
(ii) Establishes, manages, and terminates sessions
(iii) Log-in and log-out procedures
(iv) Provides independence from differences in data representation

Intg. M.Sc. Vth Semester, October 2023
Ist Internal Assessment
Computer Networks
Paper Code: CSC-301

Time: 1 Hour

Maximum marks: 20

Note: This question paper contains two sections A and B. Attempt both the sections as per the instructions given therein.

Section A

Note: This section contains short answer questions (about 40 words). Attempt any four. Each question carries equal marks. (2.5*4=10)

Q1. Suppose six devices are required to organize in a network. How many cables are required in case of mesh, ring, bus, and star topology?

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Intg. M.Sc. Vth Semester, ESE, December 2023

Computer Networks
Time: 3 Hour

Paper Code: CSC-301
Maximum Marks: 60

Note: This question paper contains Section A and Section B. Attempt both the sections as per the instructions given therein.

Section A

Note: This section contains short answer questions (about 40 words). Attempt any six. Each question carries equal marks. (2*6=12)

Q1.

a) Identify the five components of a data communications system.
b) For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology?
c) When a person makes a local telephone call to another person, is this a point-to-point or multipoint connection? Justify your answer.
d) If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?
e) What do you mean by bandwidth-delay product and jitter?
f) What do you mean by Protocol? Why are protocols needed?
g) Name the basic network topologies, and mention an advantage of each type.
h) What are the three domains of the domain name space? Give examples.

Section B

Note: **This section contains long answer questions (150 words). Attempt any four. Each question carries equal marks. (12*4=48)**

Q2.

a) What is the purpose of cladding in an optical fiber? Discuss. Name the advantages of optical fiber over twisted-pair and coaxial cable. (3+3)
b) What are the three measures essential for an effective and efficient computer network? Discuss with suitable examples. (6)

Q3.

a) Discuss the different ways to measure the performance of the network with suitable examples. (6)

P.T.O.

b) What do you meant by delay? What are the propagation time and the transmission time for a 5-Mbyte message (an image) if the bandwidth of the network is 1 Mbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4 x 108 mls. (2+4)

Q4.

a) How does a single-bit error differ from a burst error? Which of the following g(x) values guarantees that a single-bit error is caught? For each case, what is the error that cannot be caught?

(i) x + 1

(ii) x3

(iii) 1 (1.5+4.5=6)

b) A sender needs to send the five data items 7, 11, 12, 0, 6. Answer the following:

(i) Find the checksum at the sender site.

(ii) Find the checksum at the receiver site if there is no error.

(iii) Find the checksum at the receiver site if the second data item is changed to 10.

(iv) Find the checksum at the receiver site if the second data item is changed to 6 and the fifth data item is changed to 11. (1.5*4=6)

Q5.

a) An address space has a total of 1024 addresses. How many bits are needed to represent an address? In a block of addresses, we know the IP address of one host is 25.34.12.56/16. What are the first address and the last address in this block? Also find the size of the address space. (1.5+4.5=6)

b) What are the differences between classful addressing and classless addressing in IPv4? List the classes in classful addressing and define the application of each class (unicast, multicast, broadcast, or reserve) (2+4)

Q6.

a) Compare and contrast byte-stuffing and bit-stuffing. Explain the reason for moving from the Stop-and-Wait ARQ Protocol to the Go-Back-N-ARQ Protocol. (2+2)

b) List the different responsibilities of the transport layer? Discuss the working of SMTP protocol (2+2)

c) What are security and protection in computer network? Discuss the different aspects of network security. (2+2)

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SET-B

CENTRAL UNIVERSITY OF RAJASTHAN

Semester- V, End-Semester Examination (ESE), November 2022

Course Code: CSC-301

Title of the Course: Computer Networks

Time: 3 hours **Max. Marks: 60**

General Instructions: All questions are compulsory.

Q1.

a) Identify the five components of a data communications system. Discuss. (5)

b) Name the four basic network topologies, and cite an advantage of each type. (5)

OR

a) What is the difference between network layer delivery and transport layer delivery? (5)

b) Match the following to one or more layers of the OSI model:

(i) Communicates directly with user's application program

(ii) Error correction and retransmission

(iii)Mechanical, electrical, and functional interface

(iv)Responsibility for carrying frames between adjacent nodes (5)

OR

Q2.

a) Discuss throughput and bandwidth with suitable examples. A device is sending out data at the rate of 1000 bps.

(i) How long does it take to send out 10 bits?

(ii) How long does it take to send out a single character (8 bits)?

(iii)How long does it take to send a file of 100,000 characters? (2+3)

b) What are the different types of cables? List the advantages of optical fiber over twisted-pair and coaxial cable. (3+2)

OR

a) What are the types of transmission? Discuss with suitable examples. (3+2)

b) What are the three domains of the domain name space? What is the purpose of the inverse domain? (3+2)

Q3.

a) Give the two major categories of transmission media with suitable examples. What is the significance of the twisting in twisted-pair cable? (3+2)

b) Why do we need a DNS system when we can directly use an IP address? Discuss with suitable examples. (5)

OR

a) Discuss the different parameter to measure the performance of the network with suitable examples. (5)

b) Compute the propagation time and the transmission time for a 2.5-kbyte message (an e-mail) if the bandwidth of the network is 2 Gbps? Assume that the distance between the sender and the receiver is 6,000 km and that light travels at 2.4 x 108 mls. (5)

Q4.

a) In CRC, show the relationship between the following entities (size means the number of bits):
   (i) The size of the dataword and the size of the codeword
   (ii) The size of the divisor and the remainder
   (iii) The degree of the polynomial generator and the size of the divisor
   (iv) The degree of the polynomial generator and the size of the remainder (1.25*4=5)

b) Suppose our data is a list of five 4-bit numbers that we want to send to a destination. A sender needs to send the four data items (7, 11, 12, 0, 6). Answer the following:
   (i) Find the checksum at the sender site.
   (ii) Find the checksum at the receiver site if there is no error.
   (iii) Find the checksum at the receiver site if the second data item is changed to 9.
   (iv) Find the checksum at the receiver site if the second data item is changed to 6 and the third data item is changed to 17. (1.25*4=5)

OR

a) A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/27. What are first address, last address and number of addresses? (5)

b) Discuss IPv4 protocol. Compare and contrast between IPv4 and IPv6. (3+2)

Q5.

a) Discuss the working of Stop-and-Wait protocol with suitable example. (2+3)

b) Compare and contrast byte-oriented and bit-oriented protocols. Which category has been popular in the past (explain the reason)? Which category is popular now (explain the reason)? (3+2)

OR

a) What is congestion in computer network? Differentiate between Leaky and Token buckets algorithms. (5)

b) What is privacy in computer network? Discuss the different types of Encryption/Decryption techniques. (2+3)

Q6.

a) What are Electronic Mail Protocols? Discuss the working of SMTP. (2+3)

b) What is Quality of Service (QoS) in networks? Explain the parameters required to ensure the QoS. (3+2)

OR

c) What is congestion in computer network? How Leaky buckets algorithm can be used to overcome the problem of congestion? (5)

d) Digital signatures are used to validate authenticate and integrity of the message. Discuss how? (2+3)

Q4.

a) In CRC, show the relationship between the following entities (size means the number of bits):
   (i) The size of the dataword and the size of the codeword
   (ii) The size of the divisor and the remainder
   (iii) The degree of the polynomial generator and the size of the divisor
   (iv) The degree of the polynomial generator and the size of the remainder (1.25*4=5)

b) Suppose our data is a list of five 4-bit numbers that we want to send to a destination. A sender needs to send the four data items (7, 11, 12, 0, 6). Answer the following:
   (i) Find the checksum at the sender site.
   (ii) Find the checksum at the receiver site if there is no error.
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Section B

Note: **This section contains long answer questions (150 words). Attempt any two. Each question carries equal marks. (10)**

Q6. a) Differentiate between half-duplex and full-duplex transmission modes with suitable examples. (5)

b) For each of the following four networks with five devices-

(i) With mesh topology

(ii) With star topology (not counting the hub)

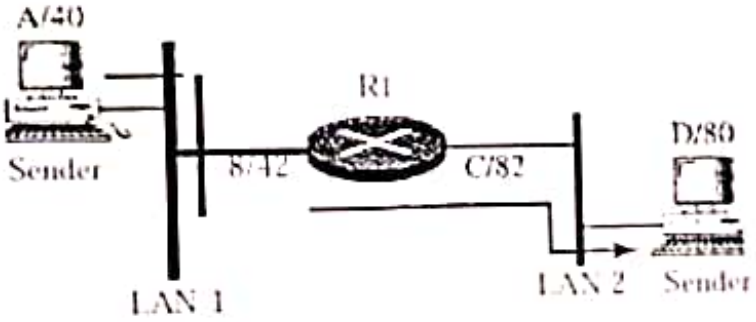
(iii) With bus topology

(iv) With ring topology

Discuss the consequences if a connection fails. (5)

Q7. a) What are headers and trailers, and how do they get added and removed? Give suitable examples. (5)

b) In the following figure, consider that the communication is between a process running at computer A with port address *x* and a process running at computer D with port address *y*. Show the contents of packets and frames at the network, data link, and transport layer for each hop. (5)



SET-B

2020imscs025

CENTRAL UNIVERSITY OF RAJASTHAN

Semester- V, End-Semester Examination (ESE), November 2022

Course Code: CSC-301

Title of the Course: Computer Networks

Time: 3 hours **Max. Marks: 60**

General Instructions: All questions are compulsory.

Q1.

a) Identify the five components of a data communications system. Discuss. (5)

b) Name the four basic network topologies, and cite an advantage of each type. (5)

OR

a) What is the difference between network layer delivery and transport layer delivery? (5)

b) Match the following to one or more layers of the OSI model:

(i) Communicates directly with user's application program

(ii) Error correction and retransmission

(iii)Mechanical, electrical, and functional interface

(iv)Responsibility for carrying frames between adjacent nodes (5)

Q2.

OR

a) Discuss throughput and bandwidth with suitable examples. A device is sending out data at the rate of 1000 bps.

(i) How long does it take to send out 10 bits?

(ii) How long does it take to send out a single character (8 bits)?

(iii)How long does it take to send a file of 100,000 characters? (2+3)

b) What are the different types of cables? List the advantages of optical fiber over twisted-pair and coaxial cable. (3+2)

OR

a) What are the types of transmission? Discuss with suitable examples. (3+2)

b) What are the three domains of the domain name space? What is the purpose of the inverse domain? (3+2)

Q3.

a) Give the two major categories of transmission media with suitable examples. What is the significance of the twisting in twisted-pair cable? (3+2)

b) Why do we need a DNS system when we can directly use an IP address? Discuss with suitable examples. (5)

OR

a) Discuss the different parameter to measure the performance of the network with suitable examples. (5)

b) Compute the propagation time and the transmission time for a 2.5-kbyte message (an e-mail) if the bandwidth of the network is 2 Gbps? Assume that the distance between the sender and the receiver i

CENTRAL UNIVERSITY OF RAJASTHAN

Semester-III, End-Semester Examination (ESE), Jan - 2024

Course Code: CSE203 | **Title of the Course: Theory of Computation**

Time: 3 hours | **Max. Marks: 60**

General Instructions: *All questions are compulsory.*

1 (a) Construct a finite state machine which takes as input a binary number from the least significant bit and outputs 2's complement of the input number. [5]

(b) $L = \{| a^{nk} | k > 0$, and n is a positive integer constant$\}$. Derive formula for minimum number of states needed in DFA to recognize L. [5]

OR

Construct a minimum state deterministic finite automaton accepting the language $L=\{w \mid w \in \{0,1\}^*$, number of 0s and 1s in w are divisible by 3 and 5, respectively. [10]

2. Write True /False with valid reason. *[10]*

I. Every language has a regular superset
II. Every language has a regular subset
III. Regular expression 01*0 represents a finite set of infinite strings.
IV. Every subset of a regular language is regular
V. Every subset of a finite language is regular

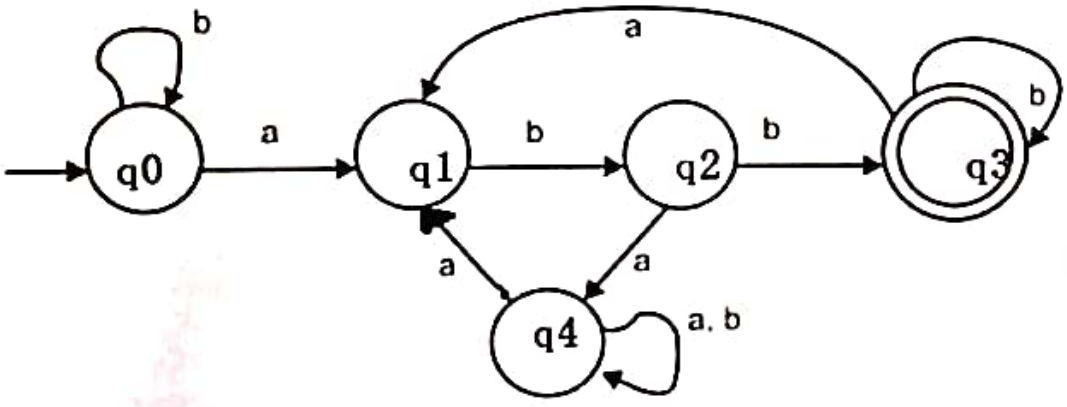
OR

Assume a suitable finite automata M (having at-least 07 states and 02 inputs). Convert M into an equivalent minimum state automata M' such that, M' should have at-most 04 states. Also draw transition table and transition system of M'.

3. Construct a regular grammar $L = \{ w \in \{ a, b\}^*$, where number of a's is 4 mod 3$\}$. [10]

OR

Find the regular expression for the given transition system using Arden's theorem. [10]



P.T.O.

4 Construct CFG which generates the language $L = \{a^i b^j \mid i \neq j\}$. Show Right most derivation and Derivation tree for a suitable string of length > 6 character. [10]

OR

Construct the grammar in CNF generating the language $L = \{ a^i b^j c^j \mid i, j \geq 1\}$. [10]

5 Construct CFG which accept equal no's of 0 and 1. Then convert it into equivalent PDA. Test by assuming any suitable string. [10]

OR

Design PDA for unequal no's of 0 and 1. [10]

6 Write True /False with valid reason [Any 5] [10]

I. If L and complement of L are both recursively enumerable then L is recursive.

II. The complement of a recursive language is either recursive or recursively enumerable.

III. L= (0+1)*, is recursively enumerable but not recursive.

IV. Every subset of a recursively enumerable language is recursive.

V. The intersection of two recursively enumerable language is recursive.

VI. Let L1 is Recursive and L2 is Recursive Enumerable Language but not Recursive, Then complement of L1 & complement of L2 are Recursive Enumerable.

OR

Design a TM, which accepts L= { ww : w ϵ {a,b}*}, Example:- if w is abb, then ww is abbabb. [10]

CENTRAL UNIVERSITY OF RAJASTHAN

(SECOND MID TERM EXAMINATION OCTOBER-2024)

CLASS : Integrated M.Sc. **SEMESTER: V**

BRANCH : CS

SUBJECT CODE & NAME: CS-333 & SOFTWARE ENGINEERING

TIME: 1 HOUR **MAX MARKS: 20**

INSTRUCTIONS:

1. **The question paper contains four questions.**
2. **Candidates must attempt all questions.**
3. **The missing data, if any, may be assumed suitably.**
4. **Before attempting the question paper, be sure that you got the correct question paper**

Q1. What does the term "Meta Model" refer to, and why is the Spiral Model referred to as such? Please illustrate its most appropriate use. [5]

Q2. What are the purposes of Data Flow diagrams & Entity-Relationship diagrams? Draw the complete DFD at least up to 2-levels for a library management system. [2+3=5]

Q3. Who should take part in the evaluation of the requirements? Create a process model that illustrates how the requirements review may possibly be structured. [3+2=5]

Q4. Discuss the COCOMO models (basic, Intermediate, and Detailed) for cost estimation. [5]