B.Sc. (HONS.) IN CSE THIRD YEAR, SIXTH SEMESTER EXAMINATION, 2021

COMPUTER NETWORKING

[According to the New Syllabus]

Subject Code : CSE-530221

Time—3 hours

Full marks—80

[N.B. The figures in the right margin indicate full marks. Answer any **four** *questions.]*

Marks

1. (*a*) What do you mean by computer network? How does computer network differ from the distributed system? 5

   (*b*) State the differences between connectionless and connection oriented network system. 4

   (*c*) Sketch the relationship between layer protocol and interface. 5

   (*d*) What is ISO-OSI reference model? Why TCP/IP model is more popular than OSI model? Which layer OSI is used for the following : 6

   (*i*) To route packets.

   (*ii*) To convert packet to frame.

   (*iii*) To detect and correct errors.

   (*iv*) To run services like DNS, FTP, Telnet etc.

2. (*a*) Define frame relay network. Explain and compare frame relay and the X·25 network architecture. 5

   (*b*) Explain the CSMA/CD technique to access medium. 5

   (*c*) Compare IEEE 802·11 with IEEE 802.16. 4

   (*d*) Classify the different classes of IP address with its range and also specify the list of all private IP address. 6

3. (*a*) Explain ATM protocol architecture 5

   (*b*) An organization is granted the block 220·50·100·0/24. The administrator wants to create 32 fixed length subnet : 8

   (*i*) Find the subnet mask.

   (*ii*) Find the number of address in each subnet.

   (*iii*) Find the first and last address in subnet 1.

   (*iv*) Find the first and last address in subnet 32.

   (*c*) Draw the IPV4 header format and mention the advantages of IPV4 over IPV6. 7

Marks

4. (*a*) Describe the function of SONET layer. 5

(*b*) What is Satellite orbit? Briefly discuss Satellite technology. 5

(*c*) What is traffic shipping in congestion control? Describe any one of traffic shipping algorithm in congestion control. 5

(*d*) Give the transmission media and topologies recommended for fiber channel (FC). 5

5. (*a*) What is a cellular network? Explain handover process in the cellular network. 5

(*b*) What are the function of router, gateway and bridge. 5

(*c*) What are the advantages and disadvantages of public key encryption? 4

(*d*) With a configuration of TCP/IP show the operation of the following : 6

(*i*) action to sender;

(*ii*) action to router;

(*iii*) action to receiver.

6. Write short notes of the following (any **four**) : 5×4=20

(*i*) Shortest Path Routing

(*ii*) Packet Switching

(*iii*) QoS in Multimedia Network

(*iv*) Cryptography

(*v*) SNMP

(*vi*) Domain Name System (DNS).

B.Sc. (HONS.) IN CSE THIRD YEAR, SIXTH SEMESTER EXAMINATION, 2021

SOFTWARE ENGINEERING

[According to the New Syllabus]

Subject Code : CSE-530219

Time—3 hours

Full marks—80

[N.B. The figures in the right margin indicate full marks. Answer any **four** *questions.]*

		Marks
1.	(*a*) What do you mean by software engineering? Describe the attributes of good software.	1+4=5
	(*b*) Explain spiral software process model with its merits and demerits.	6
	(*c*) Discuss about the professional and ethical responsibilities of a software engineer.	5
	(*d*) Write down some characteristics of legacy software.	4
2.	(*a*) Describe the umbrella activities of software engineering.	5
	(*b*) Differentiate between functional and non-functional requirements in software engineering.	5
	(*c*) What is cycomatic complexity? How cycomatic complexity is computed in order to find the number of independent paths? Explain with example.	5
	(*d*) Discuss the generic view of software engineering.	5
3.	(*a*) Why testing is necessary for software development? What are the major components of system testing? Explain.	2+4=6
	(*b*) What is CASE? Mention CASE tools with a brief description.	4
	(*c*) Discuss about different types of cohesion in the context of software design.	5
	(*d*) What are the principles those are applicable to data design?	5

[Please turn over

Marks

4. (*a*) What is software configuration management? Distinguish between re-engineering and reverse engineering. 1+5=6

(*b*) What is CCB? Describe the tasks of CCB. 1+4=5

(*c*) Describe the checklist of software testability. 5

(*d*) Explain briefly different types of software maintenance. 4

5. (*a*) Discuss in detail about the software pricing factors. 5

(*b*) Explain how software cost estimation can be achieved using function-point method. 5

(*c*) What do you understand by system? Write the components of computer based information system. 6

(*d*) Write the basic control flow diagram of a structure coding technique. 4

6. Write short notes on the following (any **four**) : 5×4=20

(*a*) Data Flow Diagram (DFD)

(*b*) Software Protyping

(*c*) Cocomo Model.

(*d*) Top-down and Bottom-up Integration Testing.

(*e*) Software Quality Factors.

(*f*) Levels of Capability Maturity Model (CMM).

B.Sc. (HONS.) IN CSE THIRD YEAR SIXTH SEMESTER EXAMINATION, 2021

THEORY OF COMPUTATION

[According to the New Syllabus]

Subject Code : 530225

Time—3 hours

Full marks—80

[N.B. The figures in the right margin indicate full marks. Answer any **four** *questions.]*

Marks

1. (a) What is finite automata? What are the reasons for studying automata theory in computer science? 2+4=6

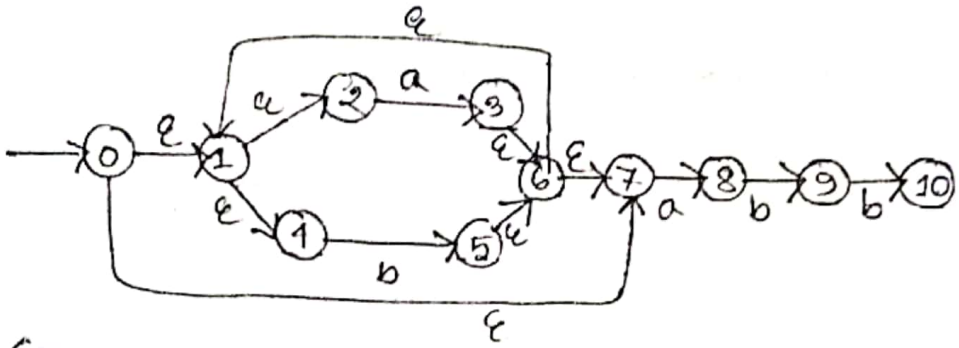
(b) What is the utility of finite automata in respect of hardware and software? 4

(c) Prove the theorem if $x \geq 4$, then $2^x \geq x^2$ (using deductive proof). 5

(d) Differentiate between NFA and DFA. 5

2. (a) Define regular expression. Write down the rules of regular expression. 5

(b) Convert the following NFA to an equivalent DFA. Here 0 is starting and 10 is final state : 10

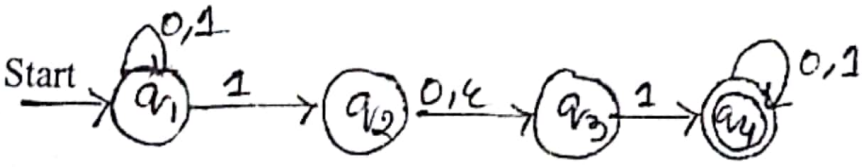


(c) Explain binary alphabet and power of an alphabet. 5

3. (a) Prove that if $D = (Q_D, \Sigma, \delta_D, \{q_o\}, F_D)$ is the DFA constructed from NFA $N = (Q_N, \Sigma, \delta_N, q_o, F_n)$ by the subset construction then $L(D) = L(N)$. 5

(b) Differentiate between $\Sigma = (0, 1)$ and $\Sigma^1 = (0, 1)$. 5

(c) Convert to a DFA the following NFA : 6



(d) Design DFA's that accepts : 4

(i) Strings starting with *aba*.

(ii) Strings contuining even number of 0's and even number of 1's.

[Please turn over

Marks

4. (a) Define context free grammer and parse tree. 4

(b) State and prove the pumping lemma for regular expression. 5

(c) Convert the following regular expressions to ε-NFA : 5

(i) $(0 + 1)^* 1 (0 + 1)$

(ii) $(a \mid b)^* abb (a/b)$

(d) Consider the following grammer : 6

$S \longrightarrow aB \mid bA$

$A \longrightarrow a \mid aS \mid bAA$

$B \longrightarrow b \mid bS \mid ABB$

Derive the string "aaabbabbba" be leftmost and rightmost derivation and draw the parse tree.

5. (a) What is Pushdown automata? Describe instantaneous description of a pushdown automata. 2+5=7

(b) Convert the following CFG expression into a PDA : 5

I ⟶ a | b | Ia | Ib | I0 | I1

E ⟶ I | E * E | E + E | (E).

(c) Design a PDA to accepts the following language : 5

$\{0^n 1^n \mid n \geq 0\}$

(d) What do you mean by transition table and transition diagram? 3

6. (a) Explain Turing Machine Model. 5

(b) Design a Turing Machine for the language $\{a^n b^n \zeta^n \mid n \geq 1\}$. 5

(c) Define decidable and undecidable problems. 4

(d) Remove null production from the following : 6

S ⟶ ASA | aB | b

A ⟶ B

B ⟶ b | Σ